Burden of Proof

2024 Conditional Use Application

January 15, 2025, Submittal

Submitted by:

Valley Landfills, Inc.

TABLE OF CONTENTS

Page

I. INTRODUCTION 3

A. Applicant's Request **3**

B. Background and Overview of the Project. 3

C. Applicable Benton County Code Provisions. 5

D. Other Issues Addressed 6

II. FACTUAL BACKGROUND 7

A. Location of Development Site. 7

B. Description of the Project 7

C. The Development Site/Zoning. 7

D. Development Site Description by Tax Lot. 8

1. Tax Lot 1107 8

2. Tax Lots 1108 and 801 9

3. Tax Lot 1101 9

4. Tax Lot 1200 9

E. Geotechnical Suitability of the Development Site for Landfill Use. 10

F. Description of the Area Surrounding the Development Site 10

G. Public Facilities and Services. 11

H. History of Coffin Butte Landfill. 12

I. The Role and Authority of DEQ. 14

J. List of Exhibits 14

III. COMPLIANCE WITH BENTON COUNTY CODE 53.205 TO 53.235 (CONDITIONAL USES) 18

A. BCC 53.205 (Purpose) 18

B. 53.210 (Permit Required) 18

TABLE OF CONTENTS
(continued)

Page

C. 53.215 (1) (Criteria) (The proposed use "does not seriously interfere") 18

1. Meaning of "Seriously Interfere." 19
2. Definition of "Adjacent Properties." 19
3. Uses on Adjacent and Nearby Properties 20
4. Establishing the "Area" for Impact Assessment. 22
5. Establishing the Character of the Analysis Area. 25
6. Establishing the Purpose of the Applicable Zone(s). 27
7. Assessment of Impacts of the Proposed Project on the Adjacent Properties 28
   a. Noise 28
   b. Odor 30
   c. Traffic 33
   d. Water—Well Capacity and/or Groundwater Impacts 34
      (i) Impact on groundwater supply (well capacity) 34
      (ii) Impact on groundwater quality 35
   e. Visual Impacts 35
8. Assessment of Whether the Potential Impacts Constitute "Serious Interference" with the Character of the Area. 36
   a. Noise 37
   b. Odor 37
   c. Traffic 37
   d. Water—Well Capacity and/or Groundwater Impacts 37
   e. Visual Impacts 37
9. Assessment of Impacts on the Purpose of the Zone(s). 38

D. BCC 53.215 (2) (Criteria) (The proposed use "does not imposed an undue burden" on public facilities and services) 38

TABLE OF CONTENTS
(continued)

Page

E. BCC 53.215 (3) (Criteria) (The proposed use "complies with any additional criteria") 39

F. BCC 53.220 (Conditions of Approval) 39

G. BCC 53.225 (Modification of a Conditional Use Permit) 41

H. BCC 53.230 (Period of Validity) 42

I. BCC 53.235 (Extension of Permit) 42

IV. COMPLIANCE WITH BENTON COUNTY CODE CHAPTER 77 (LANDFILL SITE) 43

A. BCC 77.005 Purpose 43

B. BCC 77.010 Application 43

C. BCC 77.105 Permitted Uses 43

D. BCC 77.205 Prohibited Uses 44

E. BCC 77.305 Conditional Uses Approved by the Planning Commission 44

F. BCC 77.310 Conditional Use Review 45

G. BCC 77.405 Review of DEQ Permits 47

V. COMPLIANCE WITH BENTON COUNTY CODE CHAPTER 60—FOREST CONSERVATION 48

A. BCC 60.005 (Purpose) 48

B. BCC 60.020 (Standards for Application for the Forest Conservation Zone) 49

C. BCC 60.030 Definitions 49

D. BCC 60.050 Notice of Pending Action 49

E. BCC 60.075 Period of Validity of Discretionary Decisions 50

F. BCC 60.080 Soils Designations 51

G. BCC 60.105 Permitted Uses Allowed in the Forest Conservation Zone. 52

TABLE OF CONTENTS
(continued)

Page

H. BCC 60.106 to 60.109 Dwellings In Forest Conservation Zone. 52

I. BCC 60.205 Conditional Uses Subject to Approval by the Planning Official 52

J. BCC 60.215 Conditional Uses Subject to Review by the Planning Commission 52

K. BCC 60.220 Conditional Use Criteria 53

L. BCC 60.305 to 60.330 (Creation of New Parcels or Lots; Property Line Adjustments). 55

M. BCC 60.405 Siting Standards and Requirements 55

N. BCC 60.410 Additional Siting Standards and Conditions for Dwellings. 59

VI. COMPLIANCE WITH BCC CHAPTER 87—GOAL 5 RESOURCES. 60

A. BCC 87.010 Application (Wetland Overlay Zone) 60

B. BCC 87.200 Purpose (Sensitive Fish and Wildlife Habitat Zone) 60

VII. COMPLIANCE WITH BCC CHAPTER 99—GENERAL DEVELOPMENT STANDARDS 61

A. BCC 99.005 Scope 61

B. BCC 99.105 to 99.115 61

C. BCC 99.225 Development Activities in Wetlands 63

D. BCC 99.405 General Rule of Frontage 64

E. BCC 99.505 Dedication of Right-of-Way 64

F. BCC 99.510 Road Approach Permits 65

G. BCC 99.515 Road Design and Construction Standards 65

H. BCC 99.520 Improvements in a Public Right-of-Way 69

TABLE OF CONTENTS
(continued)

Page

I. BCC 99.605 Annexation to Fire District Required 69
J. BCC 99.650 Definitions 70
K. BCC 99.660 Erosion and Sediment Control 70
L. BCC 99.670 Long-Term Stormwater Management 70
M. BCC 99.705 to 99.850 Sewage Disposal and Water Supply. 76
N. BCC 99.905 to 99.925 Improvements Agreement 76
VIII. OTHER ISSUES 79
A. Wildlife Habitat 79
B. Archeological/cultural resources 79
C. Leachate Management 80
D. Methane 80
E. Arsenic. 81
F. Seismic Resiliency 82
G. Wetlands. 82
IX. CONCLUSION 84

Burden of Proof Narrative

Conditional Use Permit – Landfill Development South of Coffin Butte Road

APPLICANT:	Valley Landfills, Inc. Ryan Lawler, Area President 28972 Coffin Butte Rd Corvallis, OR 97330
OWNER:	Valley Landfills, Inc. 28972 Coffin Butte Rd Corvallis, OR 97330
ATTORNEY:	Miller Nash LLP Jeffery Condit 1140 SW Washington St, Ste 700 Portland, OR 97205
CIVIL ENGINEER:	Civil & Environmental Consultants, Inc. Jeff Shepherd, P.E. 11811 N Tatum Blvd, Ste 3057 Phoenix, AZ 85028
GEOLOGIST / HYDROLOGIST:	Tuppan Consultants, LLC Eric Tuppan, R.G 460 Second St, Ste 103 Lake Oswego, OR 97034
TRAFFIC ENGINEER:	Transight Consulting, LLC Joe Bessman, P.E. 61271 Splendor Ln Bend, OR 97702
WILDLIFE BIOLOGIST:	Turnstone Environmental Consultants, Inc. PO Box 83362 Portland, OR 97283
ARCHEOLOGIST:	Archaeological Investigations Northwest, Inc. Eva Hulse, Ph. D., R.P.A 3510 NE 122nd Ave Portland, OR 97230
NOISE ENGINEER:	The Greenbusch Group, Inc. 1900 W Nickerson St, Ste 201 Seattle, WA 98119

PLANNING CONSULTANT:	Blackmore Planning and Development Services, LLC Greg Blackmore, Principal Planner 19454 Sunshine Way Bend, OR 97702
FIRE CONSULTANT:	SCS Engineers Jim Walsh, PE, BCEE 625 Eden Park Dr, Ste 425 Cincinnati, OH 45202
ODOR MODELING:	SCS Engineers 5963 La Place Ct, Ste 207 Carlsbad, CA 92008

I. INTRODUCTION

A. Applicant's Request. Applicant requests approval of a conditional use permit (CUP) review to expand the area on which landfill activities will be conducted to the south side of Coffin Butte Road (the "Development Site").[1] The landfill itself is proposed to be situated within the Landfill Site (LS) zone. In addition to using the Development Site for the landfill, the proposal includes an 1,800-square-foot employee building and parking on land to the west of the landfill that is zoned Forest Conservation (FC), access road modifications on lands to the north that are zoned LS and FC, and the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, the shop/maintenance area, cut activities for landfill, and leachate ponds to support the landfill onto the property to the east, which is zoned FC (collectively, the "Project").[2]

B. Background and Overview of the Project. Valley Landfills, Inc. (a wholly owned subsidiary of Republic Services, Inc.) ("VLI" or "Applicant"), is submitting this CUP application to expand Coffin Butte Landfill to an area south of Coffin Butte Road. This application takes into account the concerns and issues raised during the 2021 CUP application[3] and the subsequent Oregon Consensus process entitled "Benton Country Talks Trash" ("BCTT"), in which VLI and multiple other stakeholders participated. As a result, the 2024 application is substantially different from the 2021 application.

The chief difference is that the current proposal does not include the closure of Coffin Butte Road. Instead, Coffin Butte Road will be retained and widened in the area adjacent to the Development Site to allow for ease of use for both landfill users and through traffic. During proceedings on the 2021 application, various stakeholders expressed concern about the effect of closing Coffin Butte Road on emergency ingress and egress, notwithstanding the multiple improvements to alternative routes proposed as part of VLI's 2021 application.

[1] *See* Application, attached as Exhibit 1.

[2] *See* Civil & Environmental Consultants, Inc. ("CEC") engineer plans and drawings, attached as Exhibit 2.

[3] The Benton County Planning Commission (the "Planning Commission") denied the 2021 CUP application in December of that year. VLI appealed that decision to the Benton County Board of Commissioners (the "County Commissioners") but withdrew that appeal in order to participate in BCTT.

VLI originally proposed the closure of Coffin Butte Road to be able to utilize the airspace over the roadway for landfilling.[4] The retention of Coffin Butte Road means that the life span of the landfill where waste will be deposited will be approximately six years, as opposed to twelve,[5] and the volume of waste to be disposed of in the landfill will be reduced by approximately half. The long-term visual impact will also be reduced as a result.

When the Development Site is ready for waste disposal operations, the working face[6] of the landfill will move from north of Coffin Butte Road to the Development Site. Disposal of waste will not be occurring north of Coffin Butte Road during the operation of the Development Site. The size of the working face at the Development Site will be roughly the same as the existing operation, and there will be only one working face operating at a time.

The area where disposal will take place will be entirely located on the LS-zoned area south of Coffin Butte Road. Some of the supporting infrastructure (the access road, the relocated leachate ponds, the employee building, and the shop/maintenance area) will be located on FC-zoned adjacent tax lots. (See detailed discussion and maps below.) In contrast to the 2021 application, no portion of the working face or supporting infrastructure will be located on any properties zoned for other uses. All of the Development Site properties are owned by VLI.

A landfill is an outright permitted use in the LS zone, although any project south of Coffin Butte Road requires CUP approval from Benton County (the "County") under Benton County Code ("BCC" or the "Code") Chapter 53. A landfill is allowed as a conditional use in the FC zone, subject to CUP approval under BCC Chapter 53 and some additional criteria related to impacts on farm and forest use in BCC Chapter 60.

A conditional use is a use that is allowed in the zone, but one which may have adverse impacts on surrounding properties or on public infrastructure that may require mitigation. Applicant must demonstrate that the proposed expansion will not "seriously interfere" with uses on adjacent property, the character of the area, or the purpose of the zone. Applicant must also demonstrate that the proposed expansion will not impose an "undue burden" on public facilities and services in the area. The entire focus of the County's review is thus on the potential impacts of the expansion and mitigation of any significant impacts. This review must take into

[4] "Airspace" is essentially the measure of the volume of solid waste that can be disposed on a site.

[5] As the BCTT Site Life Subcommittee discovered, it is difficult to predict site life because it is based on a large number of factors out of VLI's control. This is VLI's estimate based upon its current model.

[6] The "working face" of the landfill is the area of active disposal of solid waste. At Coffin Butte, it is approximately half an acre in size.

account the existing conditions, which include the fact that a landfill has been operating on this site for over 50 years, and that the current landfill operation is fully approved and permitted by both the County and the State of Oregon.

During the BCTT process, several participants argued that the landfill should be closed and that all expansions should be denied. A landfill is an allowed use in the LS and FC zones. These were either expressly created for landfill uses (LS zone) or allowed for landfill use in order to permit the Coffin Butte Landfill to continue and to expand (FC zone). Applicant is entitled to have the expansion approved as long as it demonstrates compliance with the criteria in those zones. The need to continue or expand the landfill is not relevant to the approval criteria.

The evidence will show that the proposed expansion will not have significant adverse impacts on the uses of adjacent properties, the character of the area, or the purpose of the zone as compared to existing conditions. It will also show that the proposed expansion will not place an undue burden on infrastructure or services as compared to existing conditions.

Approval of a CUP by the County is only the initial step in the process to expand the landfill. VLI must also obtain permits from the Oregon Department of Environmental Qualify (DEQ). DEQ regulates the environmental aspects of the landfill and has exclusive jurisdiction over those issues. (See further discussion below.) As a result of the state coordination requirement in ORS 197.180, DEQ will not accept a permit application from VLI until the expansion has received land use approval from the County. Many of the environmental concerns raised during the 2021 application and the BCTT process (groundwater protection, methane/air quality, seismic resiliency, leachate disposal, wildlife impacts, and archeological issues) are regulated by DEQ or other state agencies. VLI will continue to work with all regulators to comply with the applicable laws and will further comply with any future changes to the applicable regulations as they are implemented.

Although the environmental issues listed in the previous paragraph are not within the jurisdiction of the County under its land use regulations, Applicant responds to these issues as part of this application so the County and other interested parties can see how they will be addressed by DEQ or other applicable agencies.

C. Applicable Benton County Code Provisions.

1. Chapter 53 (General Review Criteria and Procedures)

2. Chapter 60; Forest Conservation (FC)

3. Chapter 77; Landfill Site (LS)

4. Chapter 87; Goal 5 Resources

5. Chapter 99; General Development Standards

D. Other Issues Addressed.

1. Wildlife Impacts

2. Archeological Resources

3. Leachate

4. Methane

5. Arsenic

6. Seismic Resilience

7. Wetlands

II. FACTUAL BACKGROUND

A. Location of Development Site.

The Development Site is located approximately 6.5 miles north of Corvallis on the west side of Highway 99W. The proposed improvements are situated on five tax lots of the Benton County Tax Assessor's Map 10-41-80 and the abutting Coffin Butte Road right-of-way.[7]

B. Description of the Project.

The Project relocates the working face to the Development Site on the south side of Coffin Butte Road. The working face and all of the waste disposal area will be situated entirely within the Landfill Site (LS) zone. In addition to the working face, the Project includes an 1,800-square-foot employee building and parking on land to the west that is zoned Forest Conservation (FC), access road modifications on lands to the north that are zoned LS and FC, and the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, a shop/maintenance area, cut activities for landfill, and a shop/maintenance area supporting the landfill to the area east of the working face on land that is zoned FC.

C. The Development Site/Zoning.

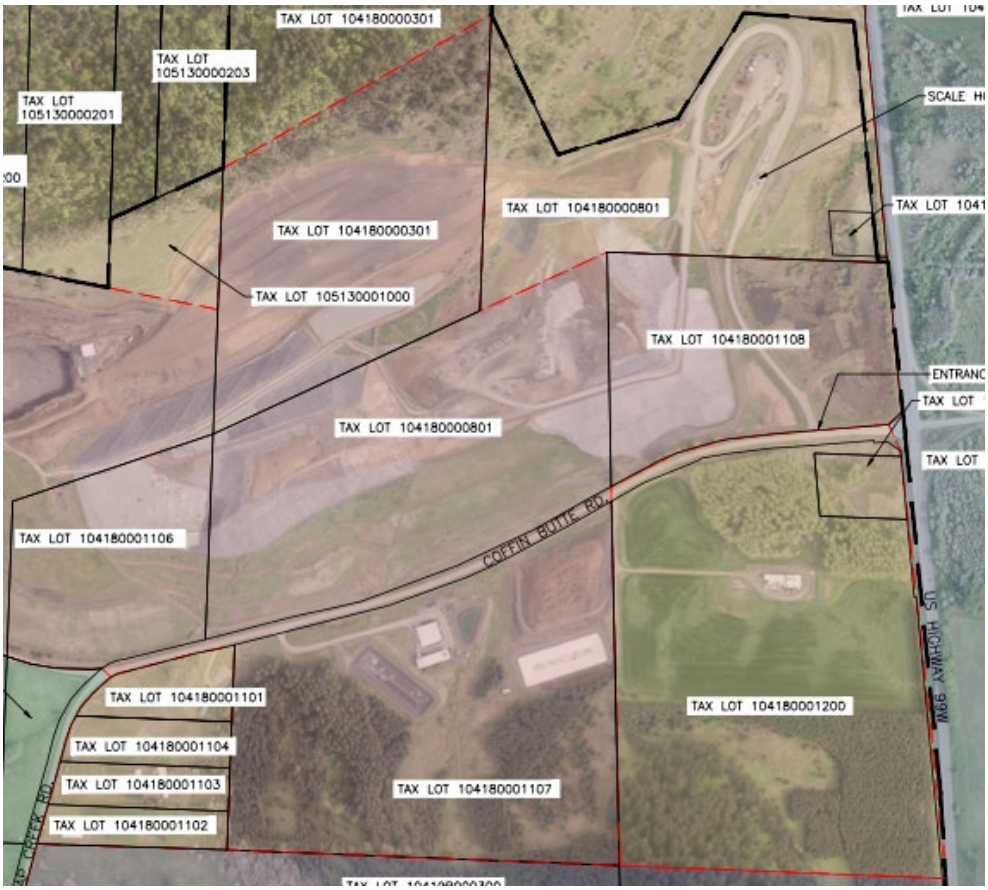
The Development Site on which the Project is located includes the following tax lots:

- Tax Lot 1107 (29000 Coffin Butte Road)—landfill area. This tax lot is zoned LS.
- Tax Lot 801 (29175 Coffin Butte Road)—access road modifications on part of the landfill area. This tax lot is zoned LS and FC; the access road improvements are on the portions zoned FC.
- Tax Lot 1101 (28972 Coffin Butte Road)—employee building and parking. This tax lot is zoned FC.
- Tax Lot 1108 (no address)—access road modifications are also located on this tax lot, which is part of the existing landfill. This tax lot is zoned LS.
- Tax Lot 1200 (29160 Coffin Butte Road)—relocated leachate ponds, leachate loadout, leachate sump, outbound scale, portions of the perimeter

[7] The deeds to the properties are attached as Exhibit 3.

landfill road, cut activities for landfill, and the shop/maintenance area. This tax lot is zoned FC.

[Note: the tax lot numbers are the last four numbers shown on the Assessor's Map below.]



D. Development Site Description by Tax Lot.

1. Tax Lot 1107. The area of the proposed landfill development is located on the south side of Coffin Butte Road. It is 59 acres and currently developed with an access drive, leachate pretreatment and treatment buildings, parking and maneuvering areas, leachate ponds, and a permeate pond. Aside from the leachate ponds, the improvements on this tax lot are obsolete infrastructure that has not been used since the early 2000s.

The existing improvements on Tax Lot 1107 are situated on the northern portion of the Development Site, which is relatively level. From the currently developed area, the site

slopes upward to the south, with an elevation change of 60-160 feet (to different points along Tampico Ridge). The undeveloped portions of the site are vegetated with grasses and trees. This tax lot contains a likely abandoned[8] but mapped Great Blue Heron rookery (#2683) in the northwest quadrant, along with a small area of Palustrine Emergent Wetland in the northeast corner.

2. **Tax Lots 1108 and 801.** The area north of Coffin Butte Road, which will include minor access-road improvements, is already in use for the existing landfill area. The area of proposed improvement contains access roads, a scale house, and scales. These tax lots also contain Palustrine Emergent Wetland on the eastern portion.

3. **Tax Lot 1101.** The western tax lot, which is planned to accommodate the employee building and parking adjacent to the existing landfill office, is gently sloping (except for a steep eastern edge). The majority of this property is grass, while the eastern edge is treed. This tax lot is currently developed with VLI offices. This tax lot also contains Palustrine Emergent Wetland on the western and northwestern edge.

4. **Tax Lot 1200.** The eastern parcel, which will accommodate the relocated leachate ponds, leachate loadout, leachate sump, a shop/maintenance area, outbound scale, portions of the perimeter landfill road, and cut activities for landfill is relatively level in the northeast corner and slopes upward to the southwest. The northeast portion of the site contains native vegetation and trees. There is also a buffer of trees along the eastern property line, abutting Hwy 99W. The center portion of the site is currently developed with a gas-to-energy plant, gas blowers and flares, parking areas, and drive aisles. The approximately 20-acre center area that surrounds the gas-to-energy plant is leased by VLI to Agri-Industries, Inc., and has historically been farmed for grass. The lands south of the fields is steep, sloping topography that is vegetated with Douglas fir surrounded by native trees. This tax lot also contains a mapped but likely abandoned Great Blue Heron rookery #2716 in the north central area

[8] *See* Wildlife Habitat Assessment and Surveys, attached as Exhibit 4.

quadrant,[9] along with Palustrine Emergent Wetland and Palustrine Forested Wetlands.

With the exception of the 20-acre section location on Tax Lot 1200, none of the property that makes up the Development Site is in commercial farm or forest use.

E. Geotechnical Suitability of the Development Site for Landfill Use.

The Wallace Group, Inc., of Bend, Oregon, completed geotechnical engineering explorations of the Development Site for the proposed expansion, attached as Exhibit 5. The subsurface exploration generally encountered 6 to 25 feet of fine-grained alluvium (Willamette Silt) underlain by weathered basalt and basalt in the lower elevations. Competent basalt was encountered in the lower elevations at depths ranging between 22 and 65 feet below ground surface (bgs). The higher elevations of the site are underlain by fine-grained to coarse-grained colluvium and volcanic saprolites, which are generally coarser with increasing elevation. These soils are underlain by brecciated and altered basalt bedrock, with the depth to rock generally decreasing with increased elevation. On the western hillside of Tampico Ridge, basalt was encountered at depths ranging between 10 and 25 feet bgs. On the eastern hillslope, surface soil was generally weaker than the western hillslope, and basalt was encountered at depths ranging between 19 and 45 feet bgs. In the valley formed between the two hillsides, the depth to basalt ranged from 21 to 23 feet bgs. Based on this exploration, the Wallace Group concludes that the Development Site is suitable for the expected development from a geotechnical perspective.

F. Description of the Area Surrounding the Development Site.

Coffin Butte Landfill is bordered by Highway 99W to the east. The area east of the highway is zoned Open Space (OS) and owned by the Oregon Department of Fish and Wildlife; it is part of the E.E. Wilson Wildlife Area, and it is managed for wildlife habitat.

Land to the south of Coffin Butte Landfill is zoned Forest Conservation (FC), Rural Residential (RR-10), and/or Exclusive Farm Use (EFU). The Rural Residential lands are separated from the landfill operations by Tampico Ridge, which is approximately 250 feet higher than the surrounding area. VLI owns the RR-10-zoned lands between the landfill and residential uses to the south, and with the exception of one property to the west[10], VLI owns all of the LS-zoned land in the area and all of the properties surrounding the LS-zoned land. The adjoining FC- and EFU-zoned lands are also owned by VLI and managed for

[9] *See* Ex. 4.

[10] 38691 Soap Creek Road (104180001103). This property appears to be used for residential and storage use only and not in commercial farm or forest use. *See* Ex. 32, pages 2-3.

farm and forest uses. VLI leases approximately 80 acres of land to Agri-Industries, Inc., which farms the lands for grass seed and row crops. Lease attached as Exhibit 31.[11] These lands were acquired by VLI to provide resource/open space buffers between the landfill and nearby lands that are owned by others.

Lands to the west of Coffin Butte Landfill west of the lands owned by VLI are zoned EFU and being used for commercial agriculture, primarily grass seed farming. The lands that are owned by VLI to the west of the landfill are farmed and managed to provide a buffer between the landfill and lands that are owned by others.[12]

Properties to the north are zoned FC, and with the exception of four properties situated northwest of the landfill, the LS-zoned lands are buffered by FC-zoned lands that are owned by VLI. The land to the northeast is owned by the State of Oregon; this land is separated from LS-zoned land by over 100 feet of FC-zoned land that is owned by VLI. Properties to the north are buffered by the forested northern slope of Coffin Butte.

There was concern expressed during BCTT that the acquisition of buffer areas by VLI was taking the land out of farm and forest use. This is not the case; these lands are being actively managed for farm and forest use by others under leases from VLI.

G. Public Facilities and Services.

1. Sewer.

The landfill is not currently served by sewer service. Sewerage is not needed for the proposed landfill development. The existing VLI offices on Tax Lot 1101 are served by a septic system. The planned new employee building/locker room is proposed to be served by a holding tank and will not connect to the existing septic system.

2. Water.

The new landfill development area is not currently served by a domestic water service, and domestic water is not needed to accommodate the proposed landfill development. The existing building and planned employee building are, and will

[11] Most of these leased lands are located west of the Development Site and west of Soap Creek Road, but as noted above, approximately 20 acres of these leased lands are located on Tax Lot 1200.

[12] There was some question during the BCTT process about whether DEQ had mandated that VLI acquire lands to buffer the landfill. With the exception of one parcel to the west of the current landfill, where DEQ required VLI to decommission a well as part of a remediation plan, VLI purchased surrounding lots of its own volition in order to provide a buffer.

continue to be, served by a well. There are two wells that are currently used for water production at the landfill: the Berkland well, which is used for the office plumbing, irrigation, and drinking water, and the PW-2 well, which was located north of Coffin Butte Road and used for the scale house plumbing, but not for drinking. The well logs are attached as Exhibit 6.

3. Streets; Access; Transportation.

Coffin Butte Landfill is currently accessed from Coffin Butte Road, which connects to Hwy 99W to the east and Soap Creek Road to the west.

4. Fire Protection.

The Project is within the Adair Fire Protection District.

5. Police Protection.

The Project is within the Benton County Sheriff Service Area.

H. History of Coffin Butte Landfill.

The Coffin Butte landfill site was established as a disposal site in 1948 (as an open burning dump) that was formerly part of the Camp Adair U.S. Army post. In 1973-74, the site was designated as a regional solid-waste disposal site in the Chemeketa Region Solid Waste Management Plan, a coordinated, multi-agency planning effort for waste disposal in Linn, Benton, Polk, Marion, and Yamhill counties. In 1983, the County amended its comprehensive plan and zoning map to apply an LS zone to the area. The LS zone was a recognition by the County Commissioners that the site had been developed as a disposal site for nearly 40 years and the County was committed to the continued use of the site as a solid-waste disposal site. With the adoption of the LS zone, the County established that LS-zoned lands are required to operate under an approved Site Development Plan, which requires approval by the Planning Commission, after receiving a recommendation from the Benton County Solid Waste Advisory Committee (SWAC). Coffin Butte Landfill is currently operating under a Site Development Plan that was last updated in 2003, via Benton County Decision PC-03-11. The property owners were granted conditional use approvals in

1994,[13] 1997,[14] 2011,[15] 2013.[16] and 2015[17] for areas that were not approved for landfilling or uses other than a landfill site.

The landfill Is considered a “regional landfill” under ORS 459.005(23), and it is the primary solid-waste disposal facility for Benton County. The landfill was acquired by VLI in 1974. In 2000, Allied Waste Transportation, Inc., a wholly owned subsidiary of Allied Waste Industries, Inc., purchased the stock of Waste Control Systems, Inc., which included its wholly owned subsidiary VLI.[18]

Over time, the landfill site has undergone periodic modifications and upgrades; the facilities have been subject to continual improvement and modernization in order to maintain high standards of technical design, operational efficiency, environmental quality, regulatory compliance, and safety. Improvements that have occurred over time include disposal of refuse in engineered cells, installation of bottom liners to protect groundwater, leachate collection and treatment systems, landfill gas collection and treatment systems, monitoring wells, and stormwater conveyance and detention.

Coffin Butte operations include more than just a landfill. The site contains recycling operations, processing, a recovery center offering commercial and public recycling for wood waste, and a nearby composting facility for yard debris. A rock-quarrying operation produces aggregate for community needs. Adjacent to Coffin Butte Landfill operations is the Coffin Butte Resource Project, a landfill gas-to-energy plant that is owned by a consortium of 12 Northwest Cooperative electric utilities. Landfill gas is harvested from decaying organic matter in the landfill and used to power generators that produce enough energy to serve an estimated 4,000 households annually. As required by the disposal franchise between Applicant and the County, Applicant maintains an environmental trust fund currently valued at $16.1 million to safeguard long-term environmental health at the site and surrounding area. Under ORS 459.272, Applicant is also responsible for providing financial assurance for the cost of closure, post-closure, and any needed corrective action. Applicant posts a bond to cover this cost,

[13] S-94-3, approval of a 2.2-megawatt power-generation facility on T10S, R4W, Section 18, Tax Lot 1100.

[14] S-97-58, approval to expand the generating capacity of the power-generation facility.

[15] LU-11-016, approval for the construction of a recycling and refuse transfer facility on T10S, R4W, Section 18, Tax Lot 801.

[16] LU-13-061, approval to use [T10S, R4W, Section 18] Tax lots 1101 and 1104 as a stockpile and staging area.

[17] LU-15-001, approval to enhance a stormwater-treatment facility on T10S, R6W, Section 13, Tax Lot 800.

[18] In 2008, Republic Services, Inc., merged with Allied Waste Industries, Inc.

which must be recertified annually with DEQ under OAR 340-094-0140(6) to ensure that the bond is sufficient to cover the estimated costs of closure.

I. The Role and Authority of DEQ.

Applicant needs approval of the County land use permit and approval of the necessary DEQ permits before it may begin construction on the Project. As a result of the state coordination requirement in ORS 197.180, DEQ will not accept a permit application from Applicant until the expansion has received land use approval from the County.

DEQ regulates the environmental impacts of landfills, including air quality requirements (methane, hydrogen sulfide, odor), leachate production and disposal, protection of both ground and surface water, as well as protection for floodplains, wetlands, geotechnical/seismic considerations, and critical habitat. DEQ also regulates closure and reclamation of landfills. Applicant will have to demonstrate compliance will all of these criteria to obtain modifications to the required permits. *See* Feb. 26, 2024, letter from Jeffery Shepherd and Paul Burns of CEC, Applicant's engineering consultants, attached as Exhibit 7, for the specific permitting standards and requirements.

DEQ has exclusive jurisdiction over the areas that it regulates. ORS 459.095 provides that "[n]o ordinance, order, regulation or contract affecting solid waste management shall be adopted by a local government unit if such ordinance, order, regulation or contract conflicts with rules adopted by the Environmental Quality Commission under ORS 459.045 or 459A.025 * * *."

J. List of Exhibits.

This application relies on the following exhibits:

1. Application form and fees.
2. Engineer Plans, CEC, dated December 2023.
    - Cover Sheet (Sheet 1)
    - Benton County Tax Lots and Zoning (Sheets 2 and 2A).
    - Existing Conditions (Sheet 3)
    - Demolition Plan (Sheet 4)
    - Overall Development Plan (Sheet 5)
    - Development Area Layout (Sheet 6)

- Left Turn Traffic Plan (Sheet 7)
- North Road Plan (Sheet 8)
- Parking Infrastructure Plan (Sheet 9)
- Development Area Top of Waste Grades (Sheet 10)
- Development Area Phase 1 (Sheet 11)
- Development Area Phase 2 (Sheet 12)
- Top of Waste Phase 1 (Sheet 13)
- Top of Waste Phase 2 (Sheet 14)
- Top of Waste Phase 3 (Sheet 15)
- Top of Waste Phase 4 (Sheet 16)
- Wetpond-Detention Pond Combination Plan (Sheet 17)
- Landscape Plan (Sheet 18)
- Stockpile Plan (Sheet 19)
- Wetpond-Detention Pond Combination Profiles (Cross-Sections AA and BB) (Sheet 20)
- Wetpond-Detention Pond Combination Profiles (Cross-Sections CC and DD) (Sheet 11)
- Cross-Sections (Sheets 22 and 23)
- Traffic Details (Sheet 24)

3. Vesting deeds to the tax lots contained in the Development Site.
4. Wildlife Habitat Assessment and Surveys, Turnstone Environmental Consultants, Inc., dated February 27, 2024, and Addendum to the Final 2024 Report dated August 6, 2024.
5. Phase II Geotechnical Exploration Report, Coffin Butte Landfill South Expansion Area, The Wallace Group, dated July 2024.
6. Well logs for PW-2 and Berkland wells.

7. Letter from Jeffery Shepherd and Paul Burns of CEC regarding the applicable Oregon DEQ permits and regulations, dated February 26, 2024.

8. Map and List of Adjacent and Nearby Properties.

9. Map defining the Analysis Area, showing odor complaints.

10. Aerial Image of topography and roads surrounding the landfill area.

11. Noise Study, The Greenbusch Group, dated September 25, 2023.

12. Weaver Consulting Group Findings on Odor, dated March 8, 2024.

13. November 19, 2021, memorandum from Ian Macnab regarding odor, methane, and hydrogen sulfide control at Coffin Butte Landfill.

14. Coffin Butte Landfill Expansion Odor Dispersion Modeling Study, SCS Engineers, dated October 8, 2024.

15. Traffic Report, Transight Consulting, LLC, dated February 26, 2024.

16. Environmental and Operational Considerations, Tuppan Consultants, dated February 22, 2024.

17. CEC Preliminary Drainage Report dated January 2024.

18. Aerial Renderings of Coffin Butte Landfill showing proposed expansion area view corridors.

19. Site Lighting Summary, CEC, dated July 2024.

20. Fire Risk Assessment of Coffin Butte Landfill, SCS Engineers, dated November 29, 2023, and updated September 24, 2024, and the addendum to the Fire Risk Assessment Report dated January 14, 2025.

21. Applicant Proposed Conditions of Approval.

22. Reclamation Plan for Expansion Area, CEC, dated April 2022.

23. Oregon DEQ Permit #306 Materials.

24. Oregon DEQ Permit Work Plan.

25. Oregon DEQ Approval of Work Plan.

26. Archaeological Report, Archaeological Investigations Northwest, Inc., dated December 19, 2023.

27. Leachate Management Summary, CEC, dated January 15, 2025.

28. Republic Services letter to the Benton County Board of Commissioners regarding methane emissions at Coffin Butte Landfill, dated 2/23/2024, and Addendum dated January 15, 2025.

29. Republic Services letter to the Benton County Board of Commissioners relating to arsenic, dated February 15, 2024, and Addendum dated January 15, 2025.

30. Proposed Coffin Butte Landfill Seismic Design, CEC, dated July 9, 2024.

31. Farm lease between Valley Landfills and Agri-Industries, Inc., dated January 15, 2020.

32. Photos of Farm and Forest Uses on Adjacent Properties.

III. COMPLIANCE WITH BENTON COUNTY CODE 53.205 TO 53.235 (CONDITIONAL USES)

As noted above, any landfill project south of Coffin Butte Road on land zoned LS or FC requires approval of a conditional use permit under BCC 53.205 to 53.235 approved by the Planning Commission.

A. BCC 53.205 (Purpose). This section states:

Conditional uses are land uses which may have an adverse effect on surrounding permitted uses in a zone.

Applicant Response: This section provides a general statement; it does not contain any measurable development standards or approval criteria. Compliance with the applicable provisions of this section will ensure conformance with the purpose stated in this section.

B. 53.210 (Permit Required). This section states:

A person shall obtain a conditional use permit from the County in order to establish a conditional use. The decision to issue a conditional use permit is discretionary.

Applicant Response: The proposal includes the expansion of a landfill and associated site improvements. As detailed in sections 60.215 and 77.305, the proposed use (including the associated site improvements) requires a CUP, along with review by the Planning Commission. Applicant understands that the decision whether to issue the CUP is discretionary, depending on whether Applicant can demonstrate compliance with the applicable criteria.

C. 53.215 (1) (Criteria) (The proposed use "does not seriously interfere"). This criterion states:

The decision to approve a conditional use permit shall be based on findings that:

(1) The proposed use does not seriously interfere with uses on adjacent property, with the character of the area, or with the purpose of the zone[.]

Applicant Response: In order to address this criterion, it is necessary to interpret the components of this criterion and then apply them to the facts.

1. Meaning of "Seriously Interfere."

The Benton County Code does not define "seriously interfere." The use of the modifier "seriously" indicates that at least some level of interference is acceptable. During BCTT, staff indicated that "seriously interfere" has generally been applied to mean more than an inconvenience or irritation, but less than rendering the uses on adjacent property impossible. Staff reported that county decision-makers have considered factors such as whether the proposed use makes it difficult to continue uses on the adjacent property; whether the proposed use creates significant disruption to the character of the area; and whether the proposed use conflicts, in a substantive way, with the purpose of the zone.

There has been an approved landfill in this area for over 50 years. This analysis has to be conducted in the context of the existing approved landfill operation: whether the proposed expansion creates additional, different, or increased impacts as compared to the existing operation, and whether these impacts, if any, when viewed through the lens of the existing operation, "seriously interfere" with adjacent properties.

2. Definition of "Adjacent Properties."

The Benton County Code does not define the term "adjacent." Absent a special definition, the courts ordinarily resort to the dictionary definitions, assuming that the legislature (or, in this case, the County Commissioners) meant to use a word of common usage in its ordinary sense.

Webster's Third New International Dictionary defines "adjacent" as "not distant or far off * * *: nearby but not touching * * *relatively near and having nothing of the same kind intervening: having a common border: ABUTTING, TOUCHING; living nearby or sitting or standing close relatively near or close together: immediately preceding or following with nothing of the same kind intervening." (Capitalized emphasis in the original.)[19]

Because the application is to expand the existing landfill operation, Applicant started with a base site that includes all tax lots on which existing landfill operations and accessory uses are located, plus all tax lots constituting the Development Site on which the Project will be located (the "Landfill Boundary"). Applicant then identified properties abutting the Landfill Boundary (the "Adjacent Properties") and the properties abutting the Adjacent Properties (the "Nearby Properties"). *See* Figure 1, below.

[19] Webster's Third New International Dictionary of the English Language Unabridged, Merriam-Webster Inc., Publishers, Springfield Massachusetts, USA, Copyright 2002.

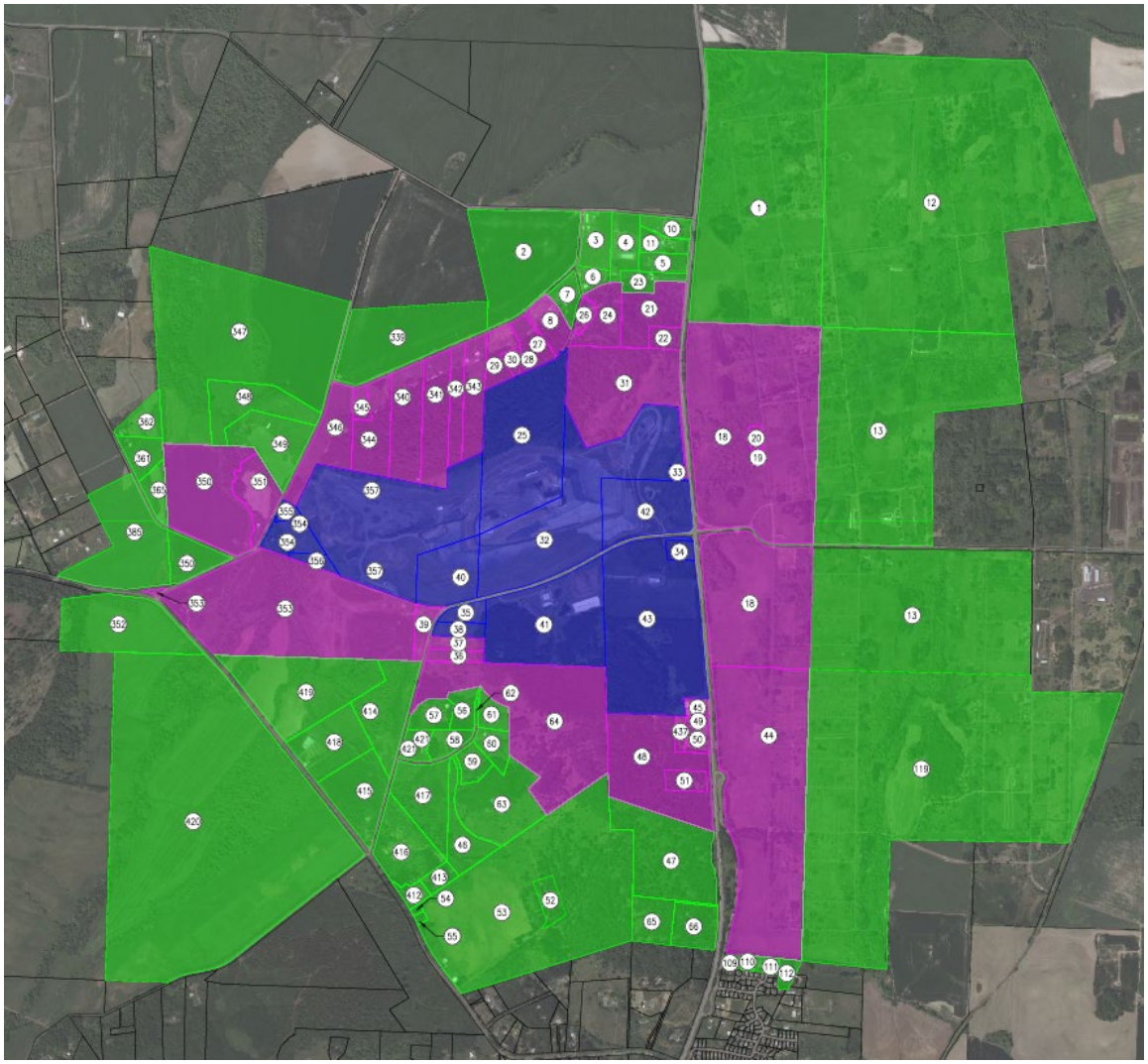


Figure 1 (Adjacent and Nearby Properties). Full-size version and tax lot list attached as Exhibit 8.

This analysis covers both the Adjacent Properties and the Nearby Properties. Although Applicant does not believe that the text of the criterion requires it to look beyond the Adjacent Properties, the Nearby Properties are included to demonstrate compliance with the criteria even in the context of a broader scope of review.

3. Uses on Adjacent and Nearby Properties.

The 16 tax lots that consist of the existing and proposed landfill areas and accessary uses are owned by VLI.[20] These properties are zoned LS and FC.

[20] Tax lots labeled 25, 32, 33, 34, 35, 38, 40, 41, 42, 43, 354, 355, 356, and 357 on Exhibit 8.

The Adjacent and Nearby Properties east of Highway 99W are predominately in public ownership, are zoned OS, and are managed as the E.E. Wilson Wildlife Area.[21] The Wildlife Area is open to the public year-round for birding, hiking, limited hunting, and fishing. There are four small rural residential (RR-5) Nearby Properties owned by individual property owners at the very south end of the adjacent property.[22] These properties are occupied by dwellings and some outbuildings.

The Adjacent and Nearby Properties north of the landfill and east of Wiles Road are generally on the north side of Coffin Butte and are shielded from the landfill by the ridge. The Adjacent Properties to the landfill are zoned FC and are generally owned by individuals and trusts and appear to be in small woodlot management or small-scale farming or livestock operations.[23] Ex. 32, pages 12-20. Several of these properties have residences and farm outbuildings, but it is unclear from observation whether they are being operated for commercial farm or forest operations within the meaning of BCC 51.020 (15) or (24). Ex. 32, pages 12-20. The large parcel northwest of the landfill is owned by the Oregon Department of Fish and Wildlife and is operated as a part of the E.E. Wilson Wildlife Area.[24] Ex. 32, pages 34-35. The FC-zoned properties north of the Wildlife Area appear to be vacant or used for small-scale farming operations.[25] Ex. 32, pages 21-23. These are owned by individuals, except for Tax Lot 0300, which is owned by Peltier Real Estate Company, a wholly owned subsidiarity of Republic Services, Inc.[26] The Peltier property is vacant and is not being used or proposed for use by VLI for the existing landfill or the proposed Project. The Nearby Properties to the north of these Adjacent Properties are zoned RR-5 and owned by individuals[27] or are zoned EFU and owned by an LLC and appear to be in commercial farm use (grass seed, row crops).[28]

The Adjacent and Nearby Properties east of the landfill and west of Wiles Road are zoned EFU and owned by individuals and trusts and appear to be in commercial farm use within the meaning of BCC 51.020.[29]

[21] Tax lots labeled 1, 12, 13, 18, 19, 20, 44 and 119 on Exhibit 8.

[22] Tax lots labeled 109, 110, 111, and 112 on Exhibit 8.

[23] Tax lots labeled 8, 27, 28, 29, 30, 340, 341, 342, 343, 344, 345, and 346 on Exhibit 8.

[24] Tax lot labeled 31 on Exhibit 8.

[25] Tax lots labeled 21, 22, 24, and 26 on Exhibit 8.

[26] Tax lot labeled 21 on Exhibit 8.

[27] Tax lots labeled 3, 4, 5, 6, 7, 10, 11, and 23 on Exhibit 8.

[28] Tax lots labeled 2 and 339 on Exhibit 8.

[29] Tax lots labeled 347, 348, 349, 350, 351, 361, 362, 365, and 385 on Exhibit 8.

The Adjacent and Nearby Properties to the southwest of the landfill between Wiles Road and Soap Creek Road are zoned EFU and owned by individuals[30] or are owned by VLI or Peltier Real Estate Company, a wholly owned subsidiary of Republic Services, Inc., and leased to Agri-Industries, Inc., for farm use.[31] *See* Ex. 31, page 8. The Nearby Properties southwest of Tampico Road are zoned EFU and are owned or controlled by Oregon State University and are used for research farm use.[32]

The Adjacent Properties to the south of the landfill are zoned FC or RR-10 and are owned by individuals,[33] Peltier Real Estate Company, a wholly owned subsidiary of Republic Services Inc.,[34] or VLI.[35] These parcels are vacant or are in residential use. The Nearby Properties to the south of these Adjacent Properties are zoned EFU[36] or RR-10[37] and are owned by individuals or VLI.[38] These lots appear to be vacant, in residential use, or in farm use.

4. Establishing the "Area" for Impact Assessment.

The Benton County Code also does not define the term "area" for CUP purposes. During BCTT, staff reported that the County has considered the following factors in determining the extent and character of the "area":

a. The particular attributes of the geographic setting (including existing operations in the vicinity).

b. Whether there is a distinct change in the area's physical characteristics beyond a certain point.

c. The features or elements give the area its character, i.e., homogenous or heterogeneous characteristics and the degree of similarity.

[30] Tax lots labeled 39, 415, and 418 on Exhibit 8.

[31] Tax lots labeled 39, 353, 414, and 419 on Exhibit 8. Peltier Real Estate Company owns the tax lot labeled 39 on Exhibit 8.

[32] Tax lots labeled 352, 411, and 420 on Exhibit 8.

[33] Tax lots labeled 37, 45, 48, 49, 50, 51 and 437 on Exhibit 8.

[34] Tax lot labeled 56 on Exhibit 8.

[35] Tax lots labeled 36, 38 and 64 on Exhibit 8.

[36] Tax lots labeled 46, 52, 53, 54, 55, 412, 413, 416, and 417 on Exhibit 8. (A portion of Tax Lot 52 is zoned RR-10.)

[37] Tax lots labeled 47, 56, 57, 58, 59, 60, 61, 62, 63, and 421 on Exhibit 8.

[38] Tax lot labeled 62 is owned by VLI.

d. The likely extent of the effects of the proposed land use. This may differ by particular effect—for example, the impact of noise might extend farther than visual impact (or vice versa).

Based upon the prior application and discussion, Applicant has identified five potential off-site impacts of the landfill: Noise, odor, water/groundwater, traffic, and visual impacts. Each of these off-site impacts has a differential effect on the surrounding area based upon proximity. As discussed in more detail below, the potential impact of odor extends farther from the landfill than the other potential impacts and thus has been used to identify the area of analysis under this criterion (the “Analysis Area”).

In order to establish the Analysis Area for purposes of BCC 53.215(1), VLI compiled all the odor complaints from June 2021 to August 2024 for which it had an address or location, plotted those locations on a map, and then drew a box around them. *See* Figure 2, below.

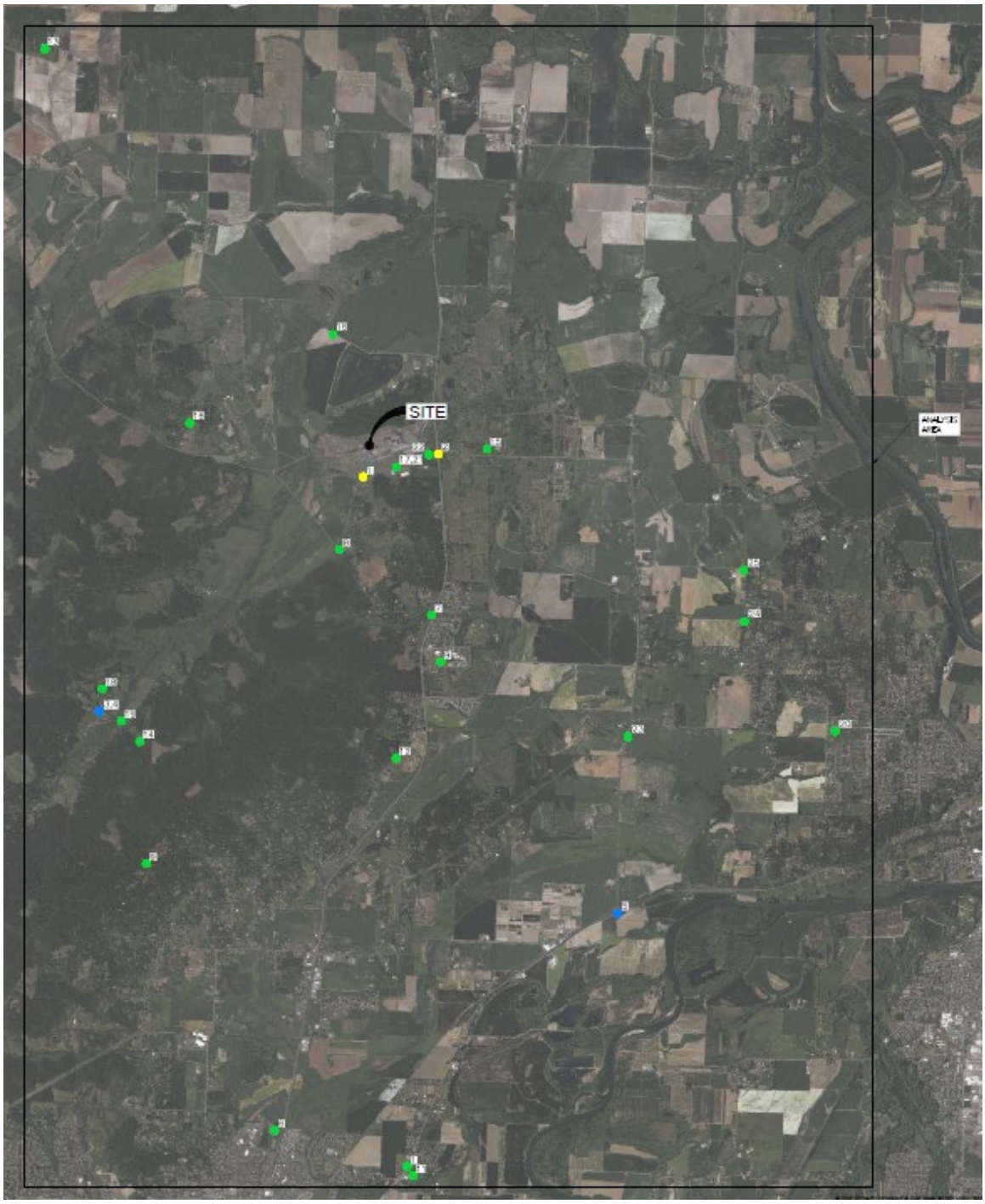


Figure 2 (The Analysis Area showing locations of odor complaints). (Full-size version and odor complaint list attached as Exhibit 9.)

VLI sometimes receives odor complaints that do not identify an address or location and notes that it did not consider these unlocated complaints to establish the Analysis Area. For these purposes, Applicant has also assumed that all the complaints were caused by odor from Coffin Butte Landfill without confirming the

actual source of the odor. Although these odor complaints are therefore over-inclusive in terms of establishing the outer limits of the potential odor impact and not required by the text of the criterion, for the purposes of the application VLI will consider this area for determining the outer limits of odor impact. Further, because odor is the impact with the farthest reach, the outer limits of odor impact provide an over-inclusive analysis area for the assessment of all other off-site impacts.

The land within the Analysis Area is not a distinct geographic setting, does not have unified physical characteristics, and is heterogenous and not homogenous. In this sense, it reflects a much larger "area" than would be determined using the other characteristics considered by the County in past applications, but Applicant is considering this "area" to demonstrate compliance with the criteria beyond what is arguably required under the code.

5. Establishing the Character of the Analysis Area.

As noted, the Analysis Area does not have a uniform character; it consists of almost 90 square miles and includes farm and forest lands, rural residential lands, the City of Adair Village, and small portions of Corvallis and North Albany.

The portion of the Analysis Area in the vicinity of the landfill is defined by two prominent topographic features: Coffin Butte and Tampico Ridge. These two topographic features are primarily surrounded and intersected by the roadways of Highway 99W on the east boundary, Robison Road to the north, Wiles and Tampico roads to the west, and Coffin Butte Road between the features. The interior flanks of Coffin Butte and Tampico Ridge are defined by Coffin Butte Landfill, while outer flanks are established with buffer areas and scattered rural residences, along with small-scale farming and forest operations. The higher elevations within the Analysis Area are well treed, while many of the lower/flatter elevations have been cleared. *See* Figure 3.

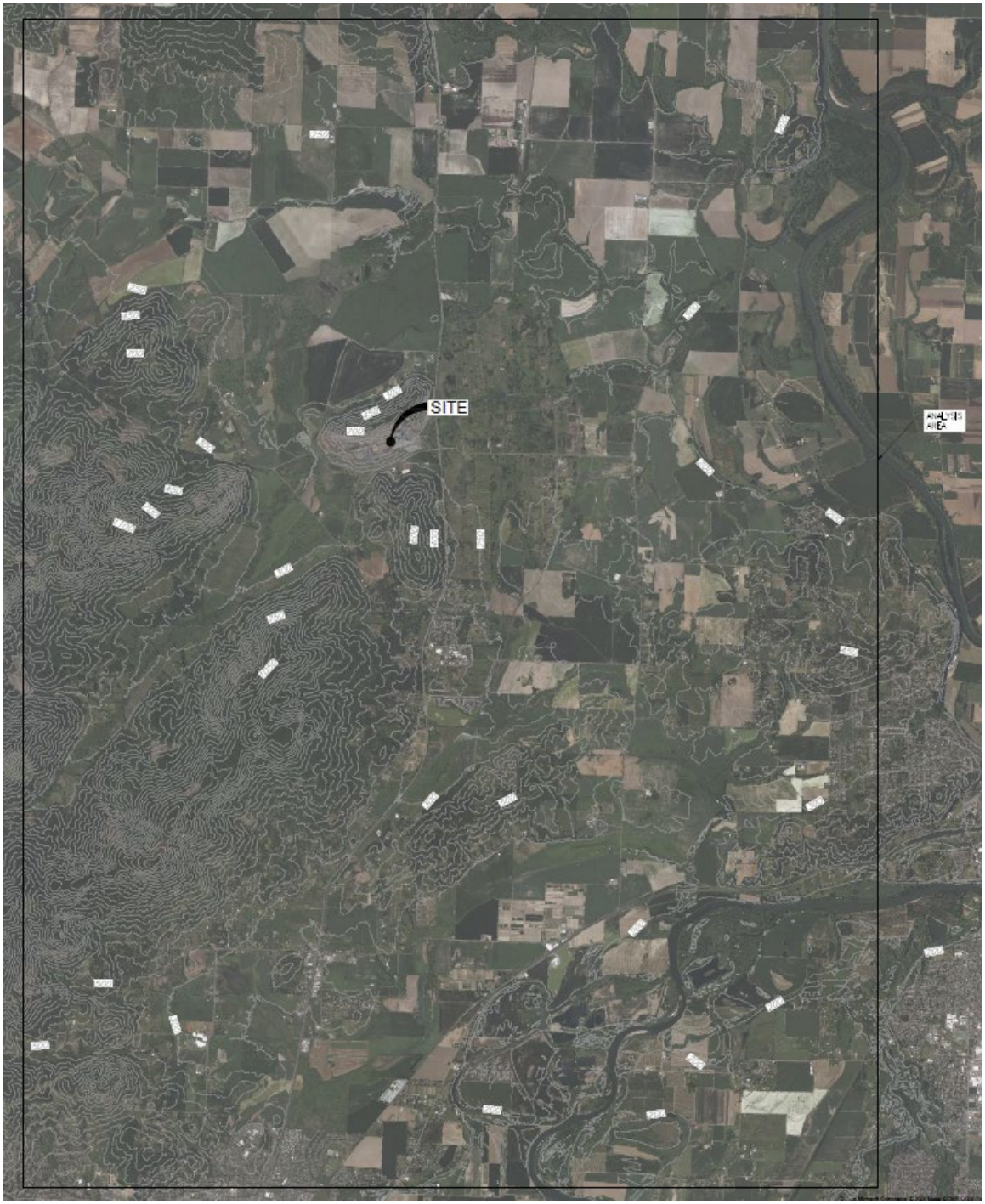


Figure 3 (Character, uses, and topography of the Analysis Area). (Full-size version attached as Exhibit 10.)

The portion of the Analysis Area beyond the immediate vicinity includes the City of Adair Village to the southeast. Adair Village is a small city in Benton County, with a population of approximately 1,005. To the east is the E.E. Wilson Wildlife Area, which is a 1,788-acre preserve that provides hunting, fishing, hiking,

wildlife viewing, shooting, and archery amenities; and to the west/southwest is Soap Creek Valley, which contains a number of rural residences.

The portion of the Analysis Area even farther afield includes larger-scale farm and forest operations, including the Starker Forest to the west, which is used for logging operations and recreation opportunities.

Current conditions in the Analysis Area include impacts from the current landfill operations, commercial farm and forest uses, urban development, and a major transportation corridor (Highway 99W).

6. Establishing the Purpose of the Applicable Zone(s).

The purpose of the LS zone is set forth in the Code as follows:

> *77.005 Purpose. The Landfill Site Zone shall establish a specific landfill area in Benton County.*

The purpose of the FC zone is established in the Code as follows:

> *PURPOSE*
>
> *60.005 Forest Conservation Zone.*
>
> 1. *The Forest Conservation Zone shall conserve forest lands, promote the management and growing of trees, support the harvesting of trees and primary processing of wood products, and protect the air, water, and wildlife resources in the zone. Resources important to Benton County and protected by this chapter include watersheds, wildlife and fisheries habitat,* maintenance *of clean air and water, support activities related to forest management, opportunities for outdoor recreational activities, and grazing land for livestock. Except for activities permitted or allowed as a conditional use[39], non-forest uses shall be prohibited in order to minimize conflicts with forest uses, reduce the potential for wildfire, and protect this area as the primary timber producing area of the County.*
>
> 2. *The provisions of this Chapter are not intended to regulate activities governed by the Forest Practices Act and Rules.*
>
> 3. *The provisions of this Chapter are based on the mandatory standards related to land use activities on forest land specified*

[39] Landfill uses are specifically allowed as a conditional use under BCC 60.205(11).

under Oregon state statutes, and Goal 4 of the Oregon Land Use Planning Program and the implementation requirements adopted by the Land Conservation and Development Commission pursuant to Chapter 660, Division 6 of the Oregon Administrative Rules.

The purpose of the LS zone is to host a landfill. The purpose of the FC zone is to conserve forest lands, promote forestry and timber uses, and protect natural resources. The specific provisions of the FC zone recognize that landfill uses are consistent with these purposes and expressly permit a landfill use as a conditional use. BCC 60.205(11).

7. Assessment of Impacts of the Proposed Project on the Adjacent Properties.

As noted above, the following off-site impacts from the Project may potentially affect the Adjacent Properties: (a) noise; (b) odor; (c) traffic; (d) water (well capacity/groundwater impacts); and (e) visual impacts. These impacts are primarily generated by the working face, which will move from north of Coffin Butte Road to the Project area south of Coffin Butte Road. Once moved, the landfill area to the north of Coffin Butte Road will not be used for disposal operations. There will be only one working face in operation at any time.

Current conditions on the Adjacent and Nearby Properties include the off-site impacts from the existing Coffin Butte Landfill. The question is thus whether the anticipated off-site impacts resulting from the Project differ from the current off-site impacts in a way that will "seriously interfere" with the uses of the Adjacent and Nearby Properties.

a. Noise. Greenbusch Group, Inc. ("Greenbusch") assessed the noise impacts from the proposed expansion (Ex. 11). Greenbusch applied OAR 340-035-0035, which regulates sound emissions from commercial and industrial uses (the "DEQ Noise Rule").[40] As explained below and in Exhibit 11, Greenbusch determined that the predicted sound levels from the Project will "comply with the applicable regulatory criteria without the inclusion of noise mitigation."[41]

As noted by Greenbusch, the Project will not change the character of operations at the landfill. Accordingly, noise impacts from the Project will be similar in kind to current conditions, where noise is produced by equipment such as dozers, excavators, compactors, tipping machines,

[40] DEQ has adopted noise standards but does not enforce them itself.

[41] In its 2021 study, Greenbusch concluded that the prior application would require mitigation measures in order to comply with the DEQ Noise Rule. The updated study, attached as Exhibit 11, concludes that no such measures are required by the 2024 proposal.

and truck traffic. When the Development Site is opened, active landfill operations will move from north of Coffin Butte Road to the Development Site, so overall noise impacts will not appreciably change as compared to the current conditions (and could even diminish).

The DEQ Noise Rule establishes sound-level limits as measured from "noise sensitive property." Noise sensitive property, in turn, means property "normally used for sleeping, or normally used as schools, churches, hospitals or public libraries." OAR 340-035-0015(38). The closest noise-sensitive uses to the Project are shown on Exhibit 11, Figure 5.1.[42]

Applying the DEQ Noise Rule, noise impacts would be measured 25 feet toward the landfill from the point of noise-sensitive building closest to the landfill or the point on the noise-sensitive property line closest to the landfill (whichever is farthest from the landfill).

Greenbusch applied stricter standards than those required by the DEQ Noise Rule as follows:

(i) The DEQ Noise Rule imposes different limits for commercial and industrial sound sources depending on whether the site has been previously used as a commercial or industrial site. Limits are stricter for sites that have not been previously used as a commercial or industrial site. The Project would be considered a new sound source located on a previously used site, and thus subject to the less-stringent limit. Nonetheless, Greenbusch evaluated the anticipated increase over existing sound levels using the limits that apply to previously unused sites.

(ii) Motor vehicle sound emissions are measured within 1,000 feet of the noise-sensitive use. OAR 340-035-0030. As explained by Greenbusch, the type of motor vehicle use at the Project is exempt from the sound limits in OAR 340-035-0030. Nonetheless, Greenbusch evaluated the sound levels from anticipated motor vehicle use at the Project and determined that they would fall under the sound-level limits imposed by OAR 340-035-0030

(iii) Operating hours at the landfill extend into both daytime and nighttime hours for purposes of the DEQ Noise Rule. Greenbusch assessed compliance using the more stringent nighttime sound-level limits.

[42] The closest noise-sensitive use is the residential home on Tax Lot 1104.

Greenbusch took a number of measurements of existing sound levels and used those measurements to model two different scenarios to analyze anticipated noise impacts from the Project. Based on these models, Greenbusch concluded that "[p]redicted sound levels from trucks using the landfill and on-site equipment comply with OAR sound limits at all nearby noise sensitive properties under both modeling scenarios." Because Greenbusch analyzed the noise-sensitive properties closest to the Development Site and because sound dissipates over distance, these conclusions necessarily apply to all noise-sensitive properties that are Adjacent or Nearby Properties to the Landfill Boundary.

In addition, although not required by the DEQ regulations, Applicant has replaced back-up alarms on its on-site equipment with ambient sensing broadband back-up alarms as a voluntary noise-mitigation measure.[43]

Finally, the Greenbush analysis demonstrates that anticipated off-site noise impacts from the Project will not be materially different from existing conditions.

Given that the proposal does not materially change the off-site noise impacts from current conditions and complies with all regulatory criteria even without mitigation, and further given that Applicant has engaged in additional mitigation measures, the off-site noise impacts of the Project will not "seriously interfere" with the use of Adjacent and Nearby Properties.

b. Odor. Weaver Consultants Group ("Weaver") assessed the odor impacts from the proposed expansion (Ex. 12) and the comprehensive set of infrastructure and practices already in place to control and manage odors is outlined in Exhibit 13. As explained below and in Exhibit 12, Weaver determined that "there has not been a significant impact to human health and environment related to [landfill gas] or odors."

The Adjacent and Nearby Properties have been in proximity to an active landfill for over 50 years. And, although the Project is a proposed "expansion," the nature of landfill operations means the Project will not result in a material expansion of odor-producing uses.

As explained in Exhibit 12, the two primary sources of odor from a landfill are the solid waste in the active landfill area (with odors similar to household waste) and the biogas produced as the solid waste begins to decompose ("landfill gas" or "LFG"). Also, as explained in Exhibit 12, the working face of a landfill is much smaller than its overall size. At Coffin

[43] Hauling trucks and other trucks coming to the site will still use standard back-up alarms.

Butte Landfill, the day-to-day active area is less than one-half acre under current conditions and will continue to be a similar size when the Development Site is opened and prior active landfill area north of Coffin Butte Road is no longer used for disposal. Consistent with best industry practice, VLI covers the active area at the end of each day with a six-inch layer of soil or alternative daily cover, which is a proven method for effective odor mitigation in all climatic regions (as noted in Exhibit 12).

As described in Exhibits 12 and 13, VLI currently employs aggressive methods for control of landfill gas, including an extensive system of landfill gas collection and control, surface emissions monitoring ("SEM"), and daily odor monitoring.

Weaver also noted that VLI employs several odor-mitigation measures in excess of what is required by applicable regulations, including: (i) the use of a plastic liner in addition to soil cover; (ii) the installation of "final cover" over nearly 40 percent of the landfill surface (when final cover is not required until the landfill is no longer accepting waste); and (iii) the installation of LFG extraction wells for waste that has been in place for only one year (when LFG extraction wells are not required until waste has been in place for five years).

A review of odor complaints over the past 20 years demonstrates that VLI's odor-control methods have been effective. Odor issues are regulated by DEQ, and the complaints to DEQ, the landfill, and local authorities have been minimal (*see* Findings on Odor, Ex. 12).[44]

Because the perception of odor is subjective and has been the subject of questions during the prior application and the BCTT process, the County asked Applicant to provide further analysis related to landfill odor. Applicant retained Greg Hauser, CIEC, of SCS Engineers to conduct an odor analysis. (*See* Coffin Butte Landfill Expansion Odor Dispersion Model Study, attached as Exhibit 14). SCS employed the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) methodology accepted by the EPA and DEQ. SCS examined wind patterns (direction and speed) over time, odor-causing landfill activities, and topography.

As noted in the report, per ASTM standards, odor concentration is defined as the dilution of an odor sample with odor-free air, at which point only 50 percent of an odor panel (or population) will detect or recognize the odor. This point is expressed in units of "dilutions-to-threshold" or "D/T".

[44] The uptick in 2021-22 occurred during the time of the contested CUP application and appears to be anomalous. Nonetheless, VLI investigates each of the complaints and takes action accordingly.

By definition, odor threshold is equal to 1 D/T. Typically, odors are considered a nuisance at or above 7 D/T.

SCS examined odor dispersion at both the current landfill operation and the proposed Project. The report concludes:

- Peak, off-site, one-hour odor concentrations were below 7 D/T (the numeric threshold of significance for nuisance odors) for all scenarios modeled.

- For existing operations (Source #1), the modeled peak, off-site, one-hour odor concentration was north of the landfill (in two different locations depending upon the meteorological data used) and ranged from 0.42 to 1.21 D/T. Impacts above 1 D/T (the point at which only 50 percent of the population is expected to smell any odor) extended only a small distance off site. None of the complaint locations from Figure 10 were within the 1 D/T contour.

- For proposed operations (Source #2), the modeled peak, off-site, one-hour odor concentration was either along Coffin Butte Road or south of the landfill (in two different locations depending upon the meteorological data used) and ranged from 0.64 to 2.04 D/T. Impacts above 1 D/T (the point at which only 50 percent of the population is expected to smell any odor) were either along Coffin Butte Road or extended only a small distance off site. Only one complaint location from Figure 10 was within the 1 D/T contour.

- Moving operations to the proposed expansion area will move the predicted peak, off-site, one-hour impact location, but impacts would remain well below the 7 D/T threshold.

- While off-site odors can occur as a result of the current and future landfill operations, these potential impacts are less than significant and expected to be short lived (i.e., only occur under weather conditions with poor atmospheric dispersion).

The SCS Study thus corroborates the Weaver assessment. Based upon the above evidence, the Project will not materially increase off-site odor impacts over the current operation, and certainly not in a way that would "seriously interfere with uses on adjacent properties."

Because certain temporary landfill operations and weather conditions can temporarily increase odor and given the complaints and concerns about odor expressed during the prior application and during BCTT, Applicant is proposing a condition of approval to provide a more structured and objective process for monitoring odor. Applicant proposes an ongoing

odor-monitoring condition in the proposed conditions of approval. Ex. 21, Condition OA-10.

c. Traffic. Transight Consulting, LLC ("Transight") prepared a Transportation Impact Analysis ("TIA") for the proposed expansion (Ex. 15). Similar to the other off-site impacts, although the Project is a proposed "expansion," the nature of landfill operations means the Project will not result in a material increase in traffic impacts.

Coffin Butte Landfill and the proposed improvements are served from Coffin Butte Road. Coffin Butte Road is a Major Collector Street and is identified as a Freight Route on the County TSP.

As discussed in the TIA, the anticipated changes to traffic are limited and consist of the following:

> "Private passenger vehicles using the landfill will continue to use the scales and services on the north side of Coffin Butte Road, with these consolidated materials then hauled by commercial truck to the expansion site for disposal. Commercial account users will also be required to use the current scales to weigh in, then will be directed to the expansion area to dispose of materials. These private and commercial vehicles will use a new outbound scale near the expansion site exit, will pay the appropriate fees, and will then exit onto Coffin Butte Road.
>
> * * * *
>
> "As a result of retaining the scales on the north side of Coffin Butte Road for the expansion there will be internal trips between the north and south sides of Coffin Butte Road."

As further discussed in the TIA, trip generation for landfill uses is not determined by landfill size, but rather by the population of the areas served.

VLI is expanding Coffin Butte Road to include bicycle lanes and shoulders and a westbound left-turn lane to avoid impacts to through traffic on Coffin Butte Road.[45]

The TIA is based on four sets of traffic counts taken from 2021 to 2023. These counts all reflect very low traffic volumes in the vicinity of the landfill. In addition, future traffic increases attributable to the landfill are based on projected population growth, which is minimal (approximately

[45] The preliminary turn-lane design includes enough queue storage for four semitrucks.

1 percent annually in the Linn-Benton area, 1 percent or lower in Linn County, and approximately 1.7 percent statewide in Oregon).

The TIA concludes as follows:

> "This report shows that the proposed landfill expansion provides minimal impacts to Benton County and ODOT transportation facilities. The proposed expansion site will not alter public trip routing, emergency ingress or egress, and it will retain the current landfill access routes. This layout maintains current functional designations identified in the County's Transportation System Plan and the design optimizes travel safety for patrons and employees."

The TIA analyzes the expected traffic impacts from the Project as far as those impacts extend from the Landfill Boundary (which is not far) and found that transportation facilities in the area will continue to function well within applicable County standards. Thus, the additional trips generated from the expansion, if any, and the minor changes in traffic patterns will not "seriously interfere" with the use of Adjacent Properties or Nearby Properties.

d. Water—Well Capacity and/or Groundwater Impacts. Tuppan Consultants, LLC ("Tuppan") assessed environmental and operational considerations related to the Project (Ex. 16), and Civil & Environmental Consultants, Inc. ("CEC") prepared a preliminary drainage report for the proposed expansion (Ex. 17). These documents outline the natural dynamics of groundwater flow in the area, the groundwater use associated with the Coffin Butte Landfill, and the existing and proposed drainage systems serving the landfill. As explained below and in Exhibits 16 and 17, the proposed expansion will have no effect on the landfill's use of groundwater in the area and will not materially change off-site impacts on groundwater quality.

As described by Tuppan, current surface-water drainage from the operations areas of the landfill drain through a number of systems designed to remove site-related compounds from stormwater before it discharges to creeks that flow off site. These systems include a settlement pond and a bioswale that was recently upgraded to include a subsurface flow wetland (SSFW) that discharges at a sampling point.

As further described by Tuppan, groundwater supply in the area is limited and disconnected in nature.

(i) Impact on groundwater supply (well capacity). As noted by Tuppan, landfill construction and the bulk of landfill operations use water supplied by Adair Village, not groundwater

from wells. The only groundwater used from wells is for the existing office and the scale house, and the volume of groundwater consumed at these two locations will not change. The Project will thus have no impact on groundwater supply in the area (as compared to current conditions).

(ii) Impact on groundwater quality. Tuppan and CEC describe a number of features and systems that protect groundwater resources, including the groundwater divide created by Tampico Ridge, the existing combined detention and wetpond facility, the requirement to install a "state-of-the-art" landfill liner system at the Development Site, stormwater diversion facilities, and a comprehensive water-quality monitoring program. Monitoring of stormwater is required by both the site's solid waste permit and its NPDES industrial stormwater discharge permit. The systems outlined above meet or exceed all regulatory requirements for groundwater protection, and to the extent they fail to function as designed, the monitoring programs will ensure that potential contamination is identified and mitigated before entering the off-site groundwater supply. The new landfill liner system planned for the Development Site is state of the art and will provide even more protection than the current system. Given that comprehensive mitigation and monitoring occurs on site, the potential impacts of the proposed expansion on the off-site groundwater supply will not "seriously interfere" with the use of Adjacent Properties or Nearby Properties.

e. Visual Impacts. Exhibit 18 is a collection of renderings showing the view corridors west along Highway 99W and east along Coffin Butte Road as they currently exist and would appear after development of the Project and the opening of the Development Site.

Figures 1, 2, and 3 show the northwest and southwest view from Highway 99W toward the landfill. As shown in Figure 1, the Project will retain the trees and vegetation at the southwest corner of the intersection of Coffin Butte Road and Highway 99W and will retain the buffer trees along the eastern property line. The Project will modify the topography of the area behind the trees shown in Figure 1; however, with the line of sight from this location, the visual impacts will be mostly unnoticeable (the top of Tampico Ridge is not visible).

Moving to a slightly higher elevation (north on Highway 99W) as shown in Figure 2, the top of Tampico Ridge is visible; thus, from this line of sight the Project may be visible.

Figure 4 shows the southwest view from the intersection of Coffin Butte and Soap Creek Road, demonstrating that the Development Site will be screened by vegetation along that corridor.

Applicant proposes installing additional screening vegetation consistent with the County's proposed condition in the 2021 Staff Report, plus additional screening. *See* Ex. 2, sheet 18. While the proposed landfill improvements on the Development Site may be visible at buildout along Coffin Butte Road within the landfill area owned by VLI and traffic traveling south on Highway 99W, the improvements will not be visible from the nearby streets, other rights-of-way, and properties that are not at higher elevations.

Overall, while the expansion may be visible from some locations around the area, it will not be highly visible, and a westerly visual corridor will be retained. In the future and in compliance with closure/post-closure plans, the current landfill area will be covered and reclaimed, reducing the off-site visual impacts that exist under current conditions. The overall effect of relocating disposal operations to the Development Site will be to reduce off-site visual impacts from those caused by the current operation.

One of the Planning Commission's reasons for denying the 2021 application was that the proposal would essentially create a new hill by filling up the gap between Tampico Ridge and Coffin Butte and therefore substantially interfere with the character of the area in a negative way. The 2024 application preserves Coffin Butte Road and the valley between Tampico Ridge and Coffin Butte. The Development Site, when completed, will change the topography on the north slope of Tampico Ridge, but will be substantially lower than the ridgeline and will be 175 feet lower in height and similar in character to the closed and to-be-closed areas north of Coffin Butte Road. *See* topographical cross-section attached as part of Exhibit 2, Sheets 22 and 23; Exhibit 18, Build-out of Coffin Butte Landfill, with approved expansion. As noted above, the LS zone contemplates landfill use, so some elevation changes are to be expected.

Applicant's lighting plan for the overall site will minimize additional light and glare. *See* Sight Lighting Summary, attached as Exhibit 19.

For these reasons, the off-site visual impacts of the Project will not "seriously interfere" with the use of Adjacent or Nearby Properties.

8. Assessment of Whether the Potential Impacts Constitute "Serious Interference" with the Character of the Area.

As established above, the character of the Analysis Area is heterogenous, but in the immediate vicinity of the landfill, it consists primarily of higher-intensity resource land that provides farm, forest, resource extraction, landfill operations,

and open spaces surrounded by scattered rural residences and small-scale farm and forest operations. The Analysis Area is currently impacted by occasional odors, sounds, noises, and trips from the existing landfill operation and surrounding resource-extraction uses.

a. Noise. The Analysis Area includes the Adjacent and Nearby Properties addressed in Section III.C.7 above, as well as a large area beyond those properties. As established above, the projected off-site noise impacts will not seriously interfere with the use of the Adjacent and Nearby Properties. It follows that any noise impacts on the Analysis Area beyond those properties will only be more attenuated and will not "seriously interfere" with the character of the Analysis Area.

b. Odor. The Analysis Area includes the Adjacent and Nearby Properties addressed in Section III.C.7 above, as well as a large area beyond those properties. As established above, the projected off-site odor impacts will not seriously interfere with the use of the Adjacent and Nearby Properties. It follows that any odor impacts on the Analysis Area beyond those properties will only be more attenuated and will not "seriously interfere" with the character of the Analysis Area.

c. Traffic. The Analysis Area includes the Adjacent and Nearby Properties addressed in Section III.C.7 above, as well as a large area beyond those properties. As established above, the projected off-site traffic impacts will not seriously interfere with the use of the Adjacent and Nearby Properties. If follows that any traffic impacts on the Analysis Area beyond those properties will only be more attenuated and will not "seriously interfere" with the character of the Analysis Area.

d. Water—Well Capacity and/or Groundwater Impacts. The Analysis Area includes the Adjacent and Nearby Properties addressed in Section III.C.7 above, as well as a large area beyond those properties. As established above, the projected off-site water impacts will not seriously interfere with the use of the Adjacent and Nearby Properties. It follows that any water impacts on the Analysis area beyond those properties will only be more attenuated and will not "seriously interfere" with the character of the Analysis Area.

e. Visual Impacts. The Analysis Area includes the Adjacent and Nearby Properties addressed in Section III.C.7 above, as well as a large area beyond those properties. As established above, the projected off-site visual impacts will not seriously interfere with the use of the Adjacent and Nearby Properties. It follows that any visual impacts on the area beyond those properties will only be less noticeable and will not "seriously interfere" with the character of the Analysis Area.

9. Assessment of Impacts on the Purpose of the Zone(s).

The Development Site is located across two zones: the LS zone and the FC zone.

As established in Section III.C.6 above, the purpose of the LS zone is to host a landfill. Allowing for landfill expansion in the Landfill Site Zone will *fulfill* rather than "seriously interfere" with the stated purpose of the zone.

The purpose of the FC zone is to conserve forest lands, promote forestry and timber uses, and protect natural resources. The specific provisions of the FC zone recognize that landfill uses are consistent with these purposes and expressly permit a landfill use as a conditional use. BCC 60.205(11).

No solid-waste disposal is proposed for the FC-zoned land. Instead, the proposed improvements on the FC-zoned land include an 1,800-square-foot employee building, parking, access road modifications, and the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, cut activities for landfill, and a shop/maintenance area. All uses proposed as part of the Project (i.e., disposal site for solid waste approved by the County Commissioners and DEQ, together with equipment, facilities, or buildings necessary for its operation) are permitted in the FC zone, so long as Applicant demonstrates compliance with all applicable CUP approval criteria. The elements of the Project that are proposed on the FC-zoned land are associated with the existing, approved Coffin Butte Landfill. These uses are explicitly allowed and therefore consistent with the stated purpose of the zone, and CUP review will minimize conflicts with forest uses, reduce the potential for wildfire, and protect this area as the primary timber-producing area of the County. Thus, the elements of the Project that are proposed on the FC-zoned land will not "seriously interfere" with the purpose of the FC zone.

As detailed above, the proposal satisfies this approval criterion.

D. BCC 53.215 (2) (Criteria) (The proposed use "does not imposed an undue burden" on public facilities and services).

This criterion states:

The decision to approve a conditional use permit shall be based on findings that:

(2) The proposed use does not impose an undue burden on any public improvements, facilities, utilities, or services available to the area; and

Applicant Response: Coffin Butte Landfill serves the public. The development is proposed so that the landfill can continue to accommodate public needs for an additional six years beyond the life of the current approved landfill. As noted above, when the Development Site is opened, the working face will move from north of Coffin Butte Road to the Development Site. As detailed in the traffic report (Ex. 15), trip growth (transportation impacts) will grow with overall population, but not because of the relocation of the working face to the Development Site. As noted in Exhibit 15, trips generated to and from the working face will remain substantially the same and well within the capacity of the existing road system. Because the 2024 CUP application does not include closure of Coffin Butte Road, none of the surrounding road systems will be impacted, and the new turn lanes and bike paths will improve safety and access along Coffin Butte Road. The Project does not necessitate any additional water or sewer services, so will not affect public water or sewer service. The property is served by the Adair Fire District and the Benton County Sheriff's Department. The Fire District expressed concern about the impact of closure of Coffin Butte Road on emergency ingress and egress during prior 2021 application; the 2024 CUP application does not change that access. Applicant's Fire Risk Assessment Report, attached as Exhibit 20, details how Applicant's fire mitigation plan prevents or addresses fires, and concludes that operations at Coffin Butte Landfill do not present a significant fire risk. There is no evidence or history that suggests that the landfill creates significant law enforcement issues. The proposed development is not projected to increase impacts to these providers.

For the above-noted reasons, the proposed expansion does impose an undue burden on any public facilities or services.

E. BCC 53.215 (3) (Criteria) (The proposed use "complies with any additional criteria"). This criterion states:

The decision to approve a conditional use permit shall be based on findings that:

(3) The proposed use complies with any additional criteria which may be required for the specific use by this code.

Applicant Response: Additional criteria are included in BCC chapters 60 and 77. This narrative addresses how the proposal complies with the additional criteria of those sections; the proposal therefore complies with this refenced provision.

F. BCC 53.220 (Conditions of Approval). This section states:

The County may impose conditions of approval to mitigate negative impacts to adjacent property, to meet the public

service demand created by the development activity, or to otherwise ensure compliance with the purpose and provisions of this code. On-site and off-site conditions may be imposed. An applicant may be required to post a bond or other guarantee pursuant to BCC 99.905 to 99.925 to ensure compliance with a condition of approval. Conditions may address, but are not limited to:

1. **Size and location of site.**
2. **Road capacities in the area.**
3. **Number and location of road access points.**
4. **Location and amount of off-street parking.**
5. **Internal traffic circulation.**
6. **Fencing, screening and landscape separations.**
7. **Height and square footage of a building.**
8. **Signs.**
9. **Exterior lighting.**
10. **Noise, vibration, air pollution, and other environmental influences.**
11. **Water supply and sewage disposal.**
12. **Law enforcement and fire protection.**

Applicant Response: Applicant understands that this section of the Code allows for the imposition of conditions of approval to address compliance with the applicable criteria, if warranted. This Code section does not add any additional substantive review criteria for approval.

Applicant expects the County to impose conditions of approval. Applicant has prepared draft conditions of approval for the County's consideration. *See* Draft Conditions, attached as Exhibit 21. The draft conditions of approval are based upon the evidence and recommendations contained in Applicant's exhibits and the analysis in this burden of proof, as well as the County's relevant recommended conditions in 2021.

One condition that was at issue in the 2021 application and was an area of disagreement during BCTT is a limitation on the hours of operation. Applicant requests a condition that would allow it to continue the current hours of operation. Prior to opening, Applicant currently must begin internal operations to prepare for opening. The landfill opens to commercial hauling traffic at 5 a.m. and opens to the general public at 8:00 a.m., except on Sundays, when it opens at 12:00 p.m. The site closes to both commercial and public traffic at 5:00 p.m. all days, with internal operations continuing thereafter to properly close the landfill for the day. The landfill has been observing these hours since 2002. This is in accordance with PC-02-07 2002, in which the County imposed the following condition regarding hours of operation:

> "The landfill operation hours shall occur between 8:00 a.m. and 5:00 p.m. Monday through Saturday, and 12:00 p.m. through 5:00 p.m. on Sunday, with 24-hour access for commercial customers."

The question during BCTT was whether Applicant was violating this section by having staff on site before 8:00 a.m. and after 5:00 p.m. Applicant had always interpreted "landfill operation hours" to mean hours that it is open to the public. Applicant noted that since the condition allows 24-hour access for commercial customers[46], the County must have contemplated that at least some staff would be on site outside the hours that it was open to the public.

From an off-site impact standpoint, having staff on site to prepare for opening and closing of the landfill has no impact on the Adjacent or Nearby Properties or the Analysis Area. In contrast, limiting the hours of operation would concentrate landfill traffic into the peak hours, resulting in increased congestion and the potential for more user conflicts. *See* Ex. 15, pages 22-23.

For these reasons, Applicant respectfully requests that any condition of approval relating to hours of operation permit Applicant to continue its long-standing practice. Exhibit 21 contains a draft condition of approval (OA-1) addressing hours of operation. The impacts to Adjacent or Nearby Properties or to the Analysis Area will not increase as compared to the existing operation, and it will avoid the unintended consequences of limiting those hours.

G. BCC 53.225 (Modification of a Conditional Use Permit). This section states:

> **An original applicant or successor in interest may request that a conditional use permit be modified if a change in circumstance has occurred since approval which would justify a change in the permit. Such application shall be processed as a new request for a conditional use permit.**

Applicant Response: The landfill site was previously granted approval, and the current proposal is a modification of the prior approval. However, whether a modification of a CUP or a new CUP, this section establishes that the application shall be processed as a new request for a CUP. Applicant anticipates that the application will be processed accordingly.

[46] Historically, the site did operate 24 hours a day for commercial customers. At its own discretion, Applicant limited hours in the early 2000s to 5:00 a.m. to 5:00 p.m. for commercial customers.

H. BCC 53.230 (Period of Validity). This section states:

Unless otherwise specified at the time of approval, a conditional use permit for a single-family dwelling shall be valid for ten (10) years from the date of decision and other conditional use permits shall be valid for a period of two (2) years from the date of decision.

Applicant Response: This section establishes a time limit within which a new CUP must be initiated unless otherwise specified at the time of approval. Applicant notes that the County's final decision may be appealed, and Applicant must also obtain DEQ permits prior to constructing the landfill, which cannot begin until the County has approved the CUP. For these reasons, Applicant has proposed a longer period in its draft conditions of approval attached as Exhibit 21 to account for these exigencies.

I. BCC 53.235 (Extension of Permit). This section states:

A conditional use permit may be extended for good cause at the discretion of the approving authority responsible for the original decision. The applicant shall submit the request for extension in writing to the Planning Official prior to expiration of the original permit.

Applicant Response: Applicant intends to initiate the development as provided in the draft conditions of approval. However, in the event of unexpected circumstances, Applicant recognizes that an extension may be granted under this section.

IV. COMPLIANCE WITH BENTON COUNTY CODE CHAPTER 77 (LANDFILL SITE)

A. BCC 77.005 Purpose. This section states:

The Landfill Site Zone shall establish a specific landfill area in Benton County.

Applicant Response: This section establishes a purpose but does not provide any development standards or approval criteria. Compliance with the standards of this section and the criteria of the Code will ensure that this purpose is implemented.

B. BCC 77.010 Application. This section states:

The Landfill Site Zone recognizes the existing site in the Coffin Butte area, and allows for its continued use pursuant to Oregon Department of Environmental Quality (DEQ) permits, Benton County Code Chapter 23, and an approved Site Development Plan.

Applicant Response: The current development area that is located within the LS zone is operating under Oregon DEQ Permit # 306. Upon approval, Applicant will seek to modify the existing DEQ permit to include the Development Site. The LS zone was expressly created to accommodate and permit the continued use of the landfill that had existed in this area since the 1940s.

C. BCC 77.105 Permitted Uses. This section states:

The following uses are allowed in the Landfill Site Zone:

(1) Municipal solid waste disposal, in accordance with a Solid Waste Disposal Franchise and an approved Site Development Plan.

(2) Recycling facilities.

(3) Forestry and agricultural use as a conversion factor leading to reclamation of the site in the future.

(4) Aggregate and mineral resource use in accordance with Oregon Department of Geology and Mineral Industry Permits.

(5) Structures normally associated with the operation of a landfill.

(6) Operation of equipment in conjunction with landfill operations.

(7) Installation and operation of monitoring devices as required by DEQ such as leachate sample equipment, leachate treatment facilities, and vector control systems.

(8) Landfill gas monitoring and recovery systems.

Applicant Response: This section establishes that solid waste disposal is a permitted use. The Project is a permitted use in the zone.

D. BCC 77.205 Prohibited Uses. This section states:

The following uses are prohibited in the Landfill Site Zone:

(1) Hazardous waste disposal.

(2) Disposal of materials prohibited by the Solid Waste Disposal Franchise.

Applicant Response: The Project does not include any of these prohibited uses.

E. BCC 77.305 Conditional Uses Approved by the Planning Commission. This section states:

Any proposal to expand the area approved for a landfill within the Landfill Site Zone is allowed by conditional use permit approved by the Planning Commission. The Benton County Environmental Health Division and the Solid Waste Advisory Council shall review and make recommendations through the Planning Official to the Planning Commission regarding the Site Development Plan Map and narrative. The Oregon Department of Environmental Quality shall be given an opportunity to review and comment on any proposal which may affect this site.

Applicant Response: The application includes a proposal to expand the area approved for a landfill within the LS zone to the Development Site located south of Coffin Butte Road; this section therefore requires review and approval by the Planning Commission. This section further establishes that the Planning

Commission will review comments from the Benton County Environmental Health Division, the Solid Waste Advisory Council, and DEQ. Applicant anticipates that the application will be processed accordingly.

F. BCC 77.310 Conditional Use Review. This section states:

(1) The applicant for a conditional use permit shall provide a narrative which describes:

(a) Adjacent land use and impacts upon adjacent uses[.]

Applicant Response: A comprehensive review of lands that are Adjacent or Nearby to the LS-zoned properties and impacts thereupon was included above. The findings from the above-noted sections are incorporated herein.

(b) Future use of site as reclaimed, and impacts of that reclamation on adjacent uses[.]

Applicant Response: The post-closure future use of the LS-zoned development area will be consistent with the rest of Coffin Butte Landfill. As documented in Exhibit 22 (Reclamation Plan), page 5:

> The final closed surface of the completed landfill will appear to be a sloped grassy savanna that blends with, and appears to be part of, the adjacent butte. Planned land use for the property will be open space grassland. Any development over filled areas of the CBLF should not include permanent enclosed structures where differential settlement and/or methane gas may cause risk.

Like the rest of Coffin Butte Landfill, the future (post-closure) use of the Development Site is not anticipated to have any impacts on Adjacent or Nearby uses.

(c) Provisions for screening of the site from public roads and adjacent property[.]

Applicant Response: This section does not require screening or provide a specific standard for screening. This section requires only that an applicant describe "provisions for screening the site from public roads and adjacent properties." Applicant owns and manages the majority of the surrounding properties, and the eastern portion of Tax Lot 1200 is and will continue to be well treed and will provide a substantial buffer from the planned improvements. Furthermore, the 83.7-acre parcel south of the landfill development area is maintained as an open-space area, along with areas to the north and west. The

areas owned by Applicant that are maintained as open spaces and/or engaged in commercial farming operations will continue to provide sufficient buffers from public roads and the majority of the Adjacent Properties. The closest Adjacent Property to screen is Tax Lot 1103 at 38691 Soap Creek Road. This nearby residence is and will continue to be buffered from the disposal site development area by a sloped and treed grade. Additionally, Applicant is proposing installation of additional screening consistent with the County's proposed condition in 2021. *See* Ex. 2, sheet 18. Overall, the planned improvements will be screened by the existing grades and vegetation existing and to be installed on the property and surrounding area.

(d) Egress and ingress[.]

Applicant Response: The proposal modifies the access points on the south side of Coffin Butte Road; it closes the access point to the existing leachate pond and relocates the access point to the gas-to-energy plant, making it the main access point to the southern area. The new access design will be served by an improved Coffin Butte Road, which includes a new left-turn lane and bike lanes. The existing and new access points, along with the overall functionality of the proposed access design, has been studied by the traffic engineer. As detailed in Exhibit 15, the access design and proposed configuration are safe and efficient and can accommodate the proposed development.

(e) Other information as required by the Planning Official.

Applicant Response: To date, the Planning Official has not requested any additional information.

(2) A site plan map shall accompany a conditional use permit application. The map shall contain at least a scale, north arrow, assessor map numbers, location of existing landfill, access, proposed alteration, leachate treatment or monitoring areas surface water systems, and existing and proposed screening (location and types of materials). A statement shall be placed on the map that the site plan map and narrative together are considered as the Site Development Plan. A signature block shall be included for the date the approval is given and the signature of the Planning Official indicating approval.

Applicant Response: The application packet is supported by a site plan that contains all of the elements noted in this section. *See* Ex. 2, sheets 5-9.

(3) A conditional use permit application shall contain a reclamation plan describing present efforts and future reclamation plans related to the site.

Applicant Response: The application packet is supported by a reclamation plan that contains all of the elements noted in this section. *See* Ex. 22.

(4) The following environmental and operational considerations shall be reviewed prior to changes in the documents referenced above:

(a) Geology;
(b) Groundwater and surface water;
(c) Soil depth and classification, and erosion control factors;
(d) Slope; and
(e) Cover material availability, transportation, and use.

Applicant Response: The application packet is supported by Exs. 9, 10, and 22. These engineering documents contain, address, and review all of the elements noted in this section.

G. BCC 77.405 Review of DEQ Permits. This section states:

Copies of materials submitted to the Oregon Department of Environmental Quality as a part of any permit process shall be submitted to the Planning Official. If at any time the Planning Official determines that permit application materials or conditions of DEQ permit are judged to merit public review, a Public Hearing before the Planning Commission shall be scheduled.

Applicant Response: A copy of the existing DEQ Permit #306 is included with the submittal items, along with correspondence related to the expansion work plan). Upon approval by the County, Applicant will apply to DEQ for the currently proposed development (to ensure conformance with all DEQ requirements) and will provide the DEQ submittal materials to the Planning Official (to determine whether the materials merit additional public review). If the future DEQ permit changes are judged by the Planning Official to merit additional public review, Applicant understands that an additional Public Hearing before the Planning Commission may be scheduled at that time.

V. COMPLIANCE WITH BENTON COUNTY CODE CHAPTER 60—FOREST CONSERVATION

A. BCC 60.005 (Purpose). This section states:

(1) The Forest Conservation Zone shall conserve forest lands, promote the management and growing of trees, support the harvesting of trees and primary processing of wood products, and protect the air, water, and wildlife resources in the zone. Resources important to Benton County and protected by this chapter include watersheds, wildlife and fisheries habitat, maintenance of clean air and water, support activities related to forest management, opportunities for outdoor recreational activities, and grazing land for livestock. Except for activities permitted or allowed as a conditional use, non-forest uses shall be prohibited in order to minimize conflicts with forest uses, reduce the potential for wildfire, and protect this area as the primary timber producing area of the County.

(2) The provisions of this Chapter are not intended to regulate activities governed by the Forest Practices Act and Rules.

(3) The provisions of this Chapter are based on the mandatory standards related to land use activities on forest land specified under Oregon state statutes, and Goal 4 of the Oregon Land Use Planning Program and the implementation requirements adopted by the Land Conservation and Development Commission pursuant to Chapter 660, Division 6 of the Oregon Administrative Rules.

Applicant Response: The provisions of this section establish the purpose of the FC zone. This section does not establish any measurable development standard or approval criteria. Conformance with the established standards of this chapter and the conditional use approval criteria will implement the purposes stated in this section.

B. BCC 60.020 (Standards for Application for the Forest Conservation Zone). This section states:

> **The Forest Conservation Zone is applied to areas designated Forestry on the adopted Comprehensive Plan Map in compliance with Statewide Planning Goal 4 and OAR 660. This zone consists of areas containing forest soils which are not otherwise subject to an exception of the statewide planning goals. The Forest Conservation Zone is also applied to other lands necessary to preserve and maintain forest uses consistent with existing and future needs for forest management. Forest land capability is indicated by the nature and type of soil, slope, size and location of the property, the suitability of the terrain, and other similar factors. The Forest Conservation Zone is also applied to intervening lands which are suitable for forest management related uses or needed to protect forest land.**

Applicant Response: This section establishes how the FC zone is to be implemented; it does not establish any measurable development standard or approval criteria.

C. BCC 60.030 Definitions. This section states:

> **As used in this chapter * * *[.]**

Applicant Response: It is understood that the definitions of this section will be used in the review of this application.

D. BCC 60.050 Notice of Pending Action. This section states:

> **Notice of all land use applications for new permanent dwellings and land divisions in the Forest Conservation Zone shall be mailed to the Department of Land Conservation and Development and the Department of Forestry at their Salem office at least ten (10) days prior to the date of decision or permit issuance. The information shall contain the information set forth in BCC 51.615.**

Applicant Response: The proposal does not include any new dwellings or a land division; this provision is therefore not applicable.

E. BCC 60.075 Period of Validity of Discretionary Decisions. This section states:

(1) When a discretionary decision under ORS 215.416 approves a dwelling pursuant to BCC 60.105(14) or (17), 60.108, or 60.109, the approval shall be void four years from the date of final decision if the development action is not initiated in that period. "Development action" typically means the property owner has submitted a complete application for a building permit for the dwelling or manufactured dwelling placement permit.

(a) One extension may be granted for two additional years.

(b) Five additional one-year extensions may be granted. Extensions shall only be granted if:

(A) The applicant makes a written request for the extension prior the expiration of the final approval or a previous extension, whichever is applicable;

(B) The applicable residential development statute has not been amended following the issued land use decision, except the amendments to ORS 215.750 Forest Dwelling Template Test by section 1, chapter 433, Oregon Laws 2019 (Enrolled House Bill 2225); and

(C) An applicable rule or land use regulation has not been amended following the issuance of the land use decision, unless allowed by the county, which may require that the applicant comply with the amended rule or land use regulation.

(c) Approval of an extension is not a land use decision and is not subject to appeal as a land use decision.

(2) A discretionary decision, other than a dwelling identified in subsection (1) of this section or a land division, approving a proposed development on Forest Conservation land outside an urban growth boundary is void two years from the date of final decision if the development action is not initiated in that period.

Applicant Response: This section establishes a time limit within which a new CUP must be initiated. Applicant understands the period of validity that is established in this section and plans to develop the site as provided in the draft conditions of approval, attached as Exhibit 21.

F. BCC 60.080 Soils Designations. This section states:

(1) For purposes of determining the "cubic feet per acre per year" in the review of an application for a dwelling pursuant to BCC 60.108(2), the county shall use the average annual increase in cubic foot volume of wood fiber per tract for fully stocked stands at the culmination of mean annual increment as reported by the USDA Soil Conservation Service/Natural Resources Conservation Service (NRCS) soil survey information, USDA Forest Service plant association guides, Oregon Department of Revenue western Oregon site class maps, or other information determined by the State Forester to be of comparable quality. Where such data are not available or are shown to be inaccurate, an alternative method for determining productivity may be used. An alternative method must provide equivalent data as explained in the Oregon Department of Forestry's Technical Bulletin entitled "Land Use Planning Notes Number 3 dated April 1998" or successor document and be approved by the Oregon Department of Forestry.

(2) For purposes other than those described in subsection (1), the County shall use the soil designation most recently published by the Natural Resources Conservation Service, except that the County may use more detailed soils data provided it is related to the NRCS land capability classification and is prepared by a soils scientist certified for changing soil designations by the Oregon Department of Agriculture.

Applicant Response: In the event that soil designation is necessary, Applicant understands that the County shall use the soil designation most recently published by the NRCS, except that the County may use more detailed soils data, provided it is related to the NRCS land capability classification and is prepared by a soils scientist certified for changing soil designations by the Oregon Department of Agriculture.

G. BCC 60.105 Permitted Uses Allowed in the Forest Conservation Zone.

Applicant Response: The Project is not a permitted use in the zone and so this section does not apply.

H. BCC 60.106 to 60.109 Dwellings In Forest Conservation Zone.

Applicant Response: The Project does not include a dwelling and so these sections do not apply.

I. BCC 60.205 Conditional Uses Subject to Approval by the Planning Official.

Applicant Response: As detailed below, the proposed uses on the FC-zoned properties require review and approval by the Planning Commission, not the Planning Official; therefore, this section does not apply.

J. BCC 60.215 Conditional Uses Subject to Review by the Planning Commission.

This section states:

> **The following uses may be allowed in the Forest Conservation Zone by a conditional use permit approved by the Planning Commission in conformance with the criteria set forth in BCC 60.220, 53.215, and 53.220.**
>
> **(11) Disposal site for solid waste approved by the Benton County Board of Commissioners and the Oregon Department of Environmental Quality together with equipment, facilities, or buildings necessary for its operation.**

Applicant Response: Whether serving the existing or proposed disposal site, the proposed Project elements on the FC-zoned land fall into the category of equipment, facilities, or buildings necessary for the landfill operation. Coffin Butte Landfill has been approved by the County Commissioners and is operating under DEQ Permit #306 (Exs. 23-25). For the above-noted reasons, a CUP can be approved by the Planning Commission for the FC-zoned portions of the property.

K. BCC 60.220 Conditional Use Criteria. This section states:

(1) A use allowed under BCC 60.205 or 60.215 may be approved only upon findings that the use:

(a) Will not force a significant change in, or significantly increase the cost of, accepted farming or forest practices on agriculture or forest lands[.]

Applicant Response: Applicant notes that this section by its terms only applies to the development on the FC-zoned property. As noted above, however, the existing farm and forest uses on the Adjacent Properties and in the area have developed over the years while operating adjacent to Coffin Butte Landfill and its subsidiary operations. Based upon the above findings, the relocation of the working face south of Coffin Butte Road will not materially affect or increase negative impacts on surrounding properties, whether in farm or forest or residential use. Most of the FC-zoned property that is part of the Project is currently being used for equipment, facilities, or buildings accessary to the landfill use; they are simply being relocated to accommodate the new working face.

The new or relocated elements that are proposed on the FC-zoned lands are an 1,800-square-foot employee building and parking, access road modifications, the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, cut activities for landfill, and a shop/maintenance area to support the landfill. These elements will slightly reduce the amount of land that is available for farm and forest uses; however, except as noted below the farm use on Tax Lot 1200, the area of these improvements is not actively engaged in commercial farm or forest activities within the meaning of BCC 51.020(15) and (24)(a) and is currently used for landfill operations or other non-forest or non-agricultural use. The majority of the surrounding properties are owned by Applicant and are engaged in commercial farming operations and/or open space/buffer uses.[47] For reasons stated previously, the proposal will not substantially impact public roads that serve the area or substantially interfere with uses on Adjacent and Nearby Properties. Furthermore, the primary access to the site will continue to be from Coffin Butte Road. Other than slightly reducing the amount of land that can be used for farming or forest practices, the proposal will not impact farming or forestry activities in the area; thus, it will not force a change or increase the cost of these activities. The proposal therefore conforms to this approval criterion.

[47] Applicant notes that use of forest land for buffer areas or visual separation of conflicting uses is a “forest use” within the mean of BCC 51.020 (24) (b).

(b) Will not significantly increase fire hazard or significantly increase fire suppression costs or significantly increase risks to fire suppression personnel[.]

Applicant Response: The elements that are proposed on the FC-zoned lands include an 1,800-square-foot employee building and parking, access road modifications, the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, cut activities for landfill, and a shop/maintenance area to support the landfill. Furthermore, the roadway system will not be significantly altered by the design (a left-turn lane and bike lanes will be added, as well as stormwater management facilities).

The Fire Risk Assessment Report, attached as Exhibit 20, details the lack of fire risks and describes Applicant's Fire Mitigation Plan and protocols for the entire landfill operation. The conclusion of the report is that "operations at Coffin Butte Landfill do not present a significant fire risk."

For the above-noted reasons, the proposed improvements on the FC-zoned land will not significantly increase fire hazard or suppression costs or significantly increase risks to fire-suppression personnel.

(c) Complies with criteria set forth in BCC 53.215 and 53.220.

Applicant Response: A comprehensive review of the referenced sections was included above. The above-noted findings are incorporated herein.

(2) As a condition of approval of a conditional use permit, the owner shall sign the following declaratory statement to be recorded into the County Deed Records for the subject property on which the conditional use is located that recognizes the rights of adjacent and nearby land owners to conduct forest operations consistent with the Forest Practices Act and Rules, and that recognizes the hazards associated with the area:

The property herein described is situated in the Forest Conservation Zone in Benton County, Oregon. The purpose of such zone is to conserve forest land, promote the management and growing of trees, support the harvesting of trees and primary processing of wood products, minimize conflicts with forest and farm uses, and protect the air, water, and wildlife resources in the zone. Residents may be subjected to customary forest or farm management practices

which produce noise, dust, fumes, smoke, and other impacts. The resource nature of surrounding properties can result in herbicide and pesticide spraying, slash burning, timber cutting, farm operations, crown fires, hunting, use by big-game, bears, and cougar, and other accepted resource management practices. (Crown fires are fast-moving, high-intensity forest fires in which the fire spreads from one tree crown to the next rather than only along the ground.) Resource uses are the preferred uses in this zone. Activities by residents can create management difficulties or increased costs for nearby farm or forest operations. Grantee acknowledges the need to avoid activities that negatively impact nearby farm or forest uses.

In consideration for the approval by Benton County of the following use: _____, the grantee, including heirs, assigns and lessees, recognizes that such impacts are likely to occur, and agrees therefore that no action shall be brought at law or before any governmental body or agency involving the non-negligent utilization or continuation of accepted resource-management practices such as, but not limited to, the examples noted above. As used in this section, "accepted resource management practices" means a mode of operation that is authorized under the Forest Practices Act or necessary to a farm or forest operation to obtain a profit in money.

Applicant Response: Upon approval and as required by this section, Applicant will execute the above-noted declaratory statement and have it recorded in the Benton County deed records. This requirement is included as a condition of approval in Exhibit 21.

L. BCC 60.305 to 60.330 (Creation of New Parcels or Lots; Property Line Adjustments).

Applicant Response: The proposal does not include the creation of new lots or parcels, or a property line adjustment; therefore, these sections do not apply.

M. BCC 60.405 Siting Standards and Requirements. This section states:

All new structures allowed in the Forest Conservation Zone shall be sited in compliance with BCC Chapter 99 and the following standards designed to make such uses compatible

with forest operations and agriculture, to minimize wildfire hazards and risks, and to conserve values found on forest lands:

(1) The owner of any new structure shall maintain a primary and secondary fuel-free fire-break surrounding the structure on land that is owned or controlled by the owner, in accordance with the provisions in "Recommended Fire Siting Standards for Dwellings and Structures and Fire Safety Design Standards for Roads" dated March 1, 1991, and published by the Oregon Department of Forestry.

Applicant Response: The only proposed new structures are the employee building on Tax Lot 1101 and the proposed shop on Tax Lot 1200. Applicant owns the property upon which these structures are proposed, along with all surrounding properties. Applicant proposes structures that conform to the provisions of this section. *See* Ex. 2, sheets 5, 11, and 12. The final design of the shop building has not been determined, but it can be sited in the designated area in compliance with the requirements of this section. *See* Ex. 2, sheet 5.

(2) Non-residential structures shall be located at least twenty (20) feet from a parcel or lot line, except no setback is required for a structure of 120 square feet or less. A required side or rear setback for a non- residential structure may be reduced to three (3) feet if the structure:

(a) Is detached from other buildings by five (5) feet or more;

(b) Does not exceed a height of twenty (20) feet; and

(c) Does not exceed an area of 500 square feet.

Applicant Response: As detailed on the site plan, the new employee building and shop proposed to be located at least 20 feet from all property lines, which conforms to the provisions of this section. *See* Ex. 2, sheets 5 and 6.

(3) A structure which is not a water dependent use shall be placed at least fifty (50) feet from the ordinary high water line of any river or major stream. In the case of a creek or minor stream, a structure which is not a water dependent use shall be placed at least twenty-five (25) feet from the ordinary high water line.

Applicant Response: The structures are not water-dependent and there is not a river or major steam in the vicinity of the proposed buildings; the buildings therefore conform to this standard.

(4) All new development approved by Benton County shall have a site specific development plan addressing emergency water supplies for fire protection which is approved by the local fire protection agency[.]

Applicant Response: Coffin Butte Landfill is currently served by the Adair Fire Protection District and therefore has access to water in emergency circumstances. In addition, as noted in the Fire Risk Assessment Report (Ex. 20), the landfill has a site-specific fire mitigation plan. As noted in the report, Applicant maintains a 4,000-gallon water truck with spray bar and hose attachment on site that is used routinely in dry weather for dust control and can be used as an emergency water supply for firefighting. Applicant is in compliance with this requirement.

(5) All buildings shall have roofs constructed of materials defined under the Uniform Building Code as either Class A or Class B (such as but not limited to composite mineral shingles or sheets, exposed concrete slab, ferrous or copper sheets, slate shingles, clay tiles or cement tiles).

Applicant Response: Upon approval, Applicant will finalize the building plans and will ensure that roof design conforms to the requirements of this section.

(6) All new structures shall be sited on the lot or parcel so that:

(a) They have the least impact on forest operations and accepted farming practices on nearby or adjoining lands[.]

Applicant Response: While the employee building and the shop/maintenance area are the only new structures, the proposal also includes access roads, a scale, and leachate ponds to which this section may apply. The new employee building is located near the existing office building and surrounded by the disposal site and/or buffer lands. The proposed location will not impact farming or forest activities on any nearby or adjoining lands. The employee building is designed to add supporting facilities for the current employees, so will not materially increase traffic or parking on the site. The leachate ponds and shop/maintenance area are proposed to be located in an area of Tax Lot 1200 that is currently farmed under lease; however, the property also contains a gas-to-energy plant and the properties to the west and north are zoned LS, to the east is Highway 99W, and to the south is additional land that is owned by

Applicant and maintained as open space. As noted above, the lessee leases other farmland from VLI west of Soap Creek Road, so the loss of some of the lands on Tax Lot 1200 for farming could have some impact on the lessee's farming operations on those lands in terms of economies of scale. That impact is mitigated by the fact that the other leased properties are located over three quarters of a mile away. Also, the lease specifically provides for termination if VLI needs any of the lands for landfill operations. *See* Ex. 31. Finally, the improvements are located on the western side of the farmed portion of Tax Lot 1200, leaving approximately 40 percent of the farmed portion of the property available for farming. The leachate ponds and the shop/maintenance area on the subject property will not significantly impact farming or forest operations on any nearby or adjoining lands.

Overall, the proposed design will not significantly impact forest operations and accepted farming practices on nearby or adjoining lands and will be sited to have the least impact. The proposal complies with this criterion.

(b) The siting ensures that adverse impacts on forest operations and accepted farming practices on the tract will be minimized;

As noted above, the new structures are clustered on the western boundary of Tax Lot 1200, minimizing the loss of farmed property to the degree practicable. The lease provides for termination by VLI upon 30 days' notice if VLI determines that it needs the property for use or development of the landfill. The lease further provides, however, that the tenant is not required to surrender the property until the harvesting of any crops planted prior to the date of the notice of termination. This mitigates the impact of the termination on the farming operation.

(c) The amount of forest lands used to site access roads, service corridors, the dwelling and structures is minimized[.]

Applicant Response: These provisions generally require that the Project be sited to minimize the impacts on forest lands. The relocated leachate ponds have been sized to accommodate the needs of the site and are not oversized. Furthermore, rather than utilizing the majority of the flatter land, these have been designed into the existing slope, which will lessen the amount of grading needed and lessen the amount of currently farmed land that will be impacted. Regarding the employee building, this is proposed to be as small as needed and clustered near the existing office and nearest to the existing road and access drive, so that additional driveways and parking areas are not needed. Lastly, the access-road modifications are not located in any area where farm or forest operations are occurring.

Overall, the building, access drives, and leachate pond locations have been designed and proposed to sizes and in locations that will minimize their impacts or farm and forest operation on the subject property in conformance with these approval criteria.

(d) The risks associated with wildfire are minimized.

Applicant Response: The elements that are proposed on the FC-zoned lands are an 1,800-square-foot employee building and parking, access road modifications, the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, cut activities for landfill, and a shop/maintenance area to support the landfill. Although this criterion applies only to land in the FC zone, Applicant conducted a fire risk assessment for the entire landfill operation, attached as Exhibit 20. After assessing Applicant's Fire Mitigation Plan and the types of fires that could occur, the report concludes that "operations at the Coffin Butte Landfill do not present a significant fire risk." The Project is in conformance with this approval criterion.

(7) To satisfy the criteria in BCC 60.405(6), the Planning Official may require that new structures be sited close to existing roads, clustered near existing structures, and sited on that portion of the parcel least suited for growing trees.

Applicant Response: As documented on the site plan, the new employee building is proposed in close proximity to the current Coffin Butte Road and office building. Furthermore, it is served by the existing drive. As proposed, the application conforms to this criterion.

N. BCC 60.410 Additional Siting Standards and Conditions for Dwellings.

Applicant Response: The Project does not include a dwelling; therefore, this section does not apply.

VI. COMPLIANCE WITH BCC CHAPTER 87—GOAL 5 RESOURCES.

A. BCC 87.010 Application (Wetland Overlay Zone). This section states:

> **The Wetland Overlay Zone shall apply to the Jackson-Frazier Wetland as inventoried in the February 1991 ESEE Analysis adopted into the Natural Resources and Hazards Background Report of the Benton County Comprehensive Plan.**

Applicant Response: While the landfill site contains wetlands, it is not part of the Jackson-Frazier Wetland and is not located within the Wetland Overlay zone, and there are no other Goal 5-designated wetlands on the Development Site. For these reasons, this section does not apply.

B. BCC 87.200 Purpose (Sensitive Fish and Wildlife Habitat Zone).

This section states:

> **The Sensitive Fish and Wildlife Habitat Overlay Zone shall protect sensitive habitats not protected by other programs such as the Willamette River Greenway Program, the Oregon Forest Practices Act or the "Cooperative Agreement between the Board of Forestry and the Fish and Wildlife Commission." The zone shall protect areas that have been identified by Oregon Department of Fish and Wildlife or Oregon Department of Forestry as containing a significant nesting, or roosting site or watering habitat for species that are classified as threatened or endangered and areas designated as sensitive bird nesting, roosting, or watering sites. Habitat protection shall be achieved through the use of site specific management plans that ensure that proposed uses and activities will not destroy or result in the abandonment of these areas.**

Applicant Response: The subject property is not located in the labeled Sensitive Fish and Wildlife Habitat Overlay on the Benton County Zoning Map. This section does not apply to the Project.

VII. COMPLIANCE WITH BCC CHAPTER 99—GENERAL DEVELOPMENT STANDARDS

A. BCC 99.005 Scope. This section states:

All development within Benton County, including land partitions, subdivisions and associated land development, and the construction of residential dwellings, industrial, commercial, or public buildings and other accessory structures shall conform to applicable standards of this chapter.

Applicant Response: The proposal includes development within Benton County; this chapter therefore applies. The applicable sections of this chapter are noted below.

B. BCC 99.105 to 99.115. These sections state:

BCC 99.105 Description of Sensitive Land.

Certain land characteristics may render a site "sensitive" to development. Sensitive land includes, but is not limited to:

(1) Land having geologic hazard potential or identified by the Oregon Department of Geology and Mineral Industries in Geologic Hazards of Eastern Benton County or Preliminary Earthquake Hazard and Risk Assessment and Water-Induced Landslide Hazard in Benton County, Oregon, hereby incorporated by reference.

(2) Land containing soils subject to high erosion hazard when disturbed, or lands containing soils subject to high shrink-swell potential as identified by the USDA Soil Conservation Service in the Soil Survey of Benton County Area, Oregon, or the Soil Survey of Alsea Area, Oregon, hereby incorporated by reference, or by a successor document produced by the USDA Soil Conservation Service or a successor agency.

Applicant Response: There appear to be sensitive lands located in areas of the development site.

BCC 99.110 Consideration.

An applicant for a land division or building permit shall consider the geology, topography, soils, vegetation and hydrology of the land when designing a parcel or lot, or siting improvements. The Planning Official or Building Official may impose conditions or modifications necessary to mitigate potential hazards or otherwise provide for compliance with adopted Comprehensive Plan policies, and may require an erosion and sediment control permit. The Planning Official or Building Official shall consider the recommendation of the County Engineer, municipal officials within urban growth boundaries, and other technical sources in the determination of sensitive land conditions and mitigating measures.

Applicant Response: The Application does not include any land divisions but does include structures that will require building permits. As noted previously in this Burden of Proof, Applicant has submitted significant geotechnical, groundwater, and drainage analyses that demonstrate that the Project may be safely sited as designed on the development. *See* Exs. 5, 16, and 17. Applicant expects to be required to obtain an erosion control permit at the time of any ground disturbance to construct site improvements.

BCC 99.115 Mitigating Sensitive Land Conditions.

The following guidelines shall be considered in the establishment of conditions and mitigating measures:

(1) Roads should be located in upland areas on benches, ridge tops and gentle slopes as opposed to steep hillsides and narrow canyon bottoms.

(2) Native vegetation removal or soil disturbance should be minimized on moderate and steep slopes and hillsides. If possible, avoid such activities during winter months.

(3) Surface water runoff should be minimized or provide appropriate means for handling surface water runoff.

(4) Techniques should be utilized that minimize erosion, such as protective groundcover.

(5) Engineering assessment of hazard potential should be required for land development.

(6) Geotechnical investigations should be required for roads and foundations in slide-prone areas.

Applicant Response: Again, Applicant has submitted significant geotechnical, groundwater, and drainage analyses that demonstrate that the Project may be safely sited as designed on the development. *See* Exs. 5, 16, and 17.

BCC 99.225 Development Activities in Wetlands. This section states:

(1) If the subject property is situated wholly or partially within areas identified as wetlands on the Statewide Wetlands Inventory on file in the office of the Benton County Community Development Department, and if a permit from the Department of State Lands has not been issued for the proposed activity, the Planning Official shall provide notice to the Division of State Lands, the applicant, and the owner of record within five days of receipt of the following types of applications:

(a) Subdivisions planned unit developments.

(b) Building permits for new structures.

(c) Conditional use permits and variances that involve physical alterations to the land or construction of new structures.

(d) Other development permits and approvals that allow physical alteration of the land, including development in the floodplain.

(2) Benton County shall process the land use application and respond to comments from the Department of State Lands consistent with the policies and procedures of that Department.

Applicant Response: The subject property contains wetlands; therefore, Applicant understands that notice may be sent to DSL. Applicant will conduct a wetlands delineation, and if a wetland is impacted, it will be mitigated through coordination with DSL. There is a mitigation wetland located on site that was protected by covenants in 2017 as result of a prior fill/removal permit approved by DSL, which required mitigation. The proposed expansion does not impact this mitigation wetland. The draft conditions of approval require Applicant to complete a wetland delineation in compliance with DSL requirements. *See* Ex. 21.

D. BCC 99.405 General Rule of Frontage. This section states:

(1) Every new dwelling and new structure designed for commercial, industrial, or public occupancy which is not part of an existing use on a parcel or lot shall be sited on a parcel or lot which has a minimum of twenty-five (25) feet of frontage along an improved public road.

Applicant Response: The only new structures is the employee building which will be located on property with frontage on Coffin Butte and Soap Creek roads. There will be over 25 feet of frontage on both roads. The proposal therefore complies with this standard.

E. BCC 99.505 Dedication of Right-of-Way. This section states:

(1) An applicant for a partition within an urban growth boundary may be required to dedicate right-of-way as a condition of approval to provide for the future development or improvement of existing and planned transportation facilities in accordance with adopted Comprehensive Plan policies and requirements.

(2) Where an existing road right-of-way does not comply with the minimum County standard for the applicable road classification, an applicant for a partition located in a non-resource zone shall dedicate to the County sufficient right-of-way to meet the minimum County road standard along the frontage of the parcel or lot being divided. Such dedication shall occur prior to final approval of the partition. Such dedication will not be required:

(a) Where the applicant signs a covenant to be recorded in County Deed Records waiving building rights until such time as sufficient right-of-way is dedicated or otherwise acquired; or

(b) Where the partition does not result in the creation of one or more developable parcels or lots. A newly created parcel or lot shall not be considered developable if no new dwelling or use can be located on the parcel or lot without further partitioning or without first obtaining a conditional use permit.

(3) Property acquired for public road purposes shall be surveyed and monumented by the County.

Applicant Response: The provisions of this section apply to partitions. The proposal is not for a partition; the majority of this section is therefore not applicable. In the event that survey work or monumentation for the Coffin Butte Road improvements are needed, Applicant will complete such survey and monumenting work.

F. BCC 99.510 Road Approach Permits. This section states:

(1) If a new road approach is proposed, the applicant shall obtain a road approach permit prior to construction of the road approach. If the proposed road approach would connect to a State highway, the permit shall be obtained from the State Highway Division. If the proposed road approach would connect to any other public road, the permit shall be acquired from Benton County. A road approach permit is not required for the construction of an approach connecting with a private road or street.

(2) A new road approach shall be constructed in accordance with the specifications prescribed by the County Engineer or the State Highway Division. The specifications shall be related to the use of the driveway, the nature of the adjoining public road, and the characteristics of drainage structure at the selected location.

(3) An occupancy permit or final inspection approval required in accordance with the State Building Code shall not be issued for any structure on a parcel or lot with a road approach which was installed in violation of permit requirements, specifications, or conditions. [Ord 90-0069]

Applicant Response: The proposal will modify the access point on the south side of Coffin Butte Road, removing the access point serving the existing leachate ponds and relocating the access point serving the power facility (to serve the southern development area). Applicant will obtain all permits needed for these modifications prior to initiating the use.

G. BCC 99.515 Road Design and Construction Standards. This section states:

(1) Schematic layout of proposed public and private roads or streets shall adhere to the following general guidelines:

(a) Streets should be aligned to join with planned collector and arterial streets and/or existing streets.

(b) Streets should be designed to respect topography and meet all applicable engineering standards.

(c) Intersections shall be approximate or actual right angles.

(d) Surface drainage shall be toward the intersecting street or through a drainage easement on abutting parcels or lots.

(e) Cul-de-sacs shall end with a minimum turning radius of 45 feet; however, for cul-de-sacs less than 200 feet in length within areas zoned for single-family residential use, an alternative design ("T", "Y", or other) or location may be approved by the County Engineer.

(f) Cul-de-sacs in excess of 900 feet in length within commercial or industrial areas or which serve more than 20 residential parcels or lots shall provide a secondary means of access for emergency use (fire lane).

(g) Dead-end streets shall be designed to connect with future streets on adjacent property. A temporary turn-around may be required.

(h) The County may reserve a one foot wide strip of public road right-of-way adjoining private land for the purpose of controlling access.

(i) Development containing more than twenty (20) parcels or lots shall contain multiple points of access into the development.

(j) Geometric design will follow AASHTO: A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS & STREETS, 1984 ED., standards, except when the County Engineer finds terrain or other conditions making it impossible or unfeasible to do so.

Applicant Response: The proposal includes improvements to Coffin Butte Road. As documented on the site plans, the design includes adding bike lanes and a left-turn lane, and related storm-drainage improvements. The proposed improvements conform to County standards and the provisions of this section.

No dead-end streets or cul-de-sacs are proposed. The proposed improvements conform to the standards of this section. *See* Ex. 2, sheets 5, 7, 8, and 24.

(2) All roads within existing or proposed public right-of-way located outside of an Urban Growth Boundary shall be designed and constructed pursuant to the Rural Design Criteria identified in Table I and Figure II. Plans and construction shall be approved by the County Engineer.

TABLE I, RURAL DESIGN STANDARDS

Local road standards are designated as RL-1, RL-2 and RL-3. Collector standards are designated as RC-1 and RC-2. Arterial standards are designated as RA-1 and RA-2.

Standard	Zones	Projected ADT	Projected DHV	Minimum ROW	Surface Width	Paving Material	Crushed Base Equivalent
RL-1	Resource	0-100	<30/hr	50 ft	18 ft	AC,PCC, APM	18 inches
RL-2	Dead end RR	0-200	<30/hr	50 ft	18 ft	AC,PCC APM	18 inches
RL-3	Resource, RR <1,000ft	100-750	<100/hr	60 ft	20 ft	4 inch AC,PCC	18 inches
RC-1	Resource	100-750	<100/hr	60 ft	20 ft	4 inch AC,PCC	18 inches
RC-2	Resource, RR	750-2000	<300/hr	60-70ft	24 ft	4 inch AC,PCC	20 inches
RA-1	All zones	1000-5000	<900/hr	80 ft	24-34ft	6 inch AC,PCC	20 inches
RA-2	All zones	>5000	>900/hr	100 ft	50-70ft	6 inch AC,PCC	24 inches

Standard	Shoulder	Maximum Grade	Bike Path	Min. Curve Radius	Design Speed	Parking	Road Approach
RL-1	4 ft gravel	17%	None	200 ft	30 mph	Limited Emergency	Shared 400ft gap
RL-2	4 ft gravel	15%	None	200 ft	30 mph	Parking Allowed	Shared 250ft gap
RL-3	5 ft paved	15%	RR Zone Class III	250 ft	30 mph	Limited Emergency	Shared 450ft gap
RC-1	5 ft paved	12%	RR Zone Class III	500 ft	45 mph	Emergency Only	Shared 400ft gap
RC-2	5 ft paved	10%	RR Zone Class III	760 ft	45 mph	Emergency Only	Shared 400ft gap
RA-1	6 ft paved	5%-8%	All zones Class III	800 ft	50 mph	Emergency Only	None
RA-2	6ft-12ft paved	4%-6%	All zones Class III	800 ft	50 mph	Emergency Only	None

Applicant Response: The improvements to Coffin Butte Road include only a left-turn lane and bike lanes. The proposed improvements conform to the requirements of this section and the County TSP. *See* Exs. 2 and 15.

The standards of this section are consistent with the cross-section of the County TSP; therefore, the proposed design and planned improvements are consistent with this section.

> **(3) All roads within existing or proposed public right-of-way located within an Urban Growth Boundary shall be designed and constructed pursuant to Urban Design Criteria identified in Table II and Figure III. Plans shall be reviewed and approved by the County Engineer in consultation with public works staff of the appropriate city.**

Applicant Response: The property is not located within a UGB; therefore, this section does not apply.

> **(4) A private road or street created by partition, or an existing private or public road which provides for access to parcels or lots created by partition shall be improved to the following County Secondary Road Standards. Required plans and construction of improvements shall be inspected and approved by the County Engineer, and the applicant shall pay an engineering review fee[.]**

Applicant Response: No partitions are proposed; therefore, this section does not apply.

> **(5) For the protection of the public interest, the County Engineer may require improvements in excess of adopted standards, if terrain or other conditions warrant such a change.**

Applicant Response: The proposed roadway improvements have been designed by an engineering firm licensed in the State of Oregon, along with a traffic engineer licensed in the State of Oregon. The qualified professionals working on the Project have designed roadway improvements that conform to County standards and engineering best practices. Applicant understands that this section allows the County Engineer to require additional improvements, if warranted.

(6) Additional off-site improvements may be required as a conditions of land division if it is found by the Planning Official, County Engineer, Planning Commission or Board of Commissioners that the land division will have a significant impact on the level of service or maintenance costs for existing roads, drainage, or other public facilities.

Applicant Response: The proposal does not include a land division; therefore, this section does not apply.

H. BCC 99.520 Improvements in a Public Right-of-Way. This section states:

An applicant intending to construct or upgrade a roadway within a public right-of-way shall be responsible for design and installation of all improvements within the public road right-of-way. Such improvements shall commence from an existing improved public roadway and continue to the subject property and twenty-five (25) feet along the frontage of the proposed parcel or lot, or to the private driveway serving the building site, whichever is greater. Required plans and construction of improvements shall be inspected and approved by the County Engineer.

Applicant Response: The proposal includes improvements in Coffin Butte Road (left-turn lane, bike lanes, and related stormwater improvements). Applicant understands that it will be responsible for design and installation of all improvements and plans to do so in accordance with the provisions of this section. *See* Ex. 2, sheets 5, 7, and 8.

I. BCC 99.605 Annexation to Fire District Required. This section states:

If a proposed parcel or lot in a non-resource zone abuts a rural fire protection district, the applicant shall petition for and obtain annexation to the district prior to final approval of a land division.

Applicant Response: The application does not propose creating a new parcel or lot, and the entire Project is currently within the Adair Fire District, so annexation is not necessary.

J. BCC 99.650 Definitions. As used in BCC 99.650 through 99.680 (Stormwater Management).

Applicant Response: The definitions of this section are used through this narrative, and Applicant understands that the definitions will be used through the review of this application.

K. BCC 99.660 Erosion and Sediment Control. This section states:

(1) Purpose: The purpose of this section is to:

(a) Preserve and enhance the health, safety, welfare, financial investment in public and private infrastructure, private property value, and the quality of life of the inhabitants of Benton County by minimizing the risk of flooding, erosion, sedimentation, and other stormwater impacts; and

(b) Maintain or improve water quality within Benton County as required under State and Federal National Pollution Discharge Elimination System law.

Applicant Response: This section establishes a purpose; however, it does not contain any measurable development standards or approval criteria. Applicant understands that conformance with the standards of this section will ensure consistency with the purpose stated in this section.

(2) Applicability. The provisions of this section shall apply to all unincorporated areas of Benton County.

Applicant Response: The subject property is within an unincorporated area of Benton County; this section therefore applies. Upon approval of this CUP and prior to construction activities, Applicant plans to apply for all required additional development permits, including those related to erosion and sediment control, described in this section.

L. BCC 99.670 Long-Term Stormwater Management. This section states:

99.670 Post-Construction Stormwater Management

(1) Purpose. Establish stormwater management requirements and controls to protect and safeguard the health, safety, welfare, financial investment in public and private

infrastructure, and private property value, and minimize flooding and sedimentation in areas where structural and non-structural stormwater management is required to improve water quality and manage post construction runoff from new development and redevelopment projects that result in the creation or replacement (re-development) of 0.25 acres (10,890 square feet) or more of impervious surface.

(2) Applicability. Land development within unincorporated Benton County shall comply with the requirements of this section.

(3) Permit Required. A property owner increasing or replacing the impervious surface on a property shall comply with this section and the technical standards outlined in the Stormwater Support Documents. An individual construction that does not exceed the 0.25-acre threshold on its own shall nonetheless contribute to the cumulative threshold as described in subsection (a)(B) of this section.

(a) An approved Post-Construction Stormwater Permit shall be obtained prior to initiation of ground-disturbing activities if both (A) and (B) are met (exceptions are listed in subsection (b):

(A) The plan of development or redevelopment is associated with:

(i) Construction or land uses that require a permit or other review by Benton County; and

(ii) Any of the following:

(1) Construction of a public or private road, driveway, or structure; or

(2) Site preparation, associated installations (such as a septic system drainfield, ground-source heat pump, or tennis court), landscaping, clearing vegetation and other ground-disturbing activities related to new development or redevelopment construction.

(B) The total area of proposed new and replaced impervious surface combined with the cumulative total of all impervious surface established since March 1, 2023, will be 0.25 acre (10,890 square feet) or more. For subdivisions

and partitions, impervious surface area that will be established through construction on resulting lots/parcels shall be addressed through a Post-Construction Stormwater Permit approved prior to final plat approval, as described in subsection (4)(b).

(b) Exempt Activities. The following activities are exempt from the permit requirement in subsection 3(a):

(A) Accepted farm practices;

(B) Construction of buildings used exclusively for agricultural purposes and located outside the MS4. The applicant shall demonstrate to the satisfaction of the Planning Official that the structure will be used only for agricultural purposes. The Planning Official may require a deed restriction acknowledging and notifying future property owners of the limitation on use of the structure;

(C) Forest practices performed pursuant to the Oregon Forest Practices Rules. Upon completion of such forest practices or expiration of Forest Practices authorization, a Benton County Post-Construction Stormwater Permit is required unless the land has been replanted at stocking levels consistent with Oregon Department of Forestry standards;

(D) Excavations for gas or oil facilities for which the operator demonstrates compliance with 40 CFR § 122.26;

(E) Emergency measures to protect life, property, public infrastructure, or essential services, in which case a Stormwater Site Plan approval shall be obtained as soon as possible after-the-fact;

(F) Fish passage, stream enhancement, and wildlife habitat projects that comply with local, state and federal standards and permit requirements, provided that evidence of such compliance is submitted to Benton County Public Works prior to initiation of the activity;

(G) Repairs to any stormwater facility as deemed necessary by Benton County;

(H) Mining activities performed pursuant to applicable state permit requirements;

(l) Activities, conducted by public agencies, that meet or exceed state or federal standards for post-construction stormwater management.

(4) Permit Procedures and Requirements.

(a) The property owner shall submit all of the following:

(A) Post-Construction Stormwater Permit Application form.

(B) Post-Construction Stormwater site plan and additional documentation deemed appropriate by the County Engineer and/or Planning Official to demonstrate compliance with this section. Stormwater detention and treatment shall be:

- **(i) Designed in accordance with the Stormwater Support Documents, as interpreted by the County Engineer. Within the urban growth boundary of an incorporated city, structural and non-structural requirements will be consistent with the current standards of the pertinent city; and**
- **(ii) Designed to accommodate the cumulative total of all impervious surface established since March 1, 2023, including the proposed additional impervious surface.**

(C) Fee(s) established by the Board of County Commissioners.

(D) The Post-Construction Stormwater Management Plan shall be designed, stamped and signed by a engineering geologist or engineer licensed in the State of Oregon.

(b) Subdivision or Partitions. The Post-Construction Stormwater site plan and permit application shall address all impervious surface that will be established by the subdivision or partition, including but not limited to roads and other infrastructure, dwellings, accessory structures and driveways. Maximum impervious surface area that may be established on each lot or parcel shall be specified and shall be memorialized in a deed restriction running with the lot or parcel or on the plat. Stormwater treatment and detention for the entire buildout of impervious surfaces shall be designed and constructed prior to final plat approval.

(c) A Post-Construction Stormwater Permit may be issued upon determination by the County Engineer that the submitted materials demonstrate compliance with the requirements of this section and the property owner has entered into a Stormwater Management Facilities Long-Term Maintenance Agreement pursuant to subsection (6) of this section. To address specific conditions of a given site, the County Engineer may require modification to the proposed Site Plan and/or to the standard requirements of this section.

(d) Issuance or denial of a Post-Construction Stormwater Permit is not a land use decision and is not subject to the requirements of a land use decision including but not limited to BCC 51.535, BCC 51.605 through 51.625, and BCC 51.805 through 51.840.

(e) The County Engineer may, pursuant to the Stormwater Support Documents and in response to mitigating actions proposed by the applicant, determine that stormwater detention and treatment that would otherwise be indicated pursuant to subsection (3) of this section is not required. The County Engineer shall take such actions as necessary to ensure the long-term viability of such mitigations, including but not limited to requiring a long-term maintenance agreement or similar document.

(5) Improvements Agreement. Required stormwater infrastructure shall be subject to the Improvements Agreement provisions of BCC 99.905 through 99.925.

(6) Long-term Maintenance and Repair of Stormwater Facilities.

(a) Required stormwater facilities shall be constructed and maintained by the property owner.

(b) Stormwater facilities shall be maintained to current Benton County stormwater facility maintenance standards.

(c) The property owner shall enter into a Stormwater Management Facilities Long-Term Maintenance Agreement as required by the County Engineer. The Maintenance Agreement may, at the discretion of the County Engineer, include any or all of the following:

(A) Require the property owner to maintain and repair the stormwater facilities serving the property and located on the property or other private property;

(B) Require proper disposal of accumulated sediment;

(C) Authorize Benton County to enter the property to inspect and to effect emergency repairs or maintenance;

(D) Authorize the County Engineer to require that the property owner effect necessary repairs and maintenance;

(E) Authorize Benton County to bill the property owner for any costs incurred by the County to repair or maintain the facilities;

(F) Authorize the County to record a lien against the property to secure the County's costs in making corrections, plus interest and penalties;

(G) Run with the land as a covenant binding on current and future interest holders; and

(H) Establish other terms or provisions deemed necessary by the County Engineer to ensure the long-term functioning of the facility.

(d) For a stormwater facility serving a single property:

The stormwater facility shall be located on the property that is being served. As an alternative, the applicant may propose an off-site location but shall, through submitted design materials, easements, maintenance agreements and other mechanisms, demonstrate to the satisfaction of the County Engineer that the long-term viability of the facility will be preserved at the alternate location. The County Engineer's determination will be documented in issued Post-Construction Stormwater Permit.

Applicant Response: Stormwater controls have been designed to address the additional impervious areas as a result of the improvements to Coffin Butte Road, the new cell on the Development Site, and the new access roadway. *See* Ex. 2. *See also* Ex. 17 (CEC Preliminary Drainage Report). Applicant acknowledges that these improvements are subject to the Post-Construction Stormwater regulations under BCC 99.670 (1) to (3) and will be required to obtain a post-construction stormwater permit under subsections (3) and (4), and

Applicant will be required to enter into an infrastructure improvement agreement under subsection (5) and a Stormwater Management Long-Term maintenance agreement, if required by the County engineer, under subsection (6). Applicant understands that issuance of a post-construction stormwater permit is not a land use decision under subsection (4)(d) and therefore is not a criterion for approval of the CUP. However, in recognition that the requirement will be applicable to the stormwater improvements, Applicant has included in the draft Conditions of Approval a condition of approval requiring it to obtain the permit at the time of ground disturbance as required by subsection (3)(a).

M. BCC 99.705 to 99.850 Sewage Disposal and Water Supply.

Applicant Response: Water and sewer is not proposed to be extended to the development area. In the event that the employee building needs water and sewer accommodations, it will be served by the same well and subsurface facilities that serve the existing office building. These sections do not apply

N. BCC 99.905 to 99.925 Improvements Agreement. These sections provide:

99.905 Improvements Agreement. When required as a condition of development for a conditional use, partition, subdivision, planned unit development, or stormwater management permit, the applicant shall execute a standard improvements agreement provided by the County Engineer guaranteeing the construction of any required public improvements. The Agreement shall be recorded to put all purchasers and interested parties on notice. The agreement shall provide that:

(1) If at any time there is a breach in the agreement, the Building Official shall withhold issuance of all building permits within the subdivision or partition until such breaches have been satisfactorily corrected.

(2) The applicant shall be responsible for installing all required improvements, including, but not limited to, streets, storm drainage, pedestrian ways, water system, sewage system, etc., to the standards and specifications approved by the County Engineer and/or Board of Commissioners. All work shall be completed to the County Engineer's approval within 18 months of final plat approval, or when building permits have been issued on fifty percent (50%) of the parcels or lots, whichever comes first.

99.910 Review and Inspections. Plans for public improvements required as a condition of development shall be submitted for review and approval by the County Engineer. During the installation of improvements, the County Engineer shall conduct periodic inspections of work-in-progress. The County Engineer shall charge a fee for plans review and inspection services as established by Order of the Board of Commissioners.

99.915 Performance Guarantee.

(1) The applicant shall file with the County Engineer a performance guarantee to assure full and faithful performance. The guarantee shall be made in one of the following forms:

(a) An escrow of funds, irrevocable sight draft, letter of credit, franchised guarantee or other certification by a reputable lending institution. Such lending institution shall not be directly owned or controlled by the applicant. The amount of funds shall be released only upon authorization of the County Engineer.

(b) A surety bond executed by a surety company authorized to transact business in the State of Oregon in a form approved by the County Counsel. The bond shall guarantee to the County that the financial backing is available so that all improvements will be completed and paid for within the time specified in BCC 99.905.

(2) The guarantee shall ensure that the applicant has funds committed in the amount determined by the County Engineer for the purpose of covering the cost of the improvements and repairs, including related engineering and incidental expenses. In the event of default by the applicant, the guarantee shall ensure that the County shall have, upon demand, funds to construct, complete or pay for all improvements or incidental expenses, including improvements full or partially constructed by the County, and bills which are outstanding for work done thereon by any party. [Ord 90-0069]

99.920 Calling the Guarantee. If the applicant fails to carry out provisions of the agreement and the County has unreimbursed costs or expenses resulting from such failure, the County shall call on the guarantee for reimbursement. If the amount of the bond or cash deposit exceeds the cost and expense incurred, the reminder shall be released. If the amount of the bond or

cash deposit is less than the costs and expense incurred, the applicant shall be liable to the County for the difference.

99.925 Warranty. Upon completion of roadways and other public facilities to County standards and specifications, there shall be a minimum of three year warranty period prior to County consideration of acceptance of maintenance. Before this acceptance, maintenance and repair of public facilities shall be the duty of the applicant, developer, property owner, or of the homeowners association.

Applicant Response: The proposal includes public and private improvements. In the event that the County requires an improvement agreement, Applicant understands that the provisions of this section will apply.

VIII. OTHER ISSUES

Some who participated in the prior CUP request or BCTT raised issues on topics that are outside the jurisdiction of the County under the CUP criteria and/or are governed by DEQ or other state agency rules. In keeping with the spirit of the BCTT process, Applicant addresses those issues in this section.

A. Wildlife Habitat.

As noted above, the subject property is not within an environmental overlay zone as a designated Goal 5 resource and so is not subject to regulation by the County. Applicant does have to address wildlife habitat under state law as part of the DEQ permitting process. Applicant therefore engaged Turnstone to conduct Wildlife Habitat Assessment and Surveys (Ex. 4). Turnstone has assessed the wildlife needs/uses of the site. The report surveyed two historic blue heron rookeries (the "Western Rookery" and the "Eastern Rookery") on the property from 2022 to 2024. No nesting pairs were observed in the Western Rookery, and so Turnstone determined that it is an abandoned Great Blue Heron Resource Site. Turnstone concluded that the Eastern Rookery is likely abandoned but recommends continuing surveys in 2025 to determine if the Eastern Rookery is inactive for a third consecutive year. If the Eastern Rookery is inactive in 2025, it will be deemed officially abandoned. *See* Ex. 4, Addendum. The draft conditions of approval provide for a survey in 2025 and require protection of the Eastern Rookery unless and until it is determined to be officially abandoned. The Turnstone Report documents that no other critical habitat exists on the site for bald eagles, deer and elk, or any other animal. The proposed expansion therefore does not impact any significant wildlife features of the site. Applicant's lighting plan for the overall site will minimize additional light and glare in a way that will not negatively affect habitat. *See* Sight Lighting Summary, attached as Exhibit 19.

B. Archeological/cultural resources.

The subject property does not contain any County-designated historic or cultural resources under Goal 5 and is thus not subject to regulation by the County as part of the CUP process. Applicant is required to survey for such resources under state and federal law as part of the DEQ permitting process. Applicant has therefore contracted with Archeological Investigators Northwest Incorporated ("AINW") to conduct an archeological assessment of the property and coordinate with the State Historic Preservation Office (attached as Exhibit 26). AINW did discover artifacts on site but recommends a finding that the landfill expansion will have "No Adverse Effect on Historic Properties," subject to compliance with certain conditions. *See* Ex. 26. The draft conditions of approval require Applicant to comply with these requirements.

C. Leachate Management.

The Planning Commission denied the 2021 application in part based upon a finding that the increase in tanker-truck loads will burden the transportation corridor and place an undue burden on the Corvallis wastewater treatment plant. In addition, it was suggested that treated leachate creates water quality problems. There is no evidentiary basis for these conclusions. As outlined in the Leachate Management Summary, attached as Exhibit 27, leachate collection, transport, and treatment is regulated by DEQ under the Clean Water Act. Leachate is not "hazardous waste" within the meaning of the law, and testing at the landfill indicates that the level of regulated contaminants in leachate generated by Coffin Butte Landfill are either nondetectable or well under the EPA thresholds. *See* Ex. 27. As noted in the traffic study attached as Exhibit 15, the traffic generated by the landfill is well within the capacity of the street system, and leachate tankers have to comply with the same weight limits and taxation requirements as any other commercial truck. The leachate generated by the expansion will therefore put no "undue" burden on the transportation system. There are many other commercial trucks with heavier or more hazardous loads that regularly traverse the corridor (e.g., fuel tankers). The Project will initially generate more leachate from the landfill overall, but volumes will decrease over time as older cells are closed and will be minimized by Coffin Butte Landfill's state-of-the-art leachate management system. *See* Ex. 27. Leachate is currently transported for treatment to the City of Corvallis and City of Salem wastewater-treatment plants, although Applicant is exploring a transition to a different facility to improve overall efficiencies. The City of Corvallis treatment permit expires December 31, 2025, and the City of Salem treatment permit expires on December 31, 2027.

Applicant recognizes that leachate regulation by the EPA and DEQ is likely to change during the lifetime of the Project. Applicant will be required to comply with any such regulations or Applicant will not be able to continue to operate. Approval of the Project will not materially change that obligation because it will apply equally to the leachate generated by current and future landfill operations. Environmental and other regulations applicable to landfill operations evolve over time, and Applicant will remain in compliance.

Leachate collection and disposal resulting from the Project will have no measurable impact on Adjacent Properties or Nearby Properties or the Analysis Area, and do not place an undue burden on any public facility or service.

D. Methane.

As noted, methane regulation is under the jurisdiction of DEQ. *See* CEC Report (Ex. 7). The CEC report details the permit modifications that will be required to move into the new cell and the requirements for compliance and ongoing monitoring. The CEC report also attaches DEQ's guidance document. DEQ

regulates air quality requirements (methane, hydrogen sulfide, odor), leachate regulation, and protection of both ground and surface water, as well as protection for floodplains, wetlands, geotechnical/seismic considerations, and critical habitat. Applicant will have to demonstrate compliance with DEQ's air quality requirements to obtain modifications to the required permits to relocate the working face to the Development Site. These regulations and ongoing monitoring will ensure that the Development Site will not have off-site environmental impacts that will seriously interfere with surrounding uses or unduly burden public facilities or services. A report from Ian Macnab, Environmental Manager at Coffin Butte Landfill, attached as Exhibit 13, details the regulatory requirements and Applicant's practices to ensure that landfill gas is collected. These practices are also covered in Weaver Consulting Group Findings, attached as Exhibit 12. Attached to Exhibit 13 is the current Coffin Butte DEQ Title V Permit that includes emission limits, how emissions are monitored, methane-collection requirements, and the extensive reporting requirements to ensure ongoing compliance. Also attached to Exhibit 13 is a 2019 Hydrogen Sulfide Test Report that shows very low to nondetectable levels of hydrogen sulfide in Coffin Butte's landfill gas.

In February 2024, the Benton County Board of Commissioners raised some questions with regard to methane emissions and recent inspections by EPA of Coffin Butte Landfill. EPA is focusing on landfills across the country as a part of EPA's Strategic Plan to mitigate climate change by reducing methane emissions. As part of this enhanced focus on landfill emissions, Coffin Butte was inspected in June 2022 and again in June of 2024. The 2022 inspection has been the subject of numerous news stories, and Applicant worked with the EPA to take corrective measures. Applicant provided a comprehensive memorandum to the County about the 2022 inspection and Applicant's response. *See* Ex. 28. A final report from the 2024 EPA inspection is not yet available, but Applicant is aware that the inspectors found exceedances while conducting surface emissions monitoring. Applicant is addressing each exceedance as allowed in the regulations. Applicant will continue to work closely with regulators to demonstrate compliance and implement solutions, including, potentially, final capping on portions of the landfill.

The takeaways are that future operations at the Development Site must comply with all laws regulating methane and that it is Applicant's priority and practice to do, and the appropriate regulatory authorities have and will ensure that Applicant remains in compliance.

E. Arsenic.

Some stakeholders have expressed concern over arsenic in the drinking water. VLI had a seepage event in 1994 that resulted in elevated arsenic readings. VLI took various and appropriate corrective measures to correct the issue. Readings taken from compliance wells installed in 2011 have been stable with averages consistent with the background concentrations of arsenic in the Willamette

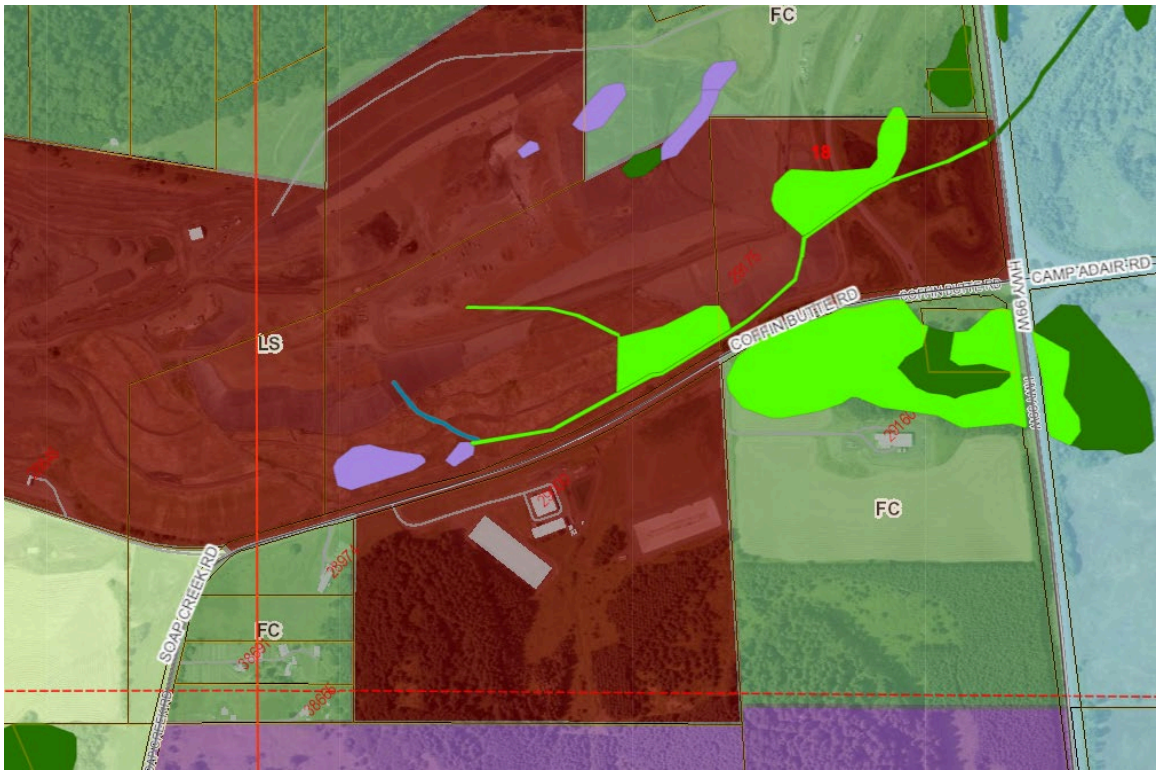
Valley. These steady readings indicate that there have been no leachate releases or impacts on groundwater. *See* Ex. 29.

F. Seismic Resiliency.

Some stakeholders have expressed a concern about the impact of a significant seismic event on the landfill. As noted in the CEC report on seismic design (Ex. 30), the proposed expansion must address seismic design requirements under both state and federal law as part of the DEQ permitting process. Thus, as part of the application submission to DEQ, additional engineering analyses will be submitted to demonstrate that landfill containment structures (i.e., including base liner and final cover systems), leachate-collection systems, and surface-water-control-systems structures are designed to resist the maximum horizontal acceleration anticipated at the site. As noted in Exhibit 30, the Seismic Hazard Analysis considers a range of previously recorded earthquakes, both near and far from the facility, and calculates parameters to use in the seismic stability models that represent the worst-case seismic loadings for the site. In 2021, a seismic analysis for Cell 6 derived a design moment magnitude of 8.48 for that site. The proposed expansion will be designed consistent with all applicable regulations to withstand a significant earthquake.

G. Wetlands.

USFWS National Wetlands Inventory Maps (attached below) indicate that the wetlands exist on tax lots 1200, 1108, and 801. None of these are designated as County Goal 5 resources, so the County has no authority to regulate the wetlands on site. At least some of the wetlands would be subject to the jurisdiction of the Oregon Department of State Lands (DSL), and so Applicant will be required to conduct a wetlands delineation prior to construction and mitigate for any disturbance to those wetlands due to the proposed expansion. The proposed conditions of approval so provide.


FC
18
CAMP ADAIR RD
HWY 99W
COFFIN BUTTE RD
LS
FC
SOAP CREEK RD
FC

IX. CONCLUSION

As documented throughout this narrative, the proposed relocation of the working face to the Development Site complies with the applicable development standards.

- The impacts from the proposed development will not "seriously interfere" with uses on Adjacent or Nearby Properties.

- The proposed development will not "seriously interfere" with the character of the Analysis Area or the purposes of the zones. Both the LS and the FC zones provide for and contemplate landfill uses in the zones, and a landfill has operated in this Analysis Area for over 50 years. The substantially reduced size of the proposed development as compared to the 2021 application, in combination with the proposed screening and mitigation measures, limits the impact of the proposed development on the Analysis Area.

- The proposed development will not impose an "undue burden" on any public improvements, facilities, utilities, or services available to the Analysis Area. The retention of and improvements to Coffin Butte Road will eliminate any transportation or emergency access impacts to the surrounding area and will improve access and safety along Coffin Butte Road. Applicant's fire prevention and mitigation plan will continue to provide protection to the site and not create a burden for the Adair Fire District. Hauling of leachate is well within the capacity of the roadway system, and leachate will continue to be disposed of per DEQ/EPA regulations. The proposed development has no other impact on public facilities and services.

- Development of the FC-zoned properties will not significantly impact forest or farm uses on Adjacent Properties.

- General environmental impacts, such as groundwater protection, leachate transport and disposal, and methane generation, will continue to be managed and regulated under the permits required by DEQ.

For these reasons, Applicant respectfully requests that the Planning Commission approve the CUP.

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

March 14, 2025

VIA EMAIL
PETRA.SCHUETZ@BENTONCOUNTYOR.GOV

Petra Schuetz, Interim Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Ms. Schuetz:

As you know, we represent Valley Landfills, Inc. ("VLI"), the Applicant for the above-referenced conditional use permit. Please accept the attached electronic copies of the following documents:

- First Addendum to the Applicant's January 15, 2025, Burden of Proof ("BOP") addressing the above information
- Updated Odor Dispersion Modeling Study prepared by SCS Engineers addressing comments and suggestions that we received from the County's engineering consultant Maul Foster Alongi
- Benton County Business Database provided by the City of Corvallis

In addition, today Bret Davis of VLI will hand deliver copies of the updated drawings and a thumb drive that includes a PDF of the drawings, the preliminary drainage report, and an updated environmental report. These documents include the revisions and updates discussed in the January 15, 2025, letter from Jeff Shepherd of Civil & Environmental Consultants, Inc. ("CEC"), that was included with VLI's January 15, 2025, submittal. VLI would be pleased to answer any questions that you may have.

Please accept these documents into the record.

Thank you for your consideration.

Very truly yours,

Jeffrey G. Condit

Attachments:

First Addendum to the Burden of Proof, dated March 14, 2025

Coffin Butte Landfill 2024 Expansion Application Odor Dispersion Modeling Study, dated March 2025

Benton County Business Database

FIRST ADDENDUM TO BURDEN OF PROOF

Submitted by Valley Landfills, Inc.
March 14, 2025

I. Purpose

This First Addendum to the Burden of Proof (this "First Addendum") supplements the evidence and argument in Applicant's January 15, 2025, Burden of Proof ("BOP"). The Addendum further addresses the odor impacts of the Project based upon a new February 2025 Odor Dispersion Modeling Study prepared by SCS Engineers (the "2025 Odor Study"). The 2025 Odor Study is attached to this First Addendum as Exhibit 33. This First Addendum also addresses the uses on surrounding properties using the current Benton County businesses data from the City of Corvallis Economic Development Office (the "Business Database"). The Business Database is attached to this First Addendum as Exhibit 34.

II. The 2025 Odor Study

A. Background. As part of its completeness review of Applicant's initial application, Benton County asked Applicant to provide further analysis related to landfill odor. Applicant retained SCS Engineers to conduct an odor analysis. SCS employed the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) methodology accepted by EPA and DEQ. SCS examined wind patterns (direction and speed) over time, odor-causing landfill activities, and topography. This analysis, entitled Coffin Butte Landfill Odor Dispersion Model Study (the "2024 Odor Study"), is attached to the BOP as Exhibit 14.

The 2024 Odor Study, more fully described in Section III.C.7 of the BOP, noted that odor disperses the farther the distance from the landfill area. The report concluded that moving landfill operations from north of Coffin Butte Road to the Development Site will shift the primary odor impacts from north of the Valley Landfills property to south along Coffin Butte Road, but that such odor impacts generally do not and will not exceed 1 D/T[1] on properties immediately adjacent to the landfill property boundary, and then dissipate to lower levels at distance, under either scenario.

Based upon the 2024 Odor Study and the Greenbush Analysis (BOP Exhibit 11), the BOP finds that the Project will not materially increase off-site odor impacts over the current operation, and

[1] As noted in the 2024 Odor Study, per ASTM standards, odor concentration is defined as the dilution of an odor sample with odor-free air, at which point only 50 percent of an odor panel (or population) will detect or recognize the odor. This point is expressed in units of "dilutions-to-threshold" or "D/T." By definition, odor threshold is equal to 1 D/T. Typically, odors are considered a nuisance at or above 7 D/T.

certainly not in a way that would "seriously interfere with uses on adjacent properties" or "seriously interfere with the character of the Area" in violation of BCC 53.215(1).

B. Recommendation From the County's Consultant. After Applicant's submission of its October 30, 2024, response to the County's incompleteness letter, the County retained Maul Foster Alongi ("MFA") to advise it on the technical aspects of the application. MFA recommended the study be reevaluated using actual/predicted emission rates in units of grams per second for volatile organic compounds and potentially odorous toxic air contaminants from each of the permitted emission units included in the Title V Operating Permit issued to the landfill. In keeping with its efforts to provide the County with the requested information, Applicant requested an extension of the 180-day local action deadline to evaluate and respond to the methodology recommended by MFA.

C. Findings From the 2025 Study. The 2025 Odor Study Corroborates the 2024 Odor Study and the Greenbush Analysis that the Project may slightly increase potential off-site odor on some adjacent or surrounding properties and reduce it on others, but in no case will it increase odor above the model threshold or create a public nuisance.

The 2025 Odor Study concludes as follows:

> "Based upon the modeling results of the two scenarios, the following conclusions are presented:
>
> - Scenario #1 (2023 actual operations) was not expected to cause detectable nuisance odors since the D/T ratio for each pollutant modeled was well below one.
>
> - Scenario #2 (2052 proposed operations) was not expected to cause detectable nuisance odors since the D/T ratio for each pollutant modeled was well below one.
>
> - Scenario #2 (2052 proposed operations) D/T ratios increased by 2 to 2.5 times as compared to Scenario #1 (2023 actual operation) for all pollutants except NOx. The decrease in the NOx D/T ratio was due to the change in tipper and AI location. As noted above, all D/T ratios were well below one.
>
> - Peak impact locations were all north of the landfill boundary in Scenario #1 and Scenario #2.
>
> - Moving operations to the proposed expansion area will move the predicted peak, off-site 1-hour impact locations, but the D/T ratio for each pollutant would remain below one.

> Typically, odors become a nuisance at or above 7 D/T [13, 14[2]] so using 1 D/T for comparison is expected to be conservative. Therefore, this study concludes that the proposed expansion Project will not cause detectable off-site nuisance odor impacts at nearby residential or commercial areas." Ex. 33 at 25.

As both the 2024 and 2025 studies indicate, certain activities or weather conditions can temporarily increase odor impacts. That will not change with the Project, but Applicant is proposing an operating condition of approval for the Project that will require daily odor monitoring, review, and (if odor is detected and is coming from the landfill) response. BOP Exhibit 21, OA-10. This program should help minimize the impact of off-site odors, if any.

D. Conclusion. Based upon the 2025 Odor Study, the 2024 Odor Study, and the Greenbush Analysis, the Project will not materially increase potential off-site odor impacts over the current operation, and certainly not in a way that would "seriously interfere with uses on adjacent properties" or "seriously interfere with the character of the Area" in violation of BCC 53.215(1).

III. Businesses on Surrounding Properties

The County suggested that we compare the list of Adjacent and Nearby Properties (BOP Exhibit 8) with the Business Database to determine the types and levels of commercial farm and forest uses on the adjacent and nearby properties. The Business Database is organized by business name, address, and North American Industry Classification System ("NAICS"). There were only two property owner/business matches: Consumers Power, which owns Lot 14 (zoned Open Space) as shown on Exhibit 8, and the owners of Lot 62 (zoned RR-5) as shown on Exhibit 8, who operate a Corvallis retail business.

Applicant is uncertain what, if any, conclusions can be drawn from the fact that the Business Database shows no commercial farm or forestry operations located on Adjacent or Nearby Properties. Owners could be leasing lands to farming operations with a different business address (as does VLI) or could be operating their farms or forestry operation as individuals or as a side business. Such lease agreements are generally not part of the public record or are confidential tax information, so there is no effective method to determine the exact business structure or commercial levels/income of farming or forestry operations on the Adjacent and Nearby Properties. For these reasons, Applicant employed visual observation combined with review of public documents, such as aerial photos, to determine the farm and forest uses on Adjacent and Nearby Properties. The summary of these visual findings is included in the BOP.

[2] Citations to references in the 2025 Odor Study.

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

January 15, 2025

Petra Schuetz, Interim Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Ms. Schuetz:

As you know, we represent Valley Landfills, Inc. ("VLI"). Please accept the attached electronic copy of our revisions to the above-noted application. These revisions are intended to address Benton County's comments and suggestions with regard to the revised application and exhibits that VLI submitted on October 30, 2024. New or amended documents are as follows:

- A revised Burden of Proof ("BOP"). This document replaces the current document on file with the County.
- An Addendum to Exhibit 20 (Fire Risk Assessment). This document should be appended to the current document on file with the County.
- A revised Exhibit 21 (Applicant Proposed Conditions of Approval). This document replaces the current document on file with the County.
- A revised Exhibit 27 (Leachate Management Summary). This document replaces the current document on file with the County.
- An Addendum to Exhibit 28 (Methane Emissions). This document should be appended to the current document on file with the County.
- An Addendum to Exhibit 29 (Arsenic). This document should be appended to the current document on file with the County.

- A new Exhibit 31 (farm lease between VLI and Agri-Industries, Inc., dated January 15, 2020).

- A new Exhibit 32 (photos of Farm and Forest Uses on Adjacent Properties).

In addition to the above-noted documents, attached is a letter dated January 15, 2025, from Jeff Shepherd of Civil & Environmental Consultants, Inc. ("CEC") responding to technical issues raised by the County's engineering consultant, Maul Foster Alongi.

Following is a brief response to the land use follow-up items prepared by the County's consultant, Winterbrook Planning, that we received on Friday, December 27, 2024. These follow-up items are addressed in detail in the revised BOP.

Follow-up Item A.1. There was some question in the BOP as to the location and nature of the proposed shop/maintenance area. The shop/maintenance area will include an enclosed structure and will be located on Tax Lot 1200 and not on Tax Lot 1101. *See* Ex. 2, Sheet 5. The revised BOP has been amended to remove the inconsistent references, and Section V has been amended to address this use more fully.

Follow-up Item A.2. Winterbrook asked VLI to confirm that the land use map attached as Exhibit 2, Sheet 2, accurately shows the location of properties owned by VLI. The map is accurate but is not complete. We should have also included three properties owned by Peltier Real Estate Company, a wholly owned subsidiary of Republic Services, Inc. Those properties are shown on Exhibit 2, sheets 2 and 2A. The Peltier properties are managed by VLI as buffer areas but are not currently used or proposed to be used for landfill operations. We have revised Section III of the BOP to clarify ownership and use and will update the land use map to reflect the Peltier properties during the 150-day waiver period requested below.

Follow-up Item B.1. Winterbrook asked for some revisions to Applicant's Exhibit 14 odor modeling maps to make them easier to read. Applicant will revise these exhibits during the 150-day waiver period requested below.

Follow-up Item C.1. Winterbrook asked for some additional information regarding the uses of adjacent properties and to correct some incomplete or inaccurate references to tax lots. Applicant has revised BOP Section III to do so.

Follow-up Item C.2. Winterbrook asked for additional information about how changes to the Project site would affect farm and forest use on site and on adjacent properties. Applicant has revised BOP Section V to address these issues.

With the submittal of the above information, it is the Applicant's position that the application is complete for purposes of review within the meaning of ORS 215.427. Please consider this letter Applicant's written notice under ORS 215.427(2)(b) that no additional completeness information will be submitted. Applicant requests that that the County initiate review of the application.

Although the application is complete for the purposes of review, Applicant requests a 58-day extension of the 150-day local action deadline as authorized under ORS 215.427 to allow Applicant to make some of the technical adjustments noted above and in the CEC letter. Applicant will further provide additional information on odor modeling and other issues. This extension would expire on March 14, 2025. The Benton County Code permits Applicant to submit new information up until close of the record and then again on appeal, if necessary, to the Board of Commissioners. Taking time to submit these documents before the start of the local hearings process, rather than submitting them during that process, will give the County and interested parties more opportunity to review any new information.

VLI would be pleased to answer any questions that you may have. Thank you for your consideration.

Very truly yours,

Jeffrey G. Condit

Attachment: January 15, 2025, letter from CEC Responding to Maul Foster comments

January 15, 2025

Benton County

Dear Ms. Petra Schuetz:

Subject: Response to Comments
Maul Foster Alongi
Coffin Butte Conditional Use Permit
CEC Project No.: 322-142

This letter represents Civil & Environmental Consultants (CEC) response to comments from Maul Foster Alongi (MFA) concerning a third-party completeness review of the Conditional Use Permit (CUP) Application for the Coffin Butte Landfill. For convenience, we have listed the comment from MFA (*italics*) and then our response directly below.

Exhibit 2: Engineering Plans
MFA has the following comments on this exhibit:

- *Multiple Sheets:*
  - *Grading and other proposed landfill-related improvements are shown extending past the property lines of the Applicant's site and into what appears to be the right-of-way of Coffin Butte Road. All landfill-related improvements and ground-disturbing activities should be completely contained on the Applicant's site, including adequate room for the temporary erosion and sediment controls and best management practices that would be needed during future construction. Any drainage components or conveyance features needing to be in the road right-of-way to maintain the existing drainage patterns—such as culverts, ditches, or swales—would need to be coordinated and approved through the appropriate County permit process.*

Response: CEC will correct the drawings that show landfill improvements in the Coffin Butte Road right of way. However, the application is proposing to expand the width of a portion of Coffin Butte Road to include a left turn lane so the expanded width of Coffin Butte Road includes some items that will be constructed within the expanded Coffin Butte right of way. Coffin Butte Landfill, when working on the improvements to Coffin Butte Road, will work with Benton County to follow all applicable regulations and requirements and will follow the appropriate permitting process.

- *Drawing No. 6:*
  - *The detail shows a 6-inch-thick gravel underdrain layer meant to collect and convey groundwater away from the rest of the liner system. An analysis for determining this thickness was not provided. As hydrostatic pressures can cause damage to the liner system, this analysis should be completed and provided in the revised engineering plans.*

Response: CEC will provide a detailed engineering analysis and calculation brief for the underdrain system to the Oregon Department of Environmental Quality (ODEQ) during the solid waste permitting process.

- *Information on the extent of the bottom liner and liner termination (i.e., anchor trench alignment, section) details are missing in the submittal package.*

Response: CEC will provide these details with the updated CUP application drawings.

- *Information on the material type and thickness for the proposed geomembrane was not provided.*

Response: CEC will provide the material type and thickness in the updated CUP application drawings.

- *Specifications for the underdrain and leachate collection and recovery layer gravel were not provided.*

Response: CEC will provide the material type and thickness in the updated CUP application drawings.

- *Drawing No. 9:*
  - *This drawing shows a proposed septic tank; however, no supporting information (test holes, calculations, etc.) was provided in the material supplied to MFA to evaluate the feasibility, sizing, or location of this proposed septic tank.*

Response: CEC will provide a detailed design of the septic holding tank when Coffin Butte Landfill applies for a building permit to construct or install the proposed employee building.

- *Drawings Nos. 11 and 12:*
  - *The total surplus cut volume presented on these drawings is approximately 3.5 million cubic yards and the notes state that this excess material will be hauled to the neighboring quarry and stockpiled for future use. A more detailed soil management plan should be developed for the site using the estimated volumes. The soil stockpile location as shown on Drawing No. 19 does not appear to represent the volumes stated in stated in Drawings Nos. 11 and 12. Also, Exhibit 16, Environmental and Operational Considerations, quotes a much smaller amount on page 13. A more detailed description of how surplus soils will be managed would help the County better understand how the stockpile plan will work.*

Response: CEC will show an additional stockpile area in the quarry area and will also increase the area shown on Drawing 19. We will also provide a detailed stockpile plan

during the solid waste permitting process and will submit that plan to the ODEQ for their review and approval. Furthermore, Exhibit 16 will be corrected with the correct estimate of the excavation quantity.

- *Additional information on the Applicant's plans for upgrading the existing landfill gas (LFG) management facility should be provided. This would include detailing any proposed connections to the existing LFG management facility as well as the LFG collection and conveyance for the proposed expansion area.*

Response: The current LFG management facility will continue to operate as shown on the CUP application drawings. During the detailed design of the new leachate storage ponds, which will be submitted to the ODEQ during the solid waste permitting process, all leachate piping and landfill gas piping will be shown on drawings to ensure that they meet the requirements of the ODEQ.

- *Drawing No. 17:*
  - *The Applicant should provide additional information on the anticipated capacities of the drainage pathways indicate by the series of flow arrows on this sheet. Erosion protection, such as riprap, may be necessary and should be sized appropriately.*

Response: CEC will adjust the CUP drawings and remove the drainage pathways as shown. A detailed stormwater design will be completed during the solid waste permitting process and the drainage system design will be submitted to the ODEQ for review and approval.

- *Calculations supporting the sizing of the riprap protection for the emergency overflow and the Manhole No. 1 (MH-1) discharge should be provided.*

Response: CEC will adjust the CUP application drawings.

- *Drawing No. 21:*
  - *The Applicant should provide additional information as to how the pond outlet is intended to function with pipes running to and from MH-1 and the single valve on the lower pipe. In addition, the rim elevation of MH-1 is several feet lower than the detention pond maximum water surface elevation. There may be additional detail needed to determine whether there is a potential for slope erosion downhill from the rim of MH-1.*

Response: CEC designed the stormwater pond, including using the correct rainfall intensity, in accordance with the Benton County requirements. CEC will review the design calculations and make the appropriate corrections based on our engineering judgement. Furthermore, all design work will be submitted to ODEQ for review and approval during the solid waste permitting process and will further be submitted to the County.

Exhibits 5, 6, and 30
A review of this group of documents was provided by Columbia West Engineering, Inc. (CWE), as a geotechnical subconsultant to MFA. MFA's and CWE's comments are summarized below, while the entire CWE letter is provided as Attachment A.

- *Exhibit 5:*
  - *The scope of the subsurface exploration and laboratory testing programs described is generally aligned with the planned analysis. However, we recommend completing at least one seismic survey at the site to evaluate shear wave velocity to a minimum depth of 100 feet below ground surface. Collecting this additional data will help the design team perform a more accurate assessment of the seismic hazard at the site.*

Response: The following is a response from our Geotechnical Engineering subconsultant, Wallace Group.

We assumed that the seismic site class is D. Site class D is based on a range of shear wave velocities (V_s) between 600 to 1,200 ft/s in the upper 100 feet. Our CPT V_s measurements of the upper 20-ft (soil) ranged from 833 to 1,393 ft/s and we do not have V_s measurements in rock below. We expect that the V_s in the rock will be in the range of 1,200 ft/s (soft rock). Based on these assumptions, the geometric mean of V_s in the upper 100-ft is approximately 1,080 ft/s. If we do a ReMi V_s test, we expect that it will confirm our site class assumption. A change in site class from D to C will not change our slope stability calculations since a site class D is more conservative.

- *Exhibit 6:*
  - *This exhibit appears to be sufficiently complete for proceeding with technical review. Note that CWE does not recommend using these logs to estimate parameters for geotechnical engineering analysis or design. MFA, however, finds that these logs are useful for reviewing existing groundwater conditions from a land use perspective.*

Response: Noted.

- *Exhibit 30:*
  - *The landfill seismic design memorandum provides a high-level overview of the proposed seismic design methodology sufficient for a pre-design review process.*

Response: Noted.

Exhibit 11: Noise Study
MFA has the following comments on this exhibit:

- *This exhibit appears to be sufficiently complete for proceeding with technical review. The report does not explicitly state that the noise sampling methods conform with the Oregon Department of Environmental Quality (DEQ) Sound Measurement Procedures Manual*

(NPCS-1) per OAR 340- 035-0035(3)(a). The content appears generally consistent with the rules; however, NPCS-1 is over 40 years old and doesn't consider modern technology. MFA recommends that the Applicant verify that the proposed noise study methodology is consistent with DEQ's protocols and requirements and state that in the report.

Response: The measurements made were generally consistent with NPCS-1. However, as noted, NPCS-1 is old and portions of NPCS-1 are no longer applicable due to the use of modern equipment. Measurements were not made 25 feet from noise sensitive buildings as noted in NPCS-1 4.2.1 because we did not have permission to access these properties. Our subconsultant will not be updating the noise report based on the comment and their response.

Exhibit 12: Findings on Odor
This exhibit appears to be sufficiently complete for proceeding with technical review, with any updates needed to reflect comments provided for Exhibit 14.

Response: Noted.

Exhibit 13: Memo Regarding Odor, Methane, and Hydrogen Sulfide Control
This exhibit appears to be sufficiently complete for proceeding with technical review.

Response: Noted.

Exhibit 14: Odor Dispersion Modeling Study for Landfill Expansion
MFA has the following comments on this exhibit:

- *AERMOD dispersion model input, (*.ADI), output (*.ADO file), and plot (*.PLT) files are required to verify the setup and results of the Study.*
- *Raw surface and upper air meteorological data files for the on-site weather station, Corvallis Municipal Airport, and the Salem-McNary Regional Airport for the period from January 1, 2018, to December 31, 2023, are required to verify the completeness of the meteorological datasets included in the study.*

The following elements in Exhibit 14 require further review and analysis:

- *Although there are no regulatory frameworks or required protocols for odor evaluations in Oregon, MFA disagrees with the odor emission rates included in the study. The odor emission rates included in the study were derived by multiplying a conservative dilutions-to-threshold ratio of 500 by an estimated LFG fugitives flow rate of 0.0001 meters per second. The resulting value (0.05 meters per second) does not represent an emissions rate that can be modeled to predict off-site concentrations that can be compared to published odor detection thresholds by individual compound. MFA recommends the study be reevaluated using actual/predicted emission rates in units of grams per second for volatile organic compounds and potentially odorous toxic air contaminants from each of the permitted emission units included in the Title V Operating Permit issued to the landfill. Using actual/predicted emission rates will result in predicted off-site concentration*

isopleths that can be directly evaluated against published odor detection thresholds by individual compounds to determine whether emissions from the landfill may be detectable in residential or commercial land use areas.

- *Only LFG fugitives from the working face were included in the study. MFA recommends the study incorporate emissions from each permitted emissions unit at the landfill, including, but not limited to, the LFG flares, the diesel-fueled tipper, leachate ponds, and petroleum contaminated soils.*

- *Each emissions unit added to the study will require new source parameters to be modeled. If point source representations are added (e.g., the LFG flare and/or diesel-fueled tipper) to the dispersion model, nearby buildings and structures will need to be evaluated for potential downwash impacts.*

- *MFA recommends correlating the meteorological data collected from the on-site weather station to historical odor complaints to identify potential correlations and trends in weather patterns leading to past odor complaints.*

Response: Applicant believes that its submitted odor analysis is sufficient for purposes of completeness review but is working with its odor consultant to review these comments and recommendation and anticipates providing responses to the County during the application review process.

Exhibit 16: Environmental and Operational Considerations
MFA has the following comments on this exhibit:

- *As noted above, the Applicant should address the discrepancy in the reported volume of excavated material to be stockpiled.*

Response: This will be corrected in the updated version.

- *Page 3: There are multiple references to Tampico Ridge in this document. However, Tampico Ridge is not shown on Figure 4. It would be helpful to show this location in the figure.*

Response: The figures will be updated accordingly.

- *Pages 7–9: Water Quality Monitoring Program.*
  - *The expanded monitoring network section in Chapter 8 lists multiple new monitoring networks and shows them in Figure 4. The section also discusses leak detection sampling locations beneath the leachate ponds but does not provide nomenclature for them nor show them on Figure 4. Consider either including this information or adding a sentence clarifying that the locations of these are yet to be determined.*

Response: Noted.

Exhibit 17: Preliminary Drainage Report
MFA has the following comments on this exhibit:

- *The comments noted on Exhibit 2 above should also be addressed in this document.*

Response: Noted.

- *The pond design elevations noted in Exhibit 2 (specifically Drawings Nos. 17 and 20) do not match the elevations presented in this report and should be revised to be consistent throughout.*

Response: CEC will update the drainage report accordingly.

- *The drainage discussion does not address what happens with excess water from storms larger than the 25-year 24-hour design storm. The plans show a riprap slope leading to a natural drainage system but there is no discussion about the downstream capacity of the drainage system leading to a proposed 12-inch culvert under Coffin Butte Road. Considering the likelihood that rain events will exceed the design storm, this should be addressed in the application.*

Response: The stormwater drainage pond was designed in accordance with the Benton County requirements using a 25-year 24-hour design storm. The Benton County requirements do not address any design storm greater than that. The elevations shown in the pond and the layout of the pipes to MH-1 are, again, in accordance with the Benton County requirements. CEC will continue its design work in accordance with the Benton County requirements will adjust the drawings accordingly as appropriate.

- *A drainage basin map should be provided to clarify the evaluated drainage basins. It would be helpful to include similar relevant information in the Current Surface Water Drainage section of Exhibit 16.*

Response: Noted.

- *Hydrological calculations should be provided for the estimation of run-on flow (from upstream of the proposed expansion area) as well as for the sizing of the culvert (24-inch) to demonstrate that there is available capacity in the conveyance swale that is proposed to divert run-on flow from the expansion footprint and routing it to the proposed stormwater pond.*

Response: Noted.

Exhibit 18: Aerial Renderings of Coffin Butte Landfill
This exhibit appears to be sufficiently complete for proceeding with technical review.

Response: Noted.

Exhibit 20: Fire Risk Assessment of Coffin Butte Landfill
MFA and our subconsultant, Dr. Tony Sperling of Landfill Fire Control Inc. (LFCI), have the following comments on this exhibit:

- *Page 2: History of Prior Landfill Fires*
  - *This report only references three fire events occurring at the landfill since 1999. However, the County has indicated that there have been at least two additional fire events on this site in the past year or so. The cause of these recent fires and the actions taken should be included in this portion of the document.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *Page 3: Fire Mitigation Plans*
  - *The first paragraph indicates that water would be used as the primary means of extinguishing a fire. LFCI notes that the most effective and current industry standard for the primary method of fire suppression for a landfill fire is smothering with 12 inches of soil. The Applicant should provide justification for the primary use of water for their initial response.*

Response: Applicant's revised Fire Assessment report addresses these comments.

  - *With consideration to the preceding comment, LFCI recommends that the second paragraph describe the action plan in the case of a landfill fire to first control the fire (using soil or water), then assess and take further steps to extinguish the fire.*

Response: Applicant's revised Fire Assessment report addresses these comments.

  - *The document refers to the availability of public water on site, but the narrative does not indicate the amount of on-site stored volume and/or refilling capacity of the water system available for fire suppression activities. This information should be included to better understand the firefighting capabilities of the existing system, as no improvements appear to be proposed. LFCI recommends a minimum sustained flow of 1,000 gallons per minute be available for fire suppression and further information be provided on how the Applicant will provide the logistics for maintaining this flow rate (e.g. available hydrant connections, tanker shuttles).*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *Page 4: Landfill Fire Sources, Risk Profiles, and Specific Mitigation Measures*
  - *Battery fires are increasingly becoming a source of landfill fires and should be addressed in this document. Reactive and banned materials should be identified.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *For Working Face Fires, LFCI recommends the inclusion of bar hole punch for monitoring the subsurface carbon monoxide (CO) and temperature, as well as infrared camera inspections.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *For Grassland Fires, LFCI recommends that this document specify a measurable fire buffer distance between the landfill and surrounding grasslands. This fire buffer should be adequately maintained at all times. In addition, fire watch provisions or infrared monitoring should be implemented to manage ignition risks during off hours.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *For Gas Well Fires, LFCI recommends preventive monitoring, including monitoring for CO levels, targeted maximum oxygen concentrations, and balancing gas levels to prevent aerobic decomposition. In addition, the Applicant should provide standard operating procedures for handling high-temperature wells and specify operating temperature thresholds.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *Other recommendations from MFA and LFCI include the following:*
  - *Spontaneous combustion fires are not addressed in this document, except in relation to gas wells. LFCI notes that spontaneous combustion on slopes is a fire risk that should be included.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *Typical landfill construction has an inherent risk of capturing LFG at the edges of geomembrane sheets and should be addressed in this document.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *Smoking should only be allowed in designated areas and prohibited elsewhere on site.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *The use of bird deterrent flares should be avoided.*

Response: Applicant's revised Fire Assessment report addresses these comments.

- *Annual fire safety and firefighting training should be undertaken for all employees who would respond to a fire along with regular cross-training with Adair Rural Fire & Rescue.*

Response: Applicant's revised fire assessment report addresses these comments.

Exhibit 22: Reclamation Plan for Expansion Area
This exhibit appears to be sufficiently complete for proceeding with technical review, other than that the comments provided for Exhibit 2 above still apply and may require revisions to the sheets provided with this document.

Response: Noted.

Exhibit 27: Leachate Management Summary
MFA has the following comments on this exhibit:

- *The summary does not address the quantitative aspects of leachate generation, storage, and disposal. The addition of a new cell and new leachate storage ponds should be addressed with specific information on peak generation, storage requirements, transportation capacity, and disposal.*

Response: We have updated Exhibit 27 to include this information.

- *Discussion on decommissioning of the existing leachate collection and treatment system, rerouting of the existing leachate collection/conveyance system, and construction of the new facility is missing. Provide details for proposed sequencing for leachate storage ponds, rerouting of the leachate conveyance, and then the decommissioning of the existing facilities.*

Response: We have updated Exhibit 27 to include this information.

- *While the document references agreements with local wastewater treatment plants in Corvallis and Salem, Oregon, to take the excess leachate, the terms of those agreements are not included in the document. The Applicant should specifically note any expiration dates or limitations on quantity in these agreements and address any further contingency plan that would be needed for leachate disposal.*

Response: We have updated Exhibit 27 to include this information.

- *Page 2:*
  - *Paragraph 1: The text of reads "since MSW leachate is not found on any of the four [listed waste] lists, it would have to be characterized as a listed hazardous waste."*

Please confirm whether the statement should be rewritten to say, "it would not have to be characterized as a listed hazardous waste."

Response: Exhibit 27 will be updated accordingly.

- *Paragraph 3: The referenced toxicity sample is from August 2023. It would be helpful if the Applicant provided a more recent data point or data trend from prior tests noting any exceedances.*

Response: Exhibit 27 will be updated using sampling data from September 2024.

Exhibit 28: Letter to County Regarding Methane Emissions
MFA has the following comments on this exhibit:

- *At the time of the 2022 U.S. Environmental Protection Agency inspection (EPA), Coffin Butte Landfill was in the middle of a construction project to install new horizontal and vertical collection wells. It would be helpful to provide a list or figure showing how many of the 61 exceedances documented by the EPA during the inspection were in the construction area.*

Response: During the 2022 EPA inspection, the Coffin Butte Landfill was undergoing a landfill gas collection and containment system (GCCS) expansion. Out of the 61 exceedances documented, approximately 10 of these exceedances were within the construction area. It is important to note that during GCCS construction, portions of the GCCS system outside of the construction can be temporarily impacted due to isolation of certain sections landfill gas header and lateral piping to allow piping tie-ins and commissioning of new vertical and horizontal gas extraction wells.

Further, the Applicant will submit an addendum to Exhibit 28.

Exhibit 29: Letter to County Related to Arsenic
MFA has the following comments on this exhibit:

- *Consider including a table comparing background concentrations for this constituent to the exceedances discussed throughout the letter.*

- *The letter states that MW-59 was due to be sampled in calendar year 2024. If this sampling has taken place, consider discussing the findings.*

Response: Applicant believes that "MW-59" was a typographical error by the Reviewer and is instead referencing "MW-9S" which is has a quintennial sampling schedule (every 5 years). Groundwater monitoring samples were collected and sent to a third-party laboratory to be analyzed in accordance with the State Groundwater Regulations in 2024, however data compilation

and statistical analyses of the results is currently being completed and will be submitted in March of 2025 as part of the Annual Environmental Monitoring Report (AEMR) per State Regulations.

Further, the Applicant will submit an addendum to Exhibit 29.

General Observations
DEQ would be expected to require an update to the current Operations Plan as part of any solid waste permit modification process. The document provides detailed information about the facility's proposed solid waste operations in the landfill expansion area and could be valuable for the County to review in assessing compliance with the permitted use and in understanding the potential impacts on neighboring properties as a result of operational changes. It was not included in the review package provided to MFA. In lieu of submitting a draft Operation Plan, a narrative description of the proposed changes to the Operation Plan could be prepared by the Applicant for review and concurrence with the County.

Response: MFA is correct in that the ODEQ will require an updated Operations Plan be submitted with the solid waste permit application. CEC will complete a new Operations Plan that will be reviewed and approved by the ODEQ.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Jeff A. Shepherd, P.E.
Senior Principal

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

April 29, 2025

Benton County Planning Commission
c/o Petra Schuetz, Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Benton County Planning Commission:

We represent Valley Landfills, Inc. ("VLI"), the Applicant on above-referenced application. Please accept the following documents into the record of the proceedings on the application. These additional documents are intended to address Benton County's comments and concerns expressed in the Benton County Staff Report dated April 22, 2025.

New or amended documents are as follows:

- A revised Odor Dispersion Modeling Study dated April 2025 from SCS Engineers. This Odor Dispersion Modeling Study is intended to replace the 2025 Odor Study submitted on March 14, 2025.

- A memorandum dated April 28, 2025, from Jeff Leadford, P.E., of SCS Engineers ("SCS"), responding to comments received from the County's engineering consultants Maul Foster & Alongi ("MFA") regarding the March 14, 2025, Odor Study.

- A memorandum dated April 21, 2025, from Jeff Leadford, P.E., of SCS Engineers ("SCS"), responding to draft staff report findings received from the County regarding the March 14, 2025, Odor Study.

- A memorandum dated April 18, 2025, from Adam Jenkins, P.E., and Justin Morgan of The Greenbusch Group, Inc. ("Greenbusch"), to VLI's project engineer Jeff Shepherd, P.E., of Civil & Environmental Consultants, Inc. ("CEC"), responding to MFA's comments on Greenbusch's September 25, 2023, Noise Study, attached as Exhibit 11 to the Applicant's Revised Burden of Proof dated January 15, 2025 (the "BOP").

- An updated traffic report dated April 28, 2025, from Joe Bessman, P.E., of Transight Consulting, LLC ("Transight"), addressing staff questions and including updated traffic counts. This report is intended to supplement Transight's February 26, 2024, report attached as Exhibit 15 to the BOP.

- A new drawing prepared by CEC showing the location of the proposed maintenance building located on Tax Lot 1200. This building was inadvertently left off of Ex. Sheet 2 attached to the BOP. The drawing demonstrates that the proposed building will comply with the applicable 20-foot setback from property lines and includes a 400-gallon septic tank. Potable water will be trucked in as there is not a well or other water source on site.

- A revised Exhibit 21 (Applicant Proposed Conditions of Approval). This document replaces the current document on file with the County. The revisions primarily address Operating Approval Condition No. 1, relating to hours of operation.

VLI's consultants will attend the April 29, 2025, hearing, and will explain these additional documents in greater detail.

Two additional points:

Odor

Jesse Winterowd, the County's planning consultant with Winterbrook Planning, asked us to detail a comment in the BOP that "certain temporary landfill operations and weather conditions can temporarily increase odor."

The following landfill activities or weather events can temporarily increase odor:

Drilling of a new gas well. Solid waste needs to be removed from the drill hole and placed into the working face. This can result in a temporary increase in odors away from the working face. In order to mitigate this impact, VLI places an "odor box" over the hole to minimize escaping gases and odors. An odor box is a metal container with a hole large enough for the drill to enter. This reduces the surface area for any escaping odors.

Gas field construction, maintenance, and expansion. New pipe is typically trenched three to four feet below the ground surface, which often uncovers solid waste and can result in a

temporary increase in odors. This opens an area too large to use an odor box, so crews work quickly and prepare all materials beforehand to reduce the length of time the trench is open. Crews are prohibited from leaving a trench exposed and open overnight. Gas field drilling and construction happens once or twice a year during the summer months and typically lasts three to four weeks. During construction, select portions of the landfill gas system are isolated from vacuum to tie in new infrastructure. During this time, wells are temporarily turned off while connections are made. These isolations are typically completed on the same day and are brought back into service.

Opening up the working face in the morning. Removal or reclaim of cover soil and tarps in the morning can cause a temporary release of odors. This exposed waste is then covered by the incoming waste during the operating day. VLI carefully removes the prior day's cover soil or tarp in an effort to disturb the underlying waste as little as possible. This practice is crucial to good landfill operations because leaving the cover soil or tarp can trap liquids within the waste mass and potentially lead to liquid seeps.

Temporary shutdown of the flare and/or power plant. This can result in gas building up in the field until the plant or flare can come back online. Gas could then escape upward and out of the ground surface. Flare shutdowns typically occur if there is an interruption in the gas flow from the field to the flare. There could be many reasons, such as isolating gas lines during construction, clogged header pipes or sumps, or a loss of power. These interruptions are infrequent and hard to predict, but there are also some planned flare shutdowns for maintenance, as discussed above.

According to Mr. Leadford of SCS, the following weather conditions can cause odors to travel farther from the site: when the atmospheric conditions are very stable with a consistent light breeze in one direction. This usually happens at night or during the winter. These conditions are not readily predictable, but less odor is generated at night when operations cease and daily cover is placed over the working face. (Mr. Leadford discusses these conditions in more detail in the updated report.)

Citizen Comments on Applicable Criteria

We believe that most of the many citizen comments are addressed by the Applicant in the BOP and exhibits, or by the Applicant or Applicant's consultant testimony. Several commentators, however, have argued that policy documents that have not been incorporated in the

Comprehensive Plan or Development Code should be applied to the application. Others have cited specific policies in the Benton County Comprehensive Plan that they argue should apply to this application.

At the threshold, the County may only apply the land use regulations duly adopted and incorporated in the County's Comprehensive Plan and Development Code to land use permits. ORS 215.416(8). If the County wishes to apply other policies or regulations, it must go through the post-acknowledgment legislative amendment process in ORS 197.610 to 197.651, and its Comprehensive Plan and Development Code, and comply with the extensive notice and hearing processes and notice to the Land Conservation and Development Commission and affected property owners required in those statutes and ordinances.

With regard to the cited Comprehensive Plan provisions, BCC 50.015 states that the policies of the Comprehensive Plan are not implementing regulations and shall not be directly applied to individual applications except as provided by the Development Code.

Staff has correctly identified the criteria that are applicable to VLI's application. None of those criteria expressly incorporate any comprehensive policy as an applicable criterion, so the comprehensive policies cited by the various commentators do not directly apply to VLI's application. VLI has addressed all of the applicable land use criteria identified in the staff report.

Based upon the submittals above and previously, the Applicant submits that is has demonstrated compliance with the applicable criteria.

VLI would be pleased to answer any questions that you may have. Thank you for your consideration.

Very truly yours,

Jeffrey G. Condit

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

June 6, 2025

Benton County Planning Commission
c/o Petra Schuetz, Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Benton County Planning Commission:

We represent Valley Landfills, Inc., the Applicant for above-referenced conditional use permit. Please accept the following documents into the record of the proceedings on the application. These additional documents address the Staff Report and testimony submitted at the April 29, May 1, May 6, and May 8, Planning Commission Hearings.

Given the volume and overlapping nature of the testimony in opposition, the Applicant addresses the major themes by topic.

1. **Legal Arguments.** The Applicant submits the attached June 6, 2025, memorandum (Applicant's Ex. 35) responding to the legal arguments raised by Jeffrey Kleinman, attorney for the Valley Neighbors for Environmental Quality and Safety, in his memorandum dated May 6, 2025. The Applicant has correctly construed and addressed the applicable criteria. Historical representations and unadopted documents are not applicable to the application. The documents attached to this letter address Mr. Kleinman's substantive and evidentiary arguments.

2. **Odor.** The Applicant submits the attached revised Odor Dispersion Modeling Study dated June 2025 (Applicant's Ex. 36) prepared by SCS Engineers. In accordance with the recommendation of the County's odor consultants at Maul Foster & Alongi (MFA), SCS Engineers has changed the methodology for measuring final height to account for the differing final heights across the landfill area. The revised study confirms that odor generated by the landfill expansion will not be at nuisance levels off site. It also demonstrates that the expansion will not significantly increase odor levels above those generated by the existing landfill if the expansion were not constructed. For these

reasons, the revised study fully addresses the issues raised in the Staff Report and demonstrates that the expansion will not interfere with uses on surrounding property. The Applicant also submits the Attached June 6, 2025, memorandum from SCS Engineers (Applicant's Ex. 37) responding to the comments and analysis prepared by Mason Leavitt of Beyond Toxics and presented at the May 6, 2025, hearing.

3. **Noise.** The Applicant submits the attached June 6, 2025, memorandum, prepared by The Greenbusch Group, Inc. ("Greenbusch") proposing mitigation measures to further reduce sound levels at the closest noise-sensitive uses during the quietest hour (Applicant's Ex. 38). The report details several modifications to on-site equipment that will reduce ambient noise levels at the nearest noise-sensitive use during the quietest hour from 11 dba to 6 dba, which is a substantial reduction. Greenbusch's memorandum proposes a condition of approval to ensure implementation prior to commencement of commercial landfill operations in the expansion area. This addresses the concern raised by MFA regarding exceedance of the Noise Rule during the quietest hours.

4. **PFAS.**

In Landfill Gas. There is limited data evidence indicating that PFAS is present in landfill gas, but there is no finalized EPA-approved method for sampling or quantifying gas-phase PFAS from landfill gas or combustion emissions. The draft EPA Other Test Method 45 (OTM-45) is a step forward in characterizing semi-volatile PFAS from stationary sources, but is still in a developmental phase and has limited adoption (EPA, 2021).

There are currently no published PFAS emission factors for landfills or flare systems. This makes it difficult to estimate emissions or compare control technologies. The Interstate Technology and Regulatory Council (ITRC) guidance acknowledges the lack of quantitative data for air emissions from waste sources (ITRC, 2023).

Collectively, the available literature and recent field data confirm substantial uncertainty in characterizing airborne PFAS risk from landfill gas. These gaps include incomplete data on emissions, inconsistent regulatory approaches, and a lack of inhalation-based health benchmarks. The Applicant's CUP should be evaluated based on current and available data with recognition that this body of research on PFAS in landfill gas is limited, and currently there is no scientific consensus that PFAS, to the extent it has

been identified in landfill gas, is causing health risks to communities with landfills. The Applicant will abide by all laws and regulations that may arise related to airborne PFAS.

In Leachate. There is similarly no specific regulatory framework for PFAS in leachate. The Applicant's disposal of leachate at the Corvallis and Salem wastewater treatment plants complies with all existing regulations. Leachate transport and treatment is regulated by DEQ under the Clean Water Act. Testing at the landfill indicates that the level of regulated contaminants in leachate generated by Coffin Butte Landfill are either nondetectable or well under the EPA thresholds. *See* BOP Ex. 27.

As the Applicant testified at the hearing, the Applicant's current disposal permit at the Corvallis wastewater treatment plant expires at the end of 2025. The leachate generated from the current landfill that was going to the Corvallis wastewater treatment plant, and some or all of the leachate from the expansion, will go to outlets other than the Corvallis plant. The Applicant is looking for disposal alternatives regardless of approval of the expansion. Similarly, the Applicant will have to comply with any subsequently adopted regulation of PFAS in leachate regardless of the approval of the expansion.

5. **Methane/Landfill Gas.** Methane, in particular, and landfill gas, in general, is not considered a significant source of on- or off-site health risk. Coffin Butte Landfill (and other Oregon landfills) are classified as lower priority Group 3 facilities under DEQ's Clean Air Oregon program. *See* March 9, 2019, DEQ Memorandum entitled "Cleaner Air Oregon Prioritizations Results," attached as Applicant's Ex. 39. As noted in the Memorandum:

> The Cleaner Air Oregon program and rules add public health-based protection from emissions of toxic air contaminants to the state's existing air permitting regulatory framework. The goal of the Cleaner Air Oregon program is to evaluate potential health risks to people near commercial and industrial facilities that emit regulated toxic air contaminants, communicate those results to affected communities, and reduce those risks to below health-based standards.

In comparison, Hollingsworth & Vose Fiber Company in Corvallis is a Group 1 facility, and TDY Industries (Wah Chang Corporation) in Albany is in Group 2. The priority

groupings govern when a facility will be called in for a Cleaner Air Oregon risk assessment.

With regard to emissions from Coffin Butte Landfill in particular, the Applicant submits the following two documents into the record: Employee Exposure Report of Findings, dated February 2025, prepared by GuziWest Inspection & Consulting ("Guzi") (Applicant's Ex. 40)[1] and the Environmental Methane Compliance Report of Findings, dated January 2025, also prepared by Guzi (Applicant's Ex. 41).

The Employee Exposure Report was prepared as a result of two OR-OSHA citations that have been referenced in the public testimony.[2] After an extensive analysis, Guzi concluded that that CBL employees are not being exposed above short-term/excursion limits nor 8-hour time-weighted average limits for asbestos, respirable crystalline silica, respirable dust, total inhalable dust, diesel particulate (elemental carbon), and the 11 metals under OSHA's METALSSG-2 sampling group. The engineering controls and personal protective equipment currently utilized in relation to these respiratory hazards appear to be adequate to protect employees from the airborne concentrations they might be exposed to on any given day.

The Guzi Report further concluded that the landfill gas monitoring performed identified short-term carbon monoxide exposure exceedances specific to a CBL work vehicle, and methane exposure exceedances during well-shortening activities, as well as during the heavy equipment operator's normal work shift. The remaining gases monitored, including carbon dioxide, hydrogen sulfide, and oxygen, remained below all regulatory thresholds, and/or stayed within acceptable ranges. Implementation of additional engineering controls and work practices subsequently reduced and/or eliminated methane and carbon monoxide exceedances.

The Environmental Methane Compliance Report was commissioned to study off-site impacts of landfill gas on the surrounding community. After an extensive analysis, Guzi concludes:

[1] This report has been redacted to remove personal employee information and work product.

[2] As noted in the report, these citations have been resolved.

> In the evaluation of landfill gases and potential impacts to the community surrounding the CBL facility, Guzi-West first assessed the potential exposure pathways landfill gases could follow. No measurable methane concentrations have been identified migrating in the subsurface since at least 2006 in the closest and most likely areas where landfill gases would be expected to migrate. Therefore, we conclude it is very unlikely subsurface migration of landfill gases is occurring and potentially impacting the surrounding community. A methane concentration of 100,000 ppm or greater was identified at the facility and is well above the lower explosive limit for methane (50,000 ppm), however re-monitoring of the same location following implementation of corrective actions resulted in a concentration of 27 ppm. These measurements were taken during instantaneous monitoring which, while useful for identifying precise locations of methane release, is not representative of the broader system, a metric that integrated monitoring captures more accurately. Further, methane and carbon dioxide can cause potential hazards within confined spaces (either due to the creation of an oxygen deficient atmosphere, and/or in the case of methane, due to the creation of an explosive risk); that said, neither gas is expected to pose asphyxiation or explosive concerns in ambient air to the community surrounding CBL. This opinion is largely based upon the results of the integrated monitoring conducted at the subject facility, which began to be required under OAR 340-239 at the start of the third quarter of 2022. The highest average methane emission for any single CBL grid was 217.64 ppm measured during the second quarter of 2023; this is 4.5 times below the OR-OSHA PEL for methane (1,000 ppm), 22 times below the IDLH for methane (5,000 ppm), and 229 times below the lower explosive limit for methane (50,000 ppm). This risk is further reduced in ambient air the farther one travels away from the landfill. In conclusion, it does not appear methane or carbon dioxide are likely to be present at concentrations that pose any immediate health concerns to the surrounding community.

As the Applicant notes in the burden of proof, landfill gas is regulated by DEQ and EPA and is out of the scope of the County's jurisdiction under the CUP process. But given the

number of persons who expressed concerns about this during public testimony, the Applicant includes this information in support of its opinion that methane/landfill gas emissions do not pose an off-site health risk to the surrounding properties or community.

6. **Traffic.** The Applicant submits the attached May 23, 2025, memorandum from Transight Consulting (Applicant's Ex. 42), addressing testimony in opposition regarding traffic. Transight explains how the new traffic pattern will not impede traffic flow on Coffin Butte Road and that Coffin Butte Road and connecting roads are more than adequate to address the traffic from the current landfill and the expansion.

7. **Wildlife.** The Applicant submits the attached June 2, 2025, memorandum from Turnstone Environmental Consultants (Applicant's Ex. 43) addressing testimony during the hearing. Turnstone confirmed testimony that there is a new Great Blue Heron rookery forming east of 99W across and that the Landfill will have to comply with the Forest Practices Act with regard to the expansion. Turnstone otherwise reiterates its prior opinion that the expansion will not seriously interfere with wildlife in the area.

8. **Fire.** The Applicant submits the attached June 5, 2025, memorandum from James Walsh of SCS Engineers (Applicant's Ex. 44) responding to testimony on fire risk at Coffin Butte Landfill.

9. **Groundwater**. The Applicant will provide the County with additional evidence in response to testimony and questions related to groundwater the week of June 9.

10. **Visual Impact.** The Applicant submits the attached Landfill Cross Section prepared by SCS Engineering (Applicant's Ex. 45) to address questions from the hearing about the height of the landfill relative to Tampico Ridge. As shown in the cross sections, the maximum height of the landfill is below Tampico Ridge at all points, and therefore the expansion area at build-out will not be visible from the south side of Tampico Ridge. For clarity, topographical features are measured from mean sea level, which is well below the level of the surrounding landscape. Coffin Butte Road, for example, is at 267 feet above mean sea level. The top of the landfill at build-out is 450 feet above mean sea level, which is 183 feet above Coffin Butte Road.

11. Miscellaneous Responses.

Landfill Tarp Issues. An aerial photo of the existing landfill dated March 26, 2025, was submitted into the record showing tears in the tarp covering certain sections of the landfill. Repairs to these tears were in process during April 2025. The attached May 9, 2025, aerial photo (Applicant's Ex. 46) show that all these areas have been repaired. Griffolyn ethylene propylene diene monomer (EPDM) tarps are place over the 18 inches of soil cover required as part of intermediate cover. [3] The goal of these covers is to reduce water infiltration and thus reduce leachate production. It is important to note that these covers are not required by any regulatory agency as part of intermediate cover, but they are Coffin Butte Landfill practice. Wind, weather, and the natural settling of waste can result in punctures or tears to the tarps. As demonstrated by Applicant's aerial photo, the Applicant monitors and repairs the tears as promptly as possible.

Working Face Size. The Applicant reviewed the testimony that the working face in recent history has been larger than the one-half acre previously estimated, and corrects the record to reflect that the current working face size is between approximately 1.5 and 2 acres. There is no regulation or requirement that limits the working face to a particular size.

Construction Sequencing. The Applicant submits a June 2025 CEC memorandum outlining the general construction sequence for the landfill expansion (Applicant's Ex. 47) in response to question that arose during the hearing.

Dry Climate Landfills. The Applicant submits a June 2025 CEC memorandum about dry climate landfills in response to testimony related to the rates of production of landfill gas and leachate in a drier climate as compared to Coffin Butte (Applicant's Ex. 48).

[3] The Applicant uses a different type of canvas tarp for average daily cover.

The Applicant would be pleased to answer any questions that you may have about these submittals and will supplement the record with further evidence the week of June 9. Thank you for your consideration.

Very truly yours,

Jeffrey G. Condit

Memorandum

To: Benton County Planning Commission

From: Jeffrey G. Condit

Subject: Response to May 5, 2025, Memorandum from Jeffrey L. Kleinman
File No. LU-24-027

Date: June 6, 2025

As you know, we represent Valley Landfills, Inc. ("VLI"), the applicant for the above-noted conditional use permit application (CUP). This memorandum responds to the above-noted memorandum prepared by Jeff Kleinman, attorney for Valley Neighbors for Environmental Quality and Safety.

I. Response to Mr. Kleinman's Sections I and II (Introduction and General Comments)

A. New Landfill. Mr. Kleinman argues that this CUP for expansion of the landfill should be treated as an application for a new landfill. That is not a plausible interpretation. The proposed expansion is on land specifically designated for landfill use, for which zoning was adopted with the intention of providing for future expansion of the landfill. A landfill has been operating in this area for 70 years, and the expansion area will be part of the landfill operation that includes areas north of Coffin Butte Road.

B. Conditions of Approval. VLI respectfully disagrees with the representation that it has a track record of noncompliance with conditions of approval or that Benton County (the "County") will not enforce conditions. The decisional record from 1973 through 1990 is not complete and is prior to Republic's ownership, so VLI also has limited records from this period. In the proposed conditions of approval, there are conditions that must be completed to the County's satisfaction during development before VLI can move onto the next phase. There are also operating conditions that continue to apply to the landfill after operations begin, such as maintenance of the vegetative screen and odor and noise monitoring and mitigation. If VLI fails to comply with these conditions, the County can bring an enforcement action against VLI up to and including revocation of the CUP. The proposed conditions are consistent with the County's

modern practice and provide plenty of teeth to ensure that VLI will continue to comply with any conditions of approval imposed by the County.

C. Benton County Talks Trash (BCTT). VLI agrees that the BCTT final report is not a binding legal document; it is, however, a highly persuasive resource. Multiple stakeholders spent months going over the history and legal framework of the landfill and produced a BCTT final report with significant (if not total) consensus. Mr. Kleiman argued at the May 6 hearing that the Planning Commission should ignore the analyses by the BCTT legal subcommittee because it included the County counsel and two attorneys for VLI. We note that Mr. Kleinman was invited to participate by Sam Imperati, the Oregon Solutions moderator, and Mr. Kleinman declined. As a result, Mr. Imperati retained former LUBA member and long-time land use lawyer Virginia Lucker to serve as the Committee's member on the legal subcommittee to ensure that the final report represented views coming from multiple perspectives. The consensus work product of the legal subcommittee included Ms. Lucker's substantive input and conclusions.

D. Past Representations About the Landfill. Mr. Kleinman and several persons testifying at the hearings argued that "promises were made" 50 years ago that the landfill would be temporary or would close after a certain period. We reiterate that the only applicable criteria are those in the current County land use regulations. *See, e.g.*, *M & T Partners, Inc. v. City of Salem*, ___ Or LUBA ___ (LUBA No. 2018-143) (Aug. 14, 2019) (oral and written representations by the applicant that the commercial shopping center uses allowed under a comprehensive plan and zone change would not include a Costco store did not support denial of a subsequent application including a Costco, where that restriction was not incorporated into the zone change and the Costco otherwise complied with the adopted requirements of the zone).

II. Response to Mr. Kleinman's Section III (Conditional Use Approval Standards)

A. Meaning of "Seriously Interfere" under BCC 53.215(1). Mr. Kleinman appears to argue that any interference that is more than insignificant is serious. That is not consistent with the express language of the Benton County Development Code. The interpretation that VLI proposed in its Burden of Proof, and with which staff concurred in the Staff Report, was based upon the BCTT analysis. That analysis was based not just on the input from the lawyers, but primarily on research by County planning staff about how the County has historically interpreted the conditional use criteria in past land use decisions. The Planning Commission should bear in mind that the conditional use criteria in BCC 53.215 apply to all conditional uses

under the Benton Development Code. If the County adopts a much more restrictive definition with regard to this application, then the County will have to apply that interpretation in any future CUP application for any conditional use in the Code. If the County adopts a more restrictive interpretation for this application than its historic interpretation, that affects the plausibility of the interpretation. If the County adopts a more restrictive interpretation for the application and then reverts to its historic interpretation in future applications, that is a due process issue. As an applicant, VLI expects to be judged based upon the text of Code and consistent the County's past practice.

Mr. Kleinman's construction of the term "significant" is not relevant because that term is not used in BCC 53.215(1).

B. Interference with Uses on Adjacent Property. BCC 53.215(1) requires an analysis of the impacts on adjacent property and on the character of the area. VLI identified the adjacent properties based upon the definition of "adjacent" in Webster's Third New International Dictionary, which, as Mr. Kleinman notes, is the dictionary preferred by LUBA and the appellate courts when construing terms of common usage. *See* BOP at 19-20. VLI identified adjacent properties, not just adjacent to the expansion area, but adjacent to the existing landfill plus the expansion area; VLI also included in its analysis properties abutting the adjacent properties. While VLI does not necessarily agree that this expansive view of "adjacent" is required by the Benton County Code, the Staff Report concurs that this captures all of the "adjacent properties."

1. Noise. As part of its post-hearing submittal, VLI has submitted an revised Odor Modeling Study dated June 2025 ("June 2025 Noise Analysis") to address the concerns in the Staff Report that led to staff's recommendations for denial and to recommend additional mitigation measures.

a. DEQ Noise Rule. Mr. Kleinman implies the DEQ Noise Control Regulations for Industry and Commerce (OAR 340-035-0035) (the "Noise Rule") are unenforceable and out of date. DEQ does not enforce its noise control regulations because the legislature withdrew DEQ's funding to do so. *See* OAR 340-035-0110. The Noise Rule has been updated since 1991, however, and is applied by cities, counties, and other state agencies in other contexts. *See, e.g.*, *Mingo v. Morrow Cnty.*, ____ Or LUBA ____ (LUBA Nos. 2011-014, 2011-016, and 2011-017) (June 1, 2011) ("*Mingo I*") (wind energy facility noise). The

Noise Rule is an accepted benchmark for determining noise impacts on surrounding properties, particularly in the absence of any County noise rules.

b. Back-Up Beepers. Mr. Kleinman argues that the proximity alarms that will be installed on VLI's vehicles instead of back-up beepers are even noisier. Mr. Kleinman cites no evidence in support of this allegation. VLI is actually proposing to install ambient-sensing broadband back-up alarms that use white noise that adjusts based upon ambient sound levels. These are much quieter than tonal alarms. June 2025 Noise Analysis.

2. Odor. As part of its post-hearing submittal, VLI has submitted an updated Odor Analysis to address the concerns in the Staff Report that led to staff's recommendations for denial.

3. Methane. Methane emissions are regulated by the EPA. VLI is fully cooperating with the EPA's Section 114 Information Request.

4. Visual Impacts. VLI relies on its analysis in the BOP and the staff analysis. The closed landfill cells will be reclaimed and revegetated over time. VLI has submitted additional testimony addressing the alleged "patchwork of decaying tarps" as part of its June 6, 2025, response to the hearing testimony. VLI has also submitted additional information about the height of the proposed expansion area. It will be below the height of Tampico Ridge at all points and will not be visible from the south side of the ridge

C. The Character of the Area. VLI relies on the arguments in its BOP.

D. 2021 Decision Findings. Mr. Kleinman cites to several findings from the Planning Commission's 2021 decision in support of denying this application. As Mr. Kleinman himself notes, the 2021 application was a substantially different application with a substantially different evidentiary record. Those findings are not relevant to this application.[1]

[1] Mr. Kleinman posits that this application is a "Trojan Horse" for the eventual closure of Coffin Butte Road and the filling in of the valley: "it is not inconceivable that the county would apply (to itself) to vacate Coffin Butte Road so that Republic would own and could fill over the right-of-way." In point of fact, any future expansion of the landfill would require a CUP process subject to the same criteria, public notice, and process as the existing application, and any concomitant vacation requires an official action of the County Board of Commissioners, even under the expedited process when all of the abutting property owners consent. *See* ORS 368.351, 368.356. Approval of this application would not affect the required process applicable to any future application or make it any easier.

E. The Purpose of the Forest Conservation (FC) Zone. Mr. Kleinman's argument that the purpose of the FC zone prohibits landfill use on FC-zoned lands ignores two express provisions in Chapter 60. Section 60.005 (Purpose of the Zone) describes forest-related uses and then goes on to say:

> Except for activities permitted or allowed as a conditional use, non-forest uses shall be prohibited in order to minimize conflicts with forest uses, reduce potential for wildfire, and protect this area as the primary timber producing area of the County.

BCC 60.215(11) expressly allows as a conditional use in the FC Zone:

> Disposal site for solid waste approved by the Benton County Board of Commissioners and the Oregon Department of Environmental Quality together with equipment, facilities, or buildings necessary for its operation.

Mr. Kleinman's argument is directly contrary to the express language of the Code.

III. Response to Mr. Kleinman's Section IV (Conditions Related to Traffic, Drainage, Leachate Management)

A. Traffic. VLI's traffic consultant has responded to testimony at the hearing regarding transportation in a report dated May 23, 2025, and included in its June 6 response to testimony at the hearing. The proposed improvements to Coffin Butte Road are more than sufficient to address the changes in truck and traffic patterns and will not impede through traffic on Coffin Butte Road.

B. Drainage and Leachate Management. Mr. Kleiman does not explain why he believes VLI's responses to drainage and leachate management are not compliant. VLI has submitted additional evidence into the record in response to testimony at the hearing about drainage/groundwater, leachate, and proposed construction. Typically, construction activity to site a proposed use is not considered part of the impact for conditional use review.[2]

IV. Response to Mr. Kleiman's Section V (Conditional Use Criteria Under BCC 60.220)

Staff correctly concluded that VLI has demonstrated compliance with these criteria. If the application is approved, the working face of landfill will move from the north side of Coffin Butte Road to the expansion area, but the overall off-site impacts will not be materially

[2] For example, OAR 340-035-0035(5)(g) exempts construction site noise from compliance with the Noise Rule.

different. As noted in VLI's BOP, farm and forest uses have thrived on adjacent properties, including the farm uses on VLI's properties directly adjacent to the landfill.

V. Response to Mr. Kleinman's Section VI (Development Activities in Wetlands)

Nothing in BCC 99.225 requires an applicant to obtain wetland permits prior to approval of a land use application or require an agency response before approval. None of the wetlands identified on site are a designated Goal 5 wetland under the County Comprehensive Plan or land use regulations, and so the County does not have any independent regulatory authority over any of the wetlands on site. The Draft Conditions of Approval (PA-1) require VLI to obtain an approved wetlands delineation and any necessary removal/fill permits prior to any ground-disturbing activities, as required by state and federal law.

VI. Conclusion

VLI has met its burden for proof to demonstrate compliance with the applicable criteria and respectfully requests that the Planning Commission approve the above-noted application.

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

June 12, 2025

Benton County Planning Commission
c/o Petra Schuetz, Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Benton County Planning Commission:

We represent Valley Landfills, Inc., the Applicant for above-referenced conditional use permit. Please accept the following into the record of the proceedings on the application. These additional documents address the staff report and testimony submitted at the April 29, May 1, May 6, and May 8, Planning Commission hearings.

In our June 6, 2025, submittal, we noted that the Applicant would submit an additional response related to groundwater questions and issues raised in testimony. Attached please find a memorandum dated June 12, 2025, from John M. Hower of Geo-Logic Associates, Inc., and Eric Tuppan of Tuppan Consultants, LLC. Please accept this memorandum into the record as Applicant's Exhibit 49.

The memorandum addresses the following issues raised in testimony during and after the hearing.

Seismic Disturbance. The memorandum describes the blasting that will occur and concludes that the blasting impact will be roughly equivalent to disturbance of rock using conventional earth-moving equipment and will be far below the levels that can result in building damage. The Applicant will comply with all requirements of its DOGAMI permit and will provide notice of blasting to surrounding property owners.

Groundwater Interruption. The memorandum analyzes whether the blasting and excavation on the new cell in the expansion area will impact wells on surrounding properties. The analysis concludes that these activities should not have any material impact on surrounding wells but proposes ongoing monitoring and mitigation if necessary.

Arsenic in Groundwater. The memorandum analyzes whether the leachate from the expansion will increase arsenic in groundwater above naturally occurring levels. After reviewing the

groundwater data, the analysis concludes that groundwater is not being affected by a leachate release. The memorandum recommends ongoing monitoring and mitigation if necessary.

Stormwater and Surface Water Management. The memorandum responds to requests for more detail about surface water flow and surface water management in the current landfill and in the expansion area.

Stormwater Runoff Flowing into Knife River Quarry. The memorandum responds to a comment that stormwater runoff was entering the Knife River quarry. The memorandum concludes that existing grades and engineered controls are designed to prevent stormwater runoff from landfill areas commingling with runoff from the quarry area.

Volume of Leachate from Cells 1 and 1a. The memorandum addresses questions regarding the amount of leachate generated from Cells 1 and 1a.

Concentration of Metals and PFAS in Leachate. The memorandum addresses comments about elevated metals and PFAS in Coffin Butte Landfill leachate. The memorandum analyzes the available data and concludes that the levels of metals and PFAS in Coffin Butte leachate is comparable to other municipal solid waste landfills.

Leachate Seeps. The memorandum acknowledges that leachate seeps have occurred in the past, but explains how current cover and management practices significantly reduce the likelihood of leachate accumulation and the formation of seeps.

Liner System. The memorandum discusses and describes the proposed composite liner system, that it far exceeds current standards, and will be designed and installed as approved by DEQ.

The Applicant would be pleased to answer any questions that you may have about this submittal and our prior submittals. We will continue to monitor testimony as it is submitted and will submit additional responses as necessary.

Thank you for your consideration.

Very truly yours,

Jeffrey G. Condit

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

June 20, 2025

Benton County Planning Commission
c/o Petra Schuetz, Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Benton County Planning Commission:

We represent Valley Landfills, Inc., the Applicant for above-referenced conditional use permit. There were several issues raised in testimony that we did not directly address in our prior testimony.

Litter Impacting Farm Use. In an April 28, 2025, email from Ryan Wilson, who has a ranching operation at 28903 Tampico Road states that he has seen as increase in air-blown trash coming from the landfill, including Styrofoam, plastic bags, and metallic chip bags that could kill his cattle and other area livestock if they were to eat them.

At the threshold, we note that Mr. Wilson's operation is located along Tampico Road, relatively far south of the existing landfill. Mr. Wilson's operation is south of Tampico Ridge, and there are trees between the landfill and his operation. Given the geography, there is a question as to how much debris making its way to Mr. Wilson's operation is actually from the landfill. Nevertheless, as litter has been raised as a concern and Applicant's aim is to always be a conscientious neighbor, Applicant notes that it employs the following litter control measures:

- To catch letter before it becomes airborne, Coffin Butte Landfill deploys portable "Bull Fencing." (First picture below.) This type of fencing is moved with heavy equipment and is placed next to the working face. The landfill also places wire fencing along the main haul road that is reinforced with orange snow fence. (Second picture below). A third line of defense is the main chain link fence around the landfill property.

- The landfill also utilizes approximately 5 temporary labor workers every day. These temporary laborers pick litter inside and outside of the landfill and place the litter in garbage bags that are picked up at the end of the day.

- In addition, the landfill has a contract with the Benton County Sheriff's Department employing work crews to pick up litter along highway 99 and the Camp Adair Road from the landfill to Independence highway twice per month.

- As the working face grows throughout the day, heavy equipment operators place daily cover on the slopes to minimize the amount of exposed waste, which is one of the most effective ways to prevent blowing litter. When the landfill personnel notice that the wind is beginning to pick up, Applicant endeavors to reduce the working area to reduce the potential of windblown debris.

In addition to a condition requiring the Applicant maintain at least the same level of litter control measures with regard to the expansion as outlined above, we propose to add a secondary line of bull fencing behind the existing line and expand the litter collection activities to include Tampico and Soap Creek Roads. Finally, Landfill personnel continue to assess where additional fencing can be placed to minimize off-site litter and will install Defender Fencing where appropriate. (Third picture below.)

The measures will limit the amount of litter leaving the landfill so that it does not "seriously interfere with uses on adjacent property," or "force a significant change or significantly increase the cost of accepted farm and forest practices on agriculture or forest lands" within the meaning of the applicable criteria.

Odor. Please see attached brief memorandum from SCS Engineers dated June 20, 2025 (Applicant's Exhibit 51), which provides some further context and information on the results of the June 6, 2025, update to the Coffin Butte Landfill 2024 Expansion Application Odor Dispersion Modeling Study ("June 2025 Model").

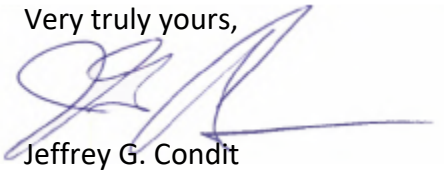
Impact of relocated leachate ponds on surrounding farm and forest uses. Some testimony expressed concern that the leachate ponds, which are proposed for relocation from the LS zone to the FC Zone, could leak leachate into the groundwater and "force a significant change or significantly increase the cost of accepted farm and forest practices on agriculture or forest lands."

The liner system for the new leachate storage ponds will be similar if not identical to the liner system that is being used in the current leachate storage ponds. This will include a leachate detection layer that is below the primary liner system. This liner system is regulated by the ODEQ and the leachate detection system is required to be monitored semi-annually. Based on our required monitoring of the existing leachate storage ponds, we do not have records of a leak detected during the time the existing ponds have been in operation. And, as explained in submissions from Geo-Logic Associates, Inc. and Tuppan Consultants LLC, there has been no evidence of a release to groundwater from portions of the Coffin Butte Landfill equipped with composite liner systems. Applicant would be glad to provide the results of the semi-annual monitoring to the County as a condition of approval.

The relocated leachate ponds will have no impact on surrounding farm and forest uses.

Thank you for your consideration.

Very truly yours,



Jeffrey G. Condit

Jeffrey G. Condit
Partner
Jeff.Condit@millernash.com
503.205.2305 (direct)

June 20, 2025

Benton County Planning Commission
c/o Petra Schuetz, Community Development Director
Benton County Community Development
4500 SW Research Way
Corvallis, OR 97330-1139

Subject: File No. LU-24-027

Dear Benton County Planning Commission:

We represent Valley Landfills, Inc., the Applicant for above-referenced conditional use permit. This letter responds to the June 10, 2025, submittal filed by Valley Neighbors for Environmental Quality and Safety (VNEQS). Many of the issues raised in this submittal are addressed in the Applicant's June 6, 2025, and June 10, 2025, submittals and the attendant reports of the Applicant's technical experts. The Applicant nonetheless asked its technical consultants to address the "Detailed Comments" in the VNEQS submittal. Accordingly, please accept the following document into the record of this proceeding:

A June 18, 2025, memorandum from the Greenbusch Group, Inc. (Applicant's Exhibit 52) responding to the VNEQS comments relating to noise.

A June 19, 2025, memorandum from SCS Engineers (Applicant's Exhibit 53) responding to the VNEQS comments relating to odor.

A June 17, 2025, memorandum from Transight Consulting LLC (Applicant's Exhibit 54) responding to the VNEQS comments relating to traffic.

A June 19, 2025, memorandum from Geologic Associates and Tuppan Consultants LLC (Applicant's Exhibit 55) responding to the VNEQS comments relating to groundwater and PFAS/Leachate.

A June 20, 2025, memorandum from SCS Engineers (Applicant's Exhibit 56) responding to the VNEQS comments relating to Fire Risk.

A June 19, 2025, memorandum from Turnstone Environmental Consultants (Applicant's Exhibit 57) responding to the VNEQS comments relating to wildlife habitat.

The Applicant relies on its previous submittals with regard to VNEQS other "Detailed Comments."

Response to VNEQS "General Criticisms." The Applicant has the following response to the VNEQS general criticisms.

- **Quarry.** The move into the quarry will increase the lifespan of the landfill but will not increase the intensity of the operation. The working face will move from its existing location to the quarry area but will be approximately the same size and will be operated at the same level and thus have the same impacts on the surrounding area. The same will happen when the working face moves from the quarry area to the expansion area. There will be a short transition period between the moves, but there will never be more than one working face.[1]

- **Increase in Waste Volume.** We assume that the volume figures cited by VNEQS come from reports submitted to DEQ as part of the Title V air quality permitting process. For purpose of that review, the Applicant errs on the high side. Further, the Applicant has had and may have to take in higher volumes of waste in emergency situations (such as from the wildfires several years ago) but otherwise expects organic growth in volume levels over time.

  VNEQS's comment that the Applicant is proposing to expand landfill operations to twenty-four hours is untrue. The Applicant is proposing exactly the same hours it is open to commercial haulers and the public as it has operated under for the last twenty years.

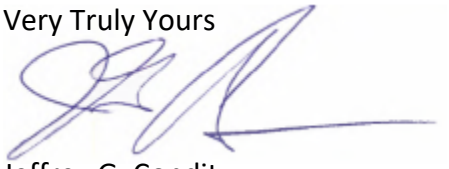
- **Landfill Lifespan**. VNEQS essentially argues that the expansion is ipso facto a "substantial interference" because it extends the life and increases the ultimate size of the landfill. The LS Zone and County Code expressly permit the landfill and allow it to expand. To deny the expansion because it expands the landfill would be a de-facto

[1] VNEQS refers to the move into the quarry as an "unpermitted." It is fully permitted. When Benton County amended the Comprehensive Plan and Development Code in 1983 to create the LS zone for landfill use and expansion, it also approved landfilling on most of the LS zone north of Coffin Butte Road, including the quarry area. This issue was examined in 2002, resulting a memorandum of understanding between the County and Valley Landfills concluding that no further county land use permits were needed for landfill expansions north of Coffin Butte Road. The issue was also extensively researched during the BCTT process, resulting in the same conclusion that the County approved landfill operations in the LS zone north of Coffin Butte Road, including the quarry area. Finally, the Applicant's current approved DEQ waste disposal permit includes the quarry territory. The issue is outside of the scope of the CUP, but the Applicant wants to clarify the record in light of the this and similar comments during the hearing process.

repeal of the Comprehensive Plan and Code. As the Applicant has testified previously, the Comprehensive Plan and Code may only be amended through the statutory and code required legislative processes. The question under the Code is whether the impacts of the expansion itself would "seriously interfere with uses on adjacent properties" or "seriously interfere with the character of the Area." Contrary to VNEQS's assertion, all of the Applicant's analyses consider that question in the contest of the impacts of the current landfill operation.

Thank you for your consideration.

Very Truly Yours



Jeffrey G. Condit

EXHIBIT 1
APPLICATION FORM AND FEES

Benton County
COMMUNITY DEVELOPMENT DEPARTMENT

Office: Kalapuya Building
4500 SW Research Way
Corvallis, OR 97333
(541) 766-6819
www.co.benton.or.us/cd

LAND USE APPLICATION

CONDITIONAL USE PERMIT

File # LU-_____
(OFFICE USE ONLY)

Fee: $10,000 deposit.
(SEE CURRENT FEE SCHEDULE)

ALL SECTIONS MUST BE COMPLETED BY OWNER, OWNER'S AGENT or APPLICANT. ATTACH ADDITIONAL SHEETS AS NECESSARY. COUNTY REVIEW WILL BEGIN WHEN THE APPLICATION IS DETERMINED TO BE COMPLETE.

I. Property Owner Information

Name(s): Valley Landfills, Inc., Ryan Lawler, Vice President Phone #1: 1-425-646-2142

Mailing Address 28972 Coffin Butte Road Phone #2: _____

City: Corvallis State: OR Zip: 97330 Email: c/o jeff.condit@millernash.com

II. Applicant Information (skip this section if Property Owner is Applicant)

Name(s): Valley Landfills, Inc., Ryan Lawler, Vice President Phone #1: 1-425-646-2142

Mailing Address: 28972 Coffin Butte Road Phone #2: _____

City: Corvallis State: OR Zip: 97330 Email: c/o jeff.condit@millernash.com

Other individuals to be notified of this application: Name, Address, City & Zip, or Email

_____

_____

III. Property Information

Site Address: 28972 to 29175 Coffin Butte Road, Corvallis, Oregon 97330

Assessor's Map & Tax Lot Number: T 10 S, R 41 W, Section(s) 80, Tax Lot(s) 801, 1101, 1107, 1107, 1108,

Acreage: 70.66 Zoning: LS and FC Fire District: Adair Rural

Water Supplied By: wells Sewage Disposal Type: subsurface

Existing Structures: See Burden of Proof Attached

Current use(s) of the property: See Burden of Proof Attached

IV. Request Summary (Example: **"**Conditional Use approval to operate a commercial kennel in the RR Zone.")

Conditional use approval to expand the area in which landfill activities maybe conducted to the south side of Coffin Butte Road.

Attached Documentation: With all land use applications, the "burden of proof" is on the applicant to demonstrate how the proposal complies with the Benton County development code and other law. It is important that you provide **ALL** the information listed on the following pages at the time you submit your application. The processing of your application will not begin until the application is determined to be complete.

Conditional Use Criteria *Please answer each question in detail on a separate sheet of paper.* ***BOP Attached.***

1. Describe how the proposed use will not seriously interfere with uses on adjacent property, with the character of the area, or with the purpose of the zone.

2. Describe how the proposed use will not impose an undue burden on any public improvements, facilities, utilities, or services available to the area.

3. If the property is zoned Exclusive Farm Use (EFU) or Forest Conservation (FC), describe how the proposed use will not force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use.

4. If the property is zoned EFU or FC, describe how the proposed use will not significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.

5. Will the proposed use involve the use of water (plumbing facilities, bathroom, water for processing, etc.)? _____ If yes:
   a. Is there an existing well or spring on the proposed parcel(s)? _____ Please attach a copy of a well log or pump test, if available, which identifies the rated yield of this water source.
   b. Is there an existing septic system on the proposed parcel(s)? _____ An evaluation by Environmental Health may be required of an existing system unless the system was recently installed or repaired. Please attach a copy of any septic system records you may have available.

6. Is the only access or proposed access to the property via a road that crosses a railroad? _____
   If yes, please draw the location on your map and explain here: _____

Mitigating Measures *Please answer in detail on a separate sheet of paper.*

1. Describe any special measures you propose to undertake in order to minimize impacts on adjacent properties and public services, and to ensure compliance with the purpose of the zone. Consideration may be given to such features as: location of the use on the parcel; road capacities in the area; driveway location; parking area; on-site traffic circulation; landscape or fencing separations; size of structures; signs; exterior lighting; noise; air emissions; drainage and more. **BOP Attached.**

Attachments

1. A copy of deed(s) covering the subject property. **BOP, Exhibit 25.**

2. A copy of all easements or other instruments granting access to any proposed parcel that does not have frontage on a public road. **N/A.**

3. An accurate scale drawing of the property, showing the locations of existing and proposed structures, roads, water supply, subsurface sewage system, easements, and driveways. Label all tax lots. **See BOP.**

Signature(s)

Assessed Property Value Notice

This action or any future related action(s), if approved, may result in a change to my property valuation, and therefore the tax amount I pay annually. I will contact the Assessor's Office at 541-766-6855 to discuss and understand potential property tax impacts.

■ **I understand**

I hereby certify that I am the legal owner or contract purchaser of the above noted property; that the information contained herein is accurate to the best of my knowledge; and that the requested conditional use permit would not violate any deed restrictions attached to the property.

Owner/Contract Purchaser Signature — Date: 07/16/2024

Owner/Contract Purchaser Signature — Date

For Office Use Only

Date Application Received:_____ Receipt Number:_____ By:_____

File Number Assigned:_____ Planner Assigned:_____

Date Application Deemed Complete:_____

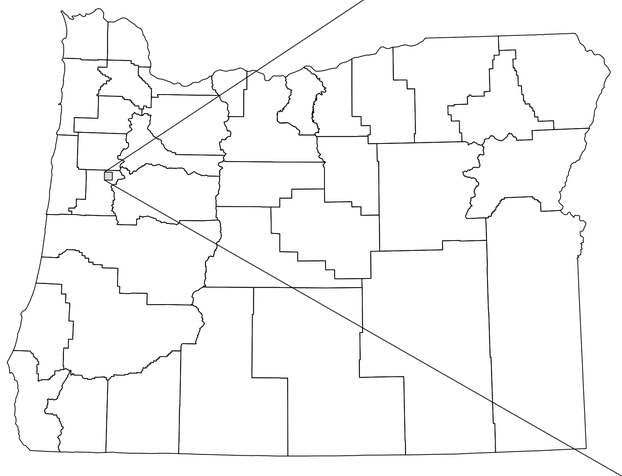
Exhibit E2

VALLEY LANDFILLS, INC.

COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
29175 COFFIN BUTTE ROAD
CORVALLIS, BENTON COUNTY, OREGON 97330

PREPARED FOR:

REPUBLIC SERVICES



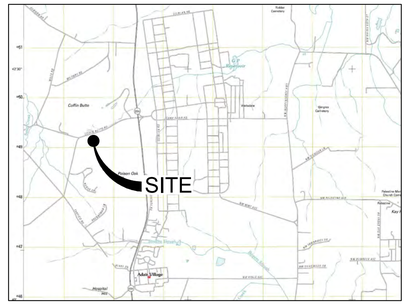
OREGON COUNTIES MAP
N.T.S.

SITE MAP

SCALE IN FEET
0 600 1200

SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	BENTON COUNTY TAX LOTS & ZONING
2A	BENTON COUNTY TAX LOTS & ZONING
3	EXISTING CONDITIONS
4	DEMOLITION PLAN
5	OVERALL DEVELOPMENT PLAN
6	DEVELOPMENT AREA LAYOUT
7	COFFIN BUTTE ROAD PROPOSED RIGHTS-OF-WAY
8	LEFT TURN TRAFFIC PLAN
9	NORTH ROAD PLAN
10	PARKING INFRASTRUCTURE PLAN
11	DEVELOPMENT AREA TOP OF WASTE GRADES
12	DEVELOPMENT AREA PHASE 1
13	DEVELOPMENT AREA PHASE 2
14	TOP OF WASTE PHASE 1
15	TOP OF WASTE PHASE 2
16	TOP OF WASTE PHASE 3
17	TOP OF WASTE PHASE 4
18	STOCKPILE PLAN
19	LANDSCAPE PLAN
20	SOUTH STORMWATER BASIN
21	WETPOND-DETENTION POND COMBINATION PLAN
22	WETPOND-DETENTION POND COMBINATION PROFILES
23	STORMWATER PROFILES
24	STORMWATER PROFILES
25	CROSS-SECTIONS
26	CROSS-SECTIONS
27	TRAFFIC DETAILS
28	DEVELOPMENT DETAILS



U.S.G.S. MAP

U.S.G.S 7.5 MIN. TOPOGRAPHY MAP,
LEWISBURG QUADRANGLE, OR, DATED 2011

SCALE IN FEET
0 5000 10000

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
△		

CEC
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

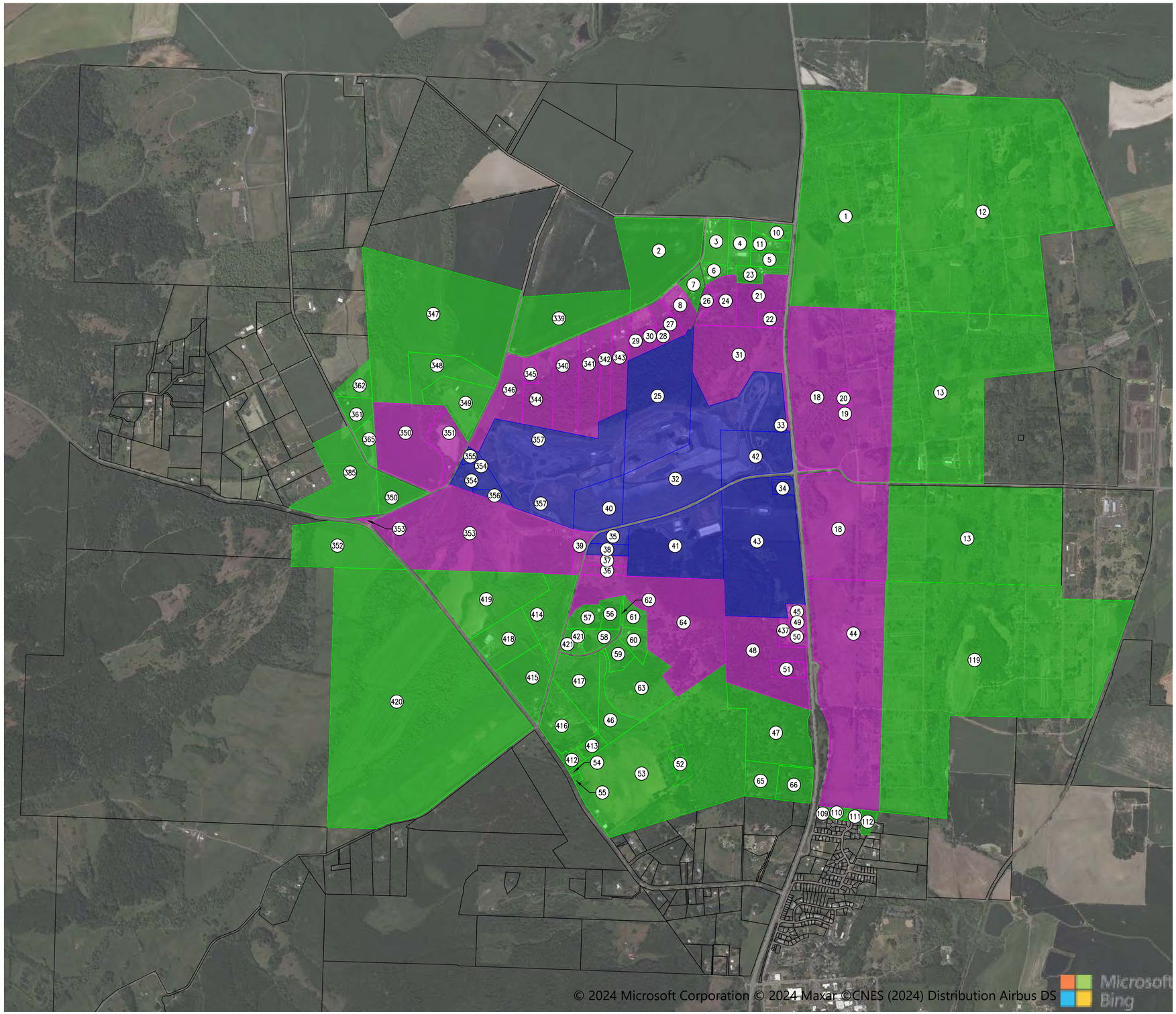
COVER SHEET

DATE:	JANUARY 2025
DRAWN BY:	JS
DWG SCALE:	AS SHOWN
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: 1

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-1-Cover Sheet.dwg[1] LS:(1/22/2025 - dbogel) - LP: 1/30/2025 10:01 AM

Exhibit E2



© 2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus DS

LEGEND

- PROPERTY WITH LANDFILL OPERATIONS
- PROPERTY ADJACENT TO LANDFILL OPERATIONS
- PROPERTY ADJACENT TO ADJACENT PROPERTY

NORTH

SCALE IN FEET

0 1,000 2,000

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

BENTON COUNTY TAX LOTS & ZONING

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: 2

P:\320-0001\322-142\-CAD\Dwg\SW01\322142-SW01-2-Benton County Tax Lots Exhibit.dwg[2] LS(1/22/2025 - jshaw) - LP: 1/30/2025 10:02 AM

Exhibit E2

NO.	TAX LOT NO.	OWNER NAME	CURRENT ZONING
1	104070000100	OREGON STATE GAME COMMISSION	OS
2	104070000300	R B WEBBER DEVELOPMENT LLC	EFU
3	104070000400	WILFONG TRISHA M	RR-5
4	104070000500	BURDOCK GARLAND R	RR-5
5	104070000601	RINKER TRISTA M	RR-5
6	104070000700	CLEARY BRYCE LAWRENCE	RR-5
7	104070000800	SCOTT DARCI L	RR-5
8	104070000900	WHITE JASON BYRON & JULIE B	RR-5
10	104070001100	AMADOR MARIBEL	RR-5
11	104070001200	LEAVENWORTH EDYNE	RR-5
12	104080000100	OREGON STATE GAME COMMISSION	OS
13	104170000100	OREGON STATE GAME COMMISSION	OS
18	104180000100	OREGON STATE GAME COMMISSION	OS
19	104180000101	CONSUMERS POWER INC	OS
20	104180000102	BUREAU OF LAND MANAGEMENT	OS
21	104180000200	PELTIER REAL ESTATE CO	FC
22	104180000201	POWELL LYNN MAY & HEALD NATHAN LESLIE	FC
23	104180000202	GOETZINGER DALE L & MONA G	RR-5
24	104180000300	DUBIKIN ALEXANDRE & POLUSHKIN GLIKERIA	FC
25	104180000301	VALLEY LANDFILLS INC	FC
26	104180000400	DUBIKIN ALEXANDRE & POLUSHKIN GLIKERIA	RR-5
27	104180000500	YOUNG CAROLYN	RR-5
28	104180000600	YOUNG CAROLYN	RR-5
29	104180000700	HOCKEMA JOSEPH E & JASMINE L	RR-5
30	104180000701	HOCKEMA JOSEPH E & JASMINE L	RR-5
31	104180000800	OREGON STATE FISH & WILDLIFE	FC
32	104180000801	VALLEY LANDFILLS INC	FC
33	104180000900	VALLEY LANDFILLS INC	FC
34	104180001000	VALLEY LANDFILLS INC	FC
35	104180001101	VALLEY LANDFILLS INC	FC
36	104180001102	VALLEY LAND FILLS INC	FC
37	104180001103	PHILLIPS SAMUEL F & CHERYL G	FC
38	104180001104	VALLEY LANDFILLS INC	FC
39	104180001105	PELTIER REAL ESTATE CO	EFU
40	104180001106	VALLEY LANDFILLS INC	LS
41	104180001107	VALLEY LANDFILLS INC	LS
42	104180001108	VALLEY LANDFILLS INC	LS
43	104180001200	VALLEY LANDFILLS INC	FC
44	104190000100	OREGON STATE GAME COMMISSION	OS
45	104190000200	BRADLEY LOWELL THOMAS & MARY ERIN	RR-10
46	104190000301	HOLDORF CATHERINE E, TR	EFU
47	104190000400	TAMPICO RIDGE LLC	RR-10
48	104190000402	KIPPER ROBERT J & JULIE A, TR	RR-10
49	104190000500	GEIER JOEL E & REBECCA S SHERMAN	RR-10
50	104190000600	CRESS MERRILL	RR-10
51	104190000700	MORRELL JEFFREY J & PATRICIA D	RR-10
52	104190001700	CLAPP CYNTHIA R	EFU & RR-10
53	104190001800	KEN & SARAH EDWARDSSON RL TRUST	EFU
54	104190001801	SLABAUGH ROGER L & MICHELLE V	EFU
55	104190001900	HERNANDEZ VICTOR	EFU
56	10419B000300	PELTIER REAL ESTATE CO	RR-10

NO.	TAX LOT NO.	OWNER NAME	CURRENT ZONING
57	10419B000400	CARLIN KATHERYN L, TR	RR-10
58	10419B000500	FRAZIER STEVEN & DAVIS LUE ANN	RR-10
59	10419B000600	GIBBS LANCE A	RR-10
60	10419B001200	BARBARA FICK LIVING TRUST	RR-10
61	10419B001300	BARBARA FICK LIVING TRUST	RR-10
62	10419B001301	VALLEY LANDFILLS INC	RR-10
63	10419B001500	CATHERINE E HOLDORF LIVING TRUST	RR-10
64	10419B001600	VALLEY LANDFILLS INC	RR-10
65	10419D000100	POSTLEWAIT JACOB EDWARD & ELIZABETH REGA	RR-10
66	10419D000200	HOLMES RICHARD H & CHARLCY L	RR-10
109	10419DD03700	YANEZ ERIC & BETHANY J	RR-5
110	10419DD03800	LOPEZ OMAR GENARO	RR-5
111	10419DD03900	ANTONIO & ELIZABETH AMANDI REVOCABLE LIV	RR-5
112	10419DD04000	ANTONIO & ELIZABETH AMANDI REVOCABLE LIV	RR-5
119	104200000300	OREGON STATE GAME COMMISSION	OS
339	105130000100	R B WEBBER DEVELOPMENT LLC	EFU
340	105130000200	DAVID & DEBRA HACKLEMAN TRUST	FC
341	105130000201	DAVID & DEBRA HACKLEMAN TRUST	FC
342	105130000202	BERKLUND HARRISUE, TR	FC
343	105130000203	BERKLUND HARRISUE, TR	FC
344	105130000300	DENOMA JOHN T JR & SEARS DONNA J	FC
345	105130000301	SEARS ROLLIN & DONNA JEANNE	FC
346	105130000400	BRISKEY JOINT REVOCABLE LIVING TRUST	FC
347	105130000500	DAVID A PLANT TRUST	EFU
348	105130000501	MARCUM DONALD R JR	EFU
349	105130000502	LINDSEY RICHARD T & KAREN J	EFU
350	105130000600	WINN TERRILL JAMES & APRIL DOVE	EFU
351	105130000601	GOETZINGER DALE L & MONA G	EFU
352	105130000700	OSC	FC
353	105130000800	VALLEY LANDFILLS INC	EFU
354	105130000900	VALLEY LANDFILLS INC	EFU
355	105130000901	VALLEY LANDFILLS INC	EFU
356	105130000902	VALLEY LANDFILLS INC	EFU
357	105130001000	VALLEY LANDFILLS INC	LS
361	105140000105	HARLAN ANNE M	EFU
362	105140000107	EDWARD L PORTZ & JOANN PORTZ TRUST	EFU
365	105140000111	HARLAN ANNE M	EFU
385	105140001400	BUCKOVIC FAMILY TRUST	EFU
411	105230000100	OREGON STATE BOARD HIGHER ED	FC
412	105240000101	JOHNSON DEBORA LEE, TR	EFU
413	105240000102	JOHNSON DEBORA LEE, TR	EFU
414	105240000103	VALLEY LANDFILLS INC	EFU
415	105240000104	LABRASSEUR GEORGE F & YOLANDE	EFU
416	105240000105	MASON FAMILY LIVING TRUST	EFU
417	105240000106	HOLDORF CATHERINE E, TR	EFU
418	105240000190	STAHL DEE M & WAYNE A	EFU
419	105240000200	VALLEY LANDFILLS INC	EFU
420	105240000300	OREGON STATE BOARD HIGHER ED	FC
421	105240000400	FLAK TIMOTHY A & LIND GINA M	RR-10
437	104190000401	SEARLS JAMES CLUETT	RR-10

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

BENTON COUNTY TAX LOTS & ZONING

DRAWN BY:	JS
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS
DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN

DRAWING NO.:
2A

P:\320-0001\322-1421-0A01\Dwg\SHT\322142-SHT1-2-Benton County Tax Lots Exhibit.dwg[DM LS](1/22/2025 - jahab) - LP: 1/30/2025 10:02 AM

Exhibit E2

LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- HERON ROOKERY AS SHOWN ON MAP BY ODF WILDLIFE BIOLOGIST DATED 08/23/21

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).

SITE SURVEY CONTROL POINTS			
PANEL NO.	NORTHING	EASTING	ELEVATION
29	389787.88	7493044.19	359.97
501	384664.04	7495154.42	307.12
503	387388.81	7486318.48	261.23
504	387264.72	7490779.38	284.60
509	389487.43	7488509.98	266.65
510	384184.71	7489109.45	275.60
513	385754.19	7487796.28	263.88
514	388618.37	7486338.73	248.52
10506	387033.07	7494916.43	245.27
10507	389112.23	7494668.96	221.72
10511	391036.59	7494506.97	235.97

NORTH

SCALE IN FEET

0 400 800

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
△		

CEC
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

EXISTING CONDITIONS

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 3

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-3-Existing Conditions.dwg[3] LS:(1/22/2025 - dbegell) - LP: 1/30/2025 10:02 AM

Exhibit E2

LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- HERON ROOKERY AS SHOWN ON MAP BY ODF WILDLIFE BIOLOGIST DATED 08/23/21

NORTH

SCALE IN FEET

0 400 800

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
△		

CEC
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

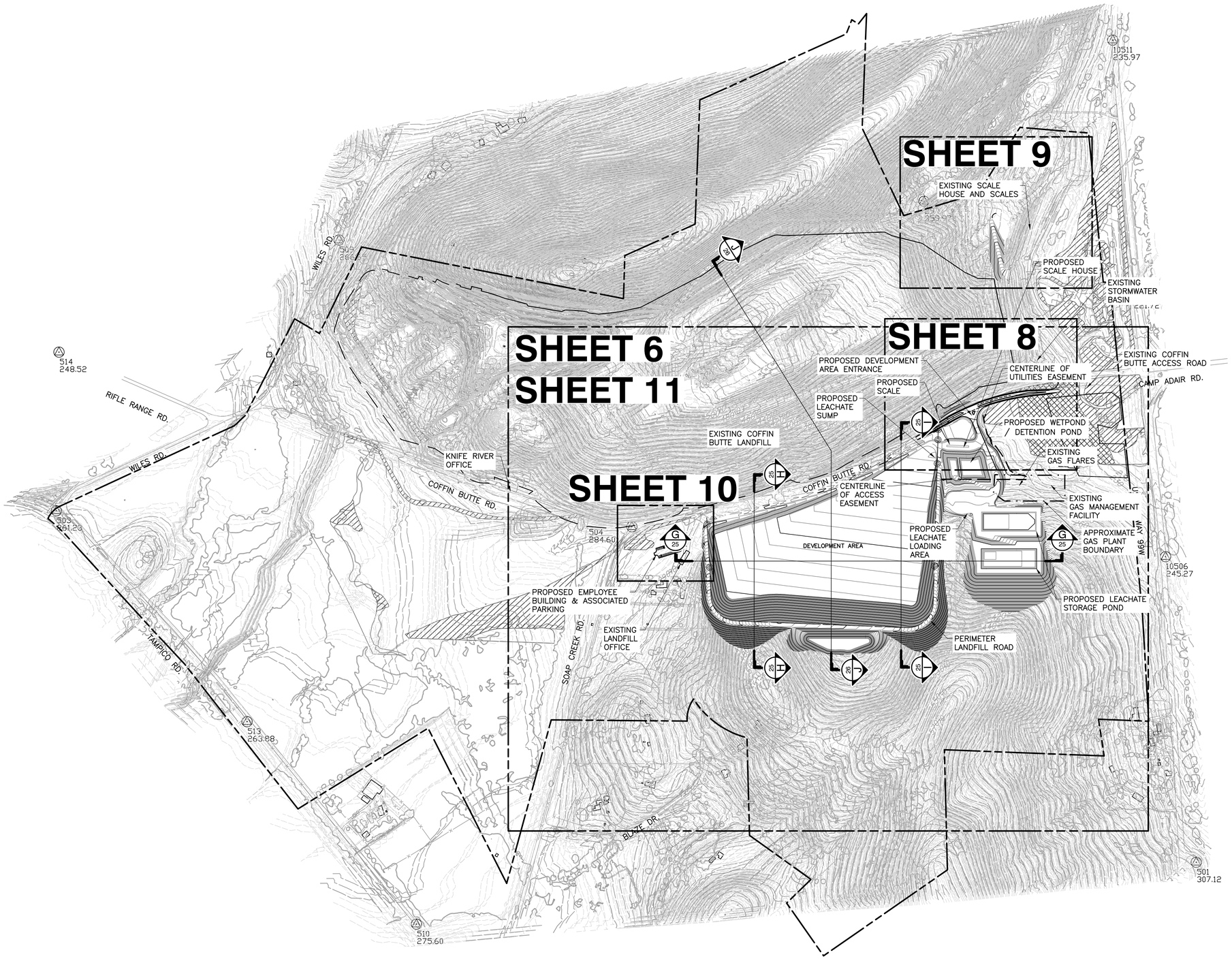
DEMOLITION PLAN

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 4

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-4-Demolition Plan.dwg[4] LS:(1/30/2025 - dbegell) - LP: 1/30/2025 10:03 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER 92360PE OREGON JULY 13, 2017 JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

CEC Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

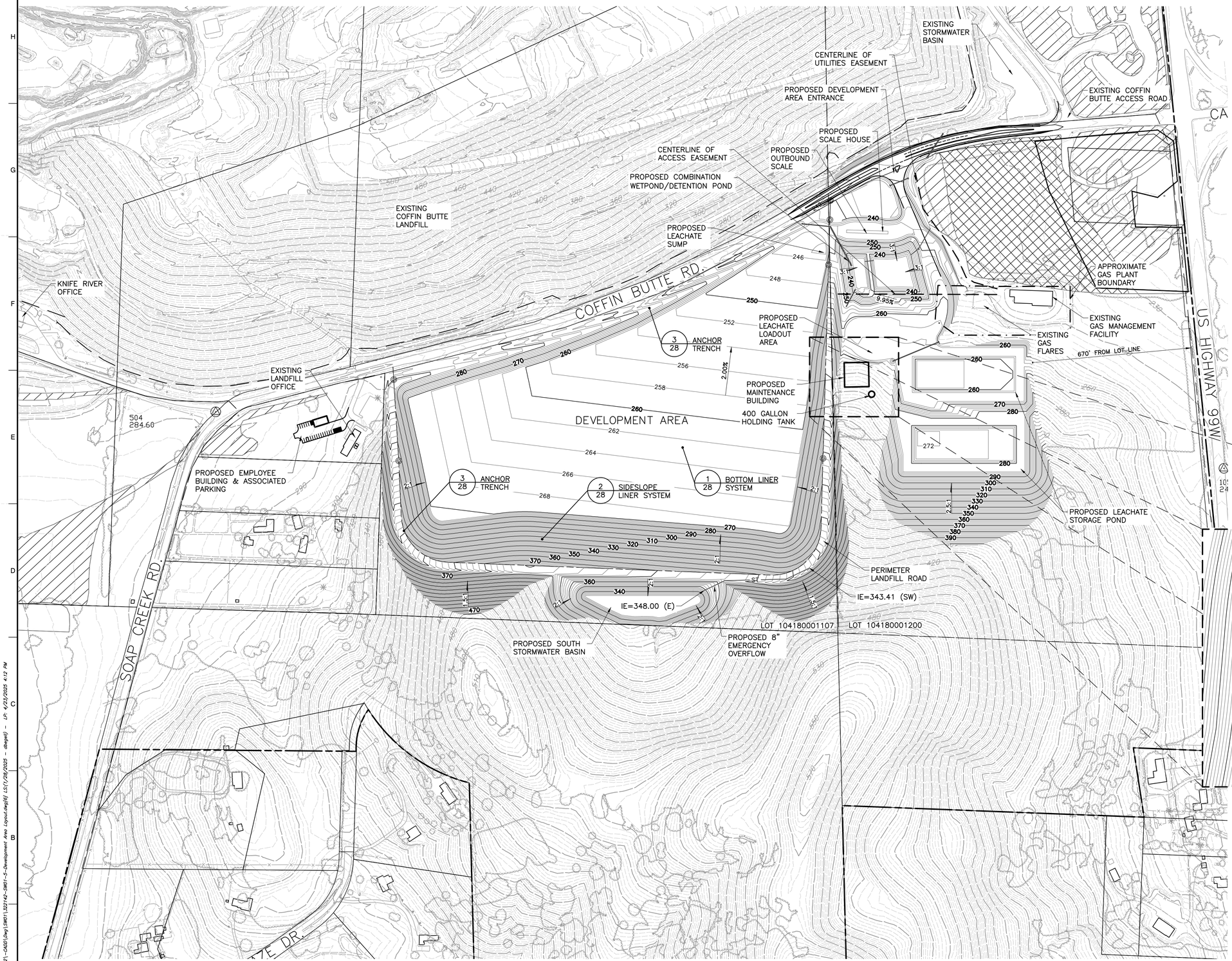
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

OVERALL DEVELOPMENT PLAN

DATE:	JANUARY 2025
DRAWN BY:	JS
DWG SCALE:	AS SHOWN
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: 5

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

ENLARGED DETAIL

SCALE: 1"=60'

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

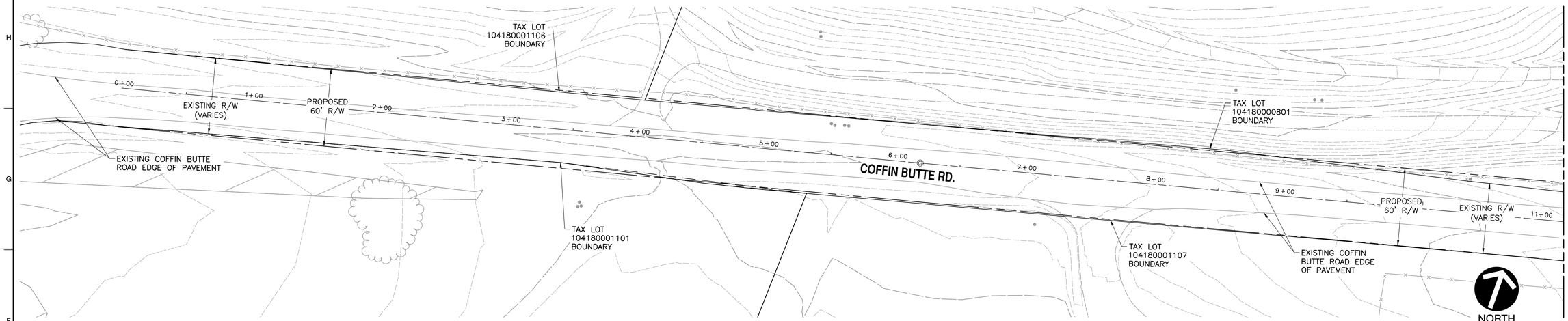
DEVELOPMENT AREA LAYOUT

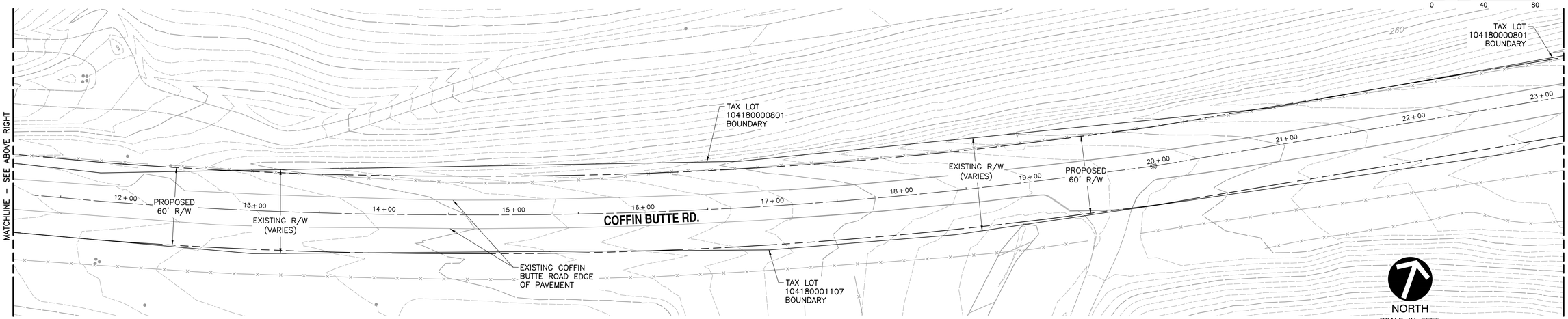
DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

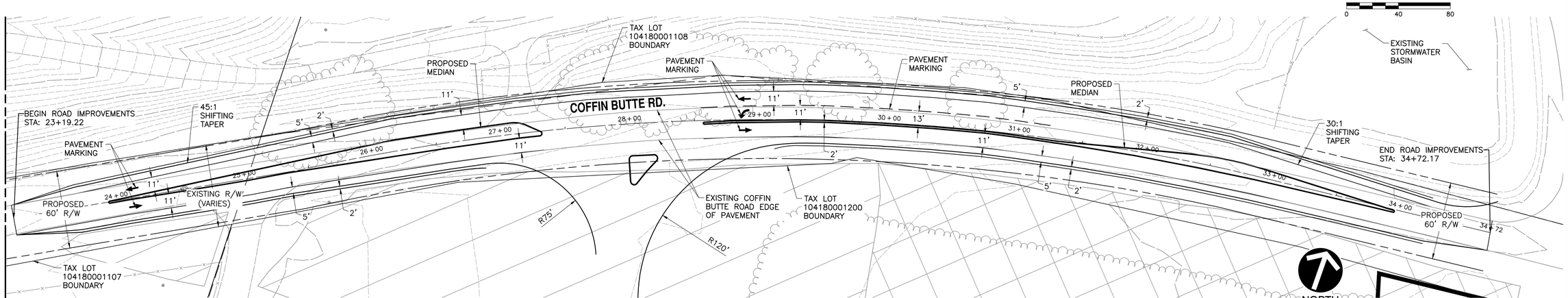
DRAWING NO.: 6

P:\320-0001\322-142\-CADD\Dwg\SW01\322142-SW01-S-Development Area Layout.dwg[G] LS(1/28/2025 - dbogel) - LP 1/31/2025 4:12 PM

Exhibit E2







LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10–FT CONTOUR
- EXISTING 2–FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10–FT CONTOUR
- 254 PROPOSD 2–FT CONTOUR
- PROPOSED R/W

NOTES:

1. AS SHOWN ON THIS DRAWING THERE IS ESSENTIALLY AN EXISTING 60–FOOT RIGHT–OF–WAY FOR COFFIN BUTTE ROAD AS THAT IS THE DISTANCE BETWEEN TAX LOTS.
2. THE EXISTING COFFIN BUTTE ROAD PAVEMENT UTILIZES APPROXIMATELY 30–FEET OF THE 60–FOOT RIGHT–OF–WAY.
3. THE FUTURE ROADWAY EXPANSION WILL BE WITHIN THAT EXISTING 60–FOOT RIGHT–OF–WAY.
4. ALL EXISTING UTILITY INFRASTRUCTURE, SUCH AS STORMWATER DRAINAGE AND ELECTRICAL, WILL REMAIN WITHIN THE 60–FOOT RIGHT–OF–WAY.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

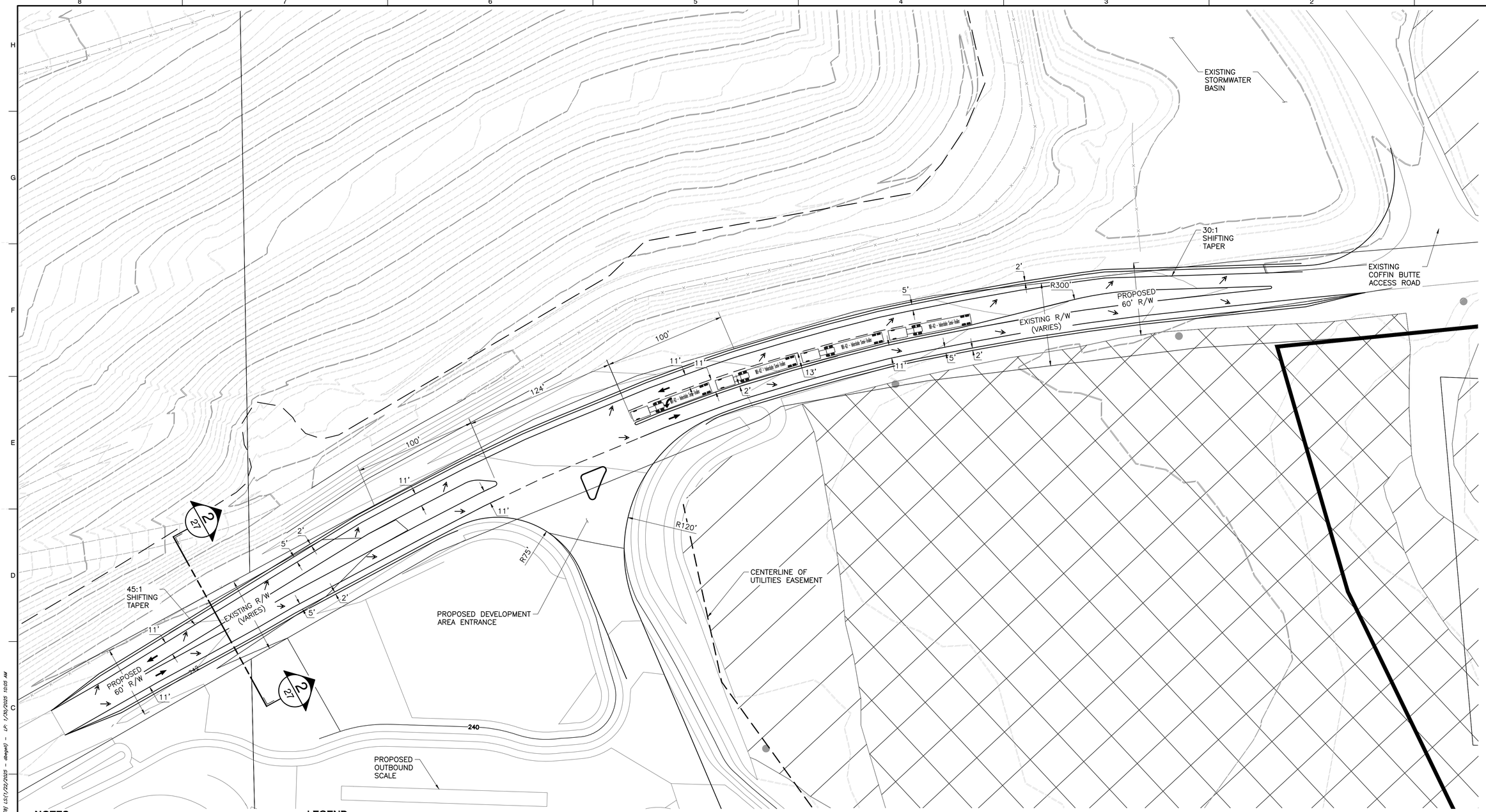
COFFIN BUTTE ROAD
PROPOSED RIGHTS-OF-WAY

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:		322-142	
APPROVED BY:			JAS

DRAWING NO.: 7

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-7-Proposed Coffin Butte Road ROW.dwg(ROW EXHIBIT) LS(1/22/2025 - dbwgel) - LP, 1/30/2025 10:05 AM

Exhibit E2



NOTES

1. LEFT TURN CHANNELIZATION BASED ON STATE OF OREGON DEPARTMENT OF TRANSPORTATION HIGHWAY DESIGN MANUAL FIGURE 8-9 FOR A DESIGN SPEED OF 40 MPH.
2. THE ADDITIONAL IMPERVIOUS AREA ADDED DUE TO THE ROAD WIDENING WILL BE APPROXIMATELY 0.65 ACRES.
3. STORMWATER RUNOFF WILL BE CAPTURED IN DRAINAGE CHANNELS OR CULVERT PIPES AND DIRECTED TO THE EXISTING STORMWATER BASIN ON NORTHWEST CORNER OF COFFIN BUTTE ROAD AND THE ENTRANCE TO COFFIN BUTTE LANDFILL.

LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR

NORTH

SCALE IN FEET

0 40 80

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

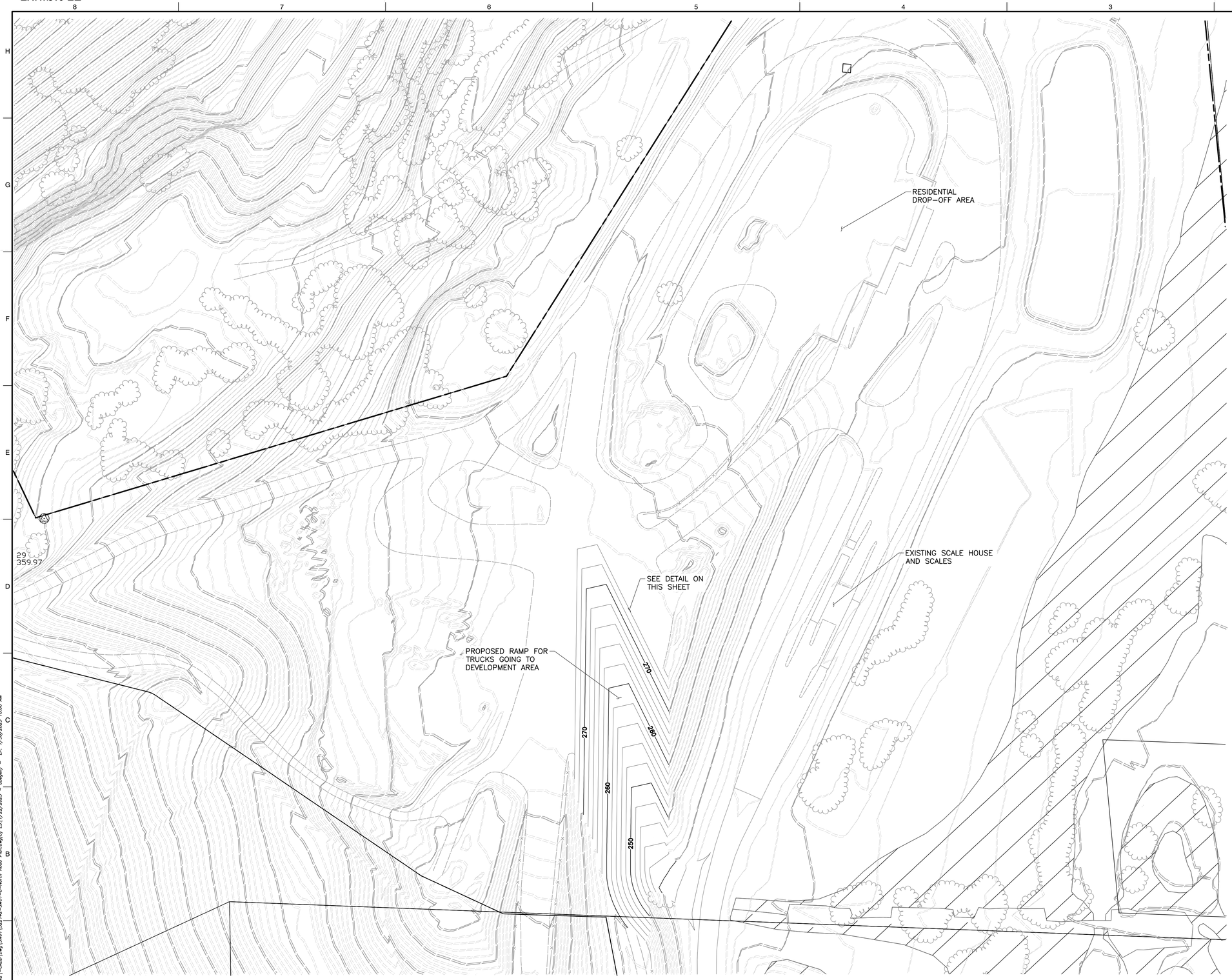
LEFT TURN TRAFFIC PLAN

DATE:	JANUARY 2025
DRAWN BY:	JS
DWG SCALE:	AS SHOWN
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: 8

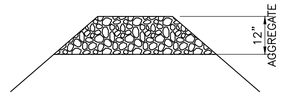
P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-7-Left Turn Traffic Plan.dwg[8] LS:(1/22/2025 - dbegell) - LP: 1/30/2025 10:05 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR



ROAD CROSS-SECTION DETAIL
N.T.S

NORTH

SCALE IN FEET
0 60 120

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

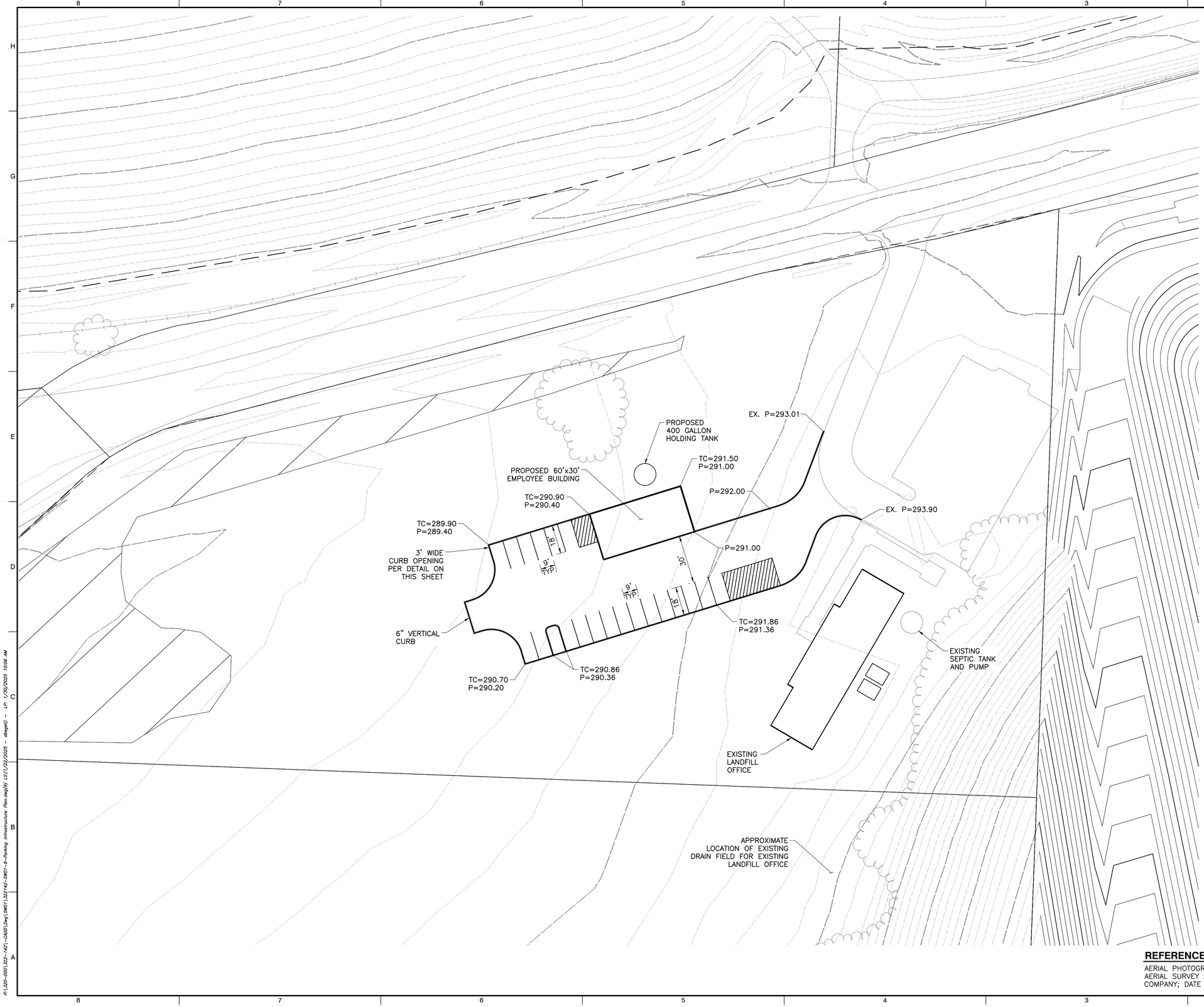
NORTH ROAD PLAN

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:		322-142	
APPROVED BY:			JAS

DRAWING NO.:
9

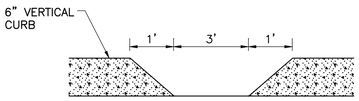
P:\320-001\322-142\-CAD\Dwg\3901\322142-3901-B-North Road Plan.dwg[B] LS(1/22/2025 - dbegal) - LP: 1/30/2025 10:06 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10–FT CONTOUR
- EXISTING 2–FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10–FT CONTOUR
- 254 PROPOSD 2–FT CONTOUR



CURB OPENING DETAIL
N.T.S

NOTE

1. PROPOSED HOLDING TANK TO BE PUMPED AS REQUIRED.
2. POTABLE WATER WILL BE OBTAINED FROM ON–SITE WATER WELL.
3. APPROXIMATELY 30 PEOPLE WILL BE USING THE LOCKER ROOM.
4. PROPOSED HOLDING TANK WILL BE DESIGNED IN ACCORDANCE WITH BENTON COUNTY OREGON REGULATIONS AT THE TIME WHEN A BUILDING / PLUMBING PERMIT IS OBTAINED FOR THE PROPOSED EMPLOYEE BUILDING.

NORTH

SCALE IN FEET
0 30 60

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

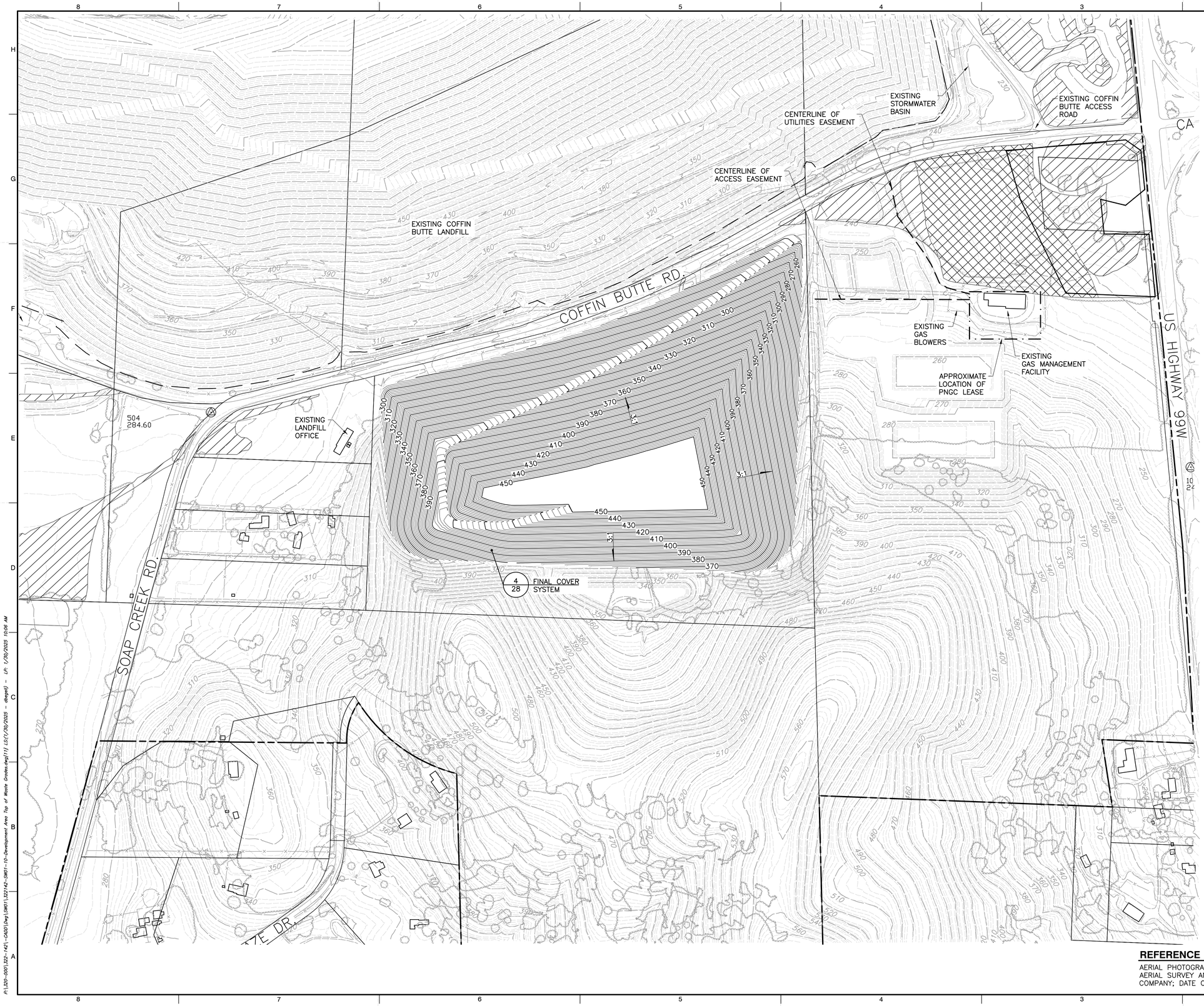
PARKING INFRASTRUCTURE PLAN

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO.:	322-142
APPROVED BY:	JAS
DRAWN BY:	JS
CHECKED BY:	JAS

DRAWING NO.: 10

P:\320-001\322-142\-CAD\Dwg\SWD\322142-SWD1-3-Parking Infrastructure Plan.dwg(B) LS(1/22/2025 - dbagell) - LP: 1/30/2025 10:08 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT TOP OF WASTE CONTOUR
- 254 PROPOSD 2-FT TOP OF CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
△		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

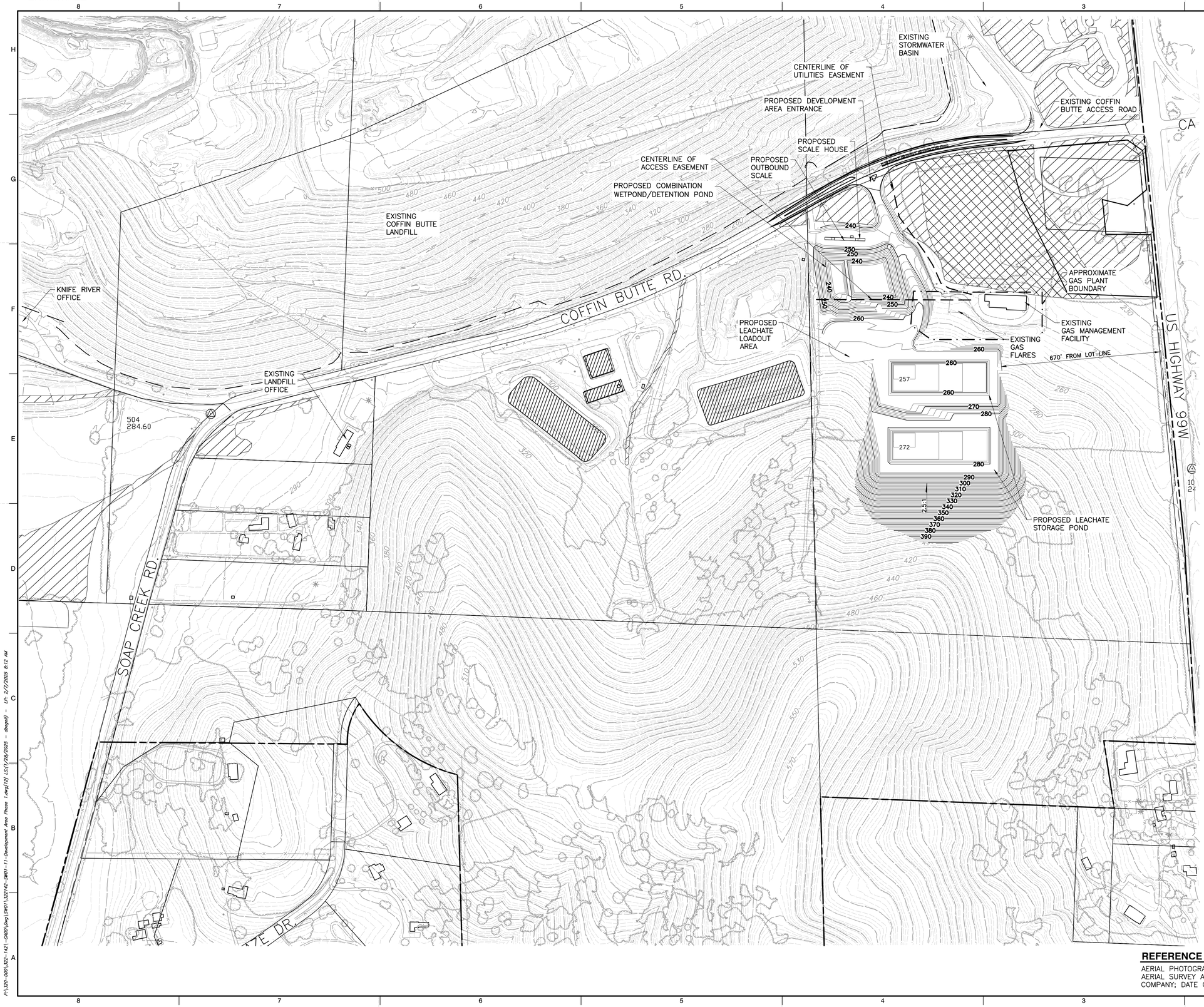
DEVELOPMENT AREA TOP OF WASTE GRADES

DATE:	JANUARY 2025
DRAWN BY:	JS
DWG SCALE:	AS SHOWN
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: 11

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-10-Development Area Top of Waste Grades.dwg[11] LS:(1/30/2025 - dbegel) - LP: 1/30/2025 10:06 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

DEVELOPMENT AREA PHASE 1 (YEAR 1)

1. CUT VOLUME = 416,325 CY
   FILL VOLUME = 48,304 CY
   TOTAL VOLUME (CUT) = 368,021 CY

   THE LANDFILL CURRENTLY USES APPROXIMATELY 225,000 CY/YEAR FOR DAILY COVER.
2. AS THE EXCESS CUT MATERIAL IS REMOVED, IT WILL BE UTILIZED AS DAILY / INTERMEDIATE COVER. THE SLIGHT EXCESS WILL BE STORED IN VARIOUS LOCATIONS AROUND THE EXISTING LANDFILL.
3. ALL LANDFILL GAS UTILITIES / PIPES THAT CURRENTLY RUN BETWEEN THE EXISTING LANDFILL AND EXISTING GAS MANAGEMENT FACILITIES WILL EITHER REMAIN IN PLACE OR WILL BE REROUTED BASED ON DETAILED DESIGN THAT WILL BE SUBMITTED TO THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY.
4. ALL EXISTING LEACHATE PIPING WILL BE REMOVED WHEN THE EXISTING PONDS ARE REMOVED.
5. NEW LEACHATE PIPING TO THE NEW LEACHATE STORAGE PONDS WILL BE DESIGNED DURING THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY SOLID WASTE PERMIT APPLICATION. OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY WILL REVIEW AND APPROVE THE DESIGN OF THOSE PIPES.

NORTH

SCALE IN FEET
0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

CEC
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC. COFFIN BUTTE LANDFILL CONDITIONAL USE PERMIT APPLICATION CORVALLIS, OR 97330

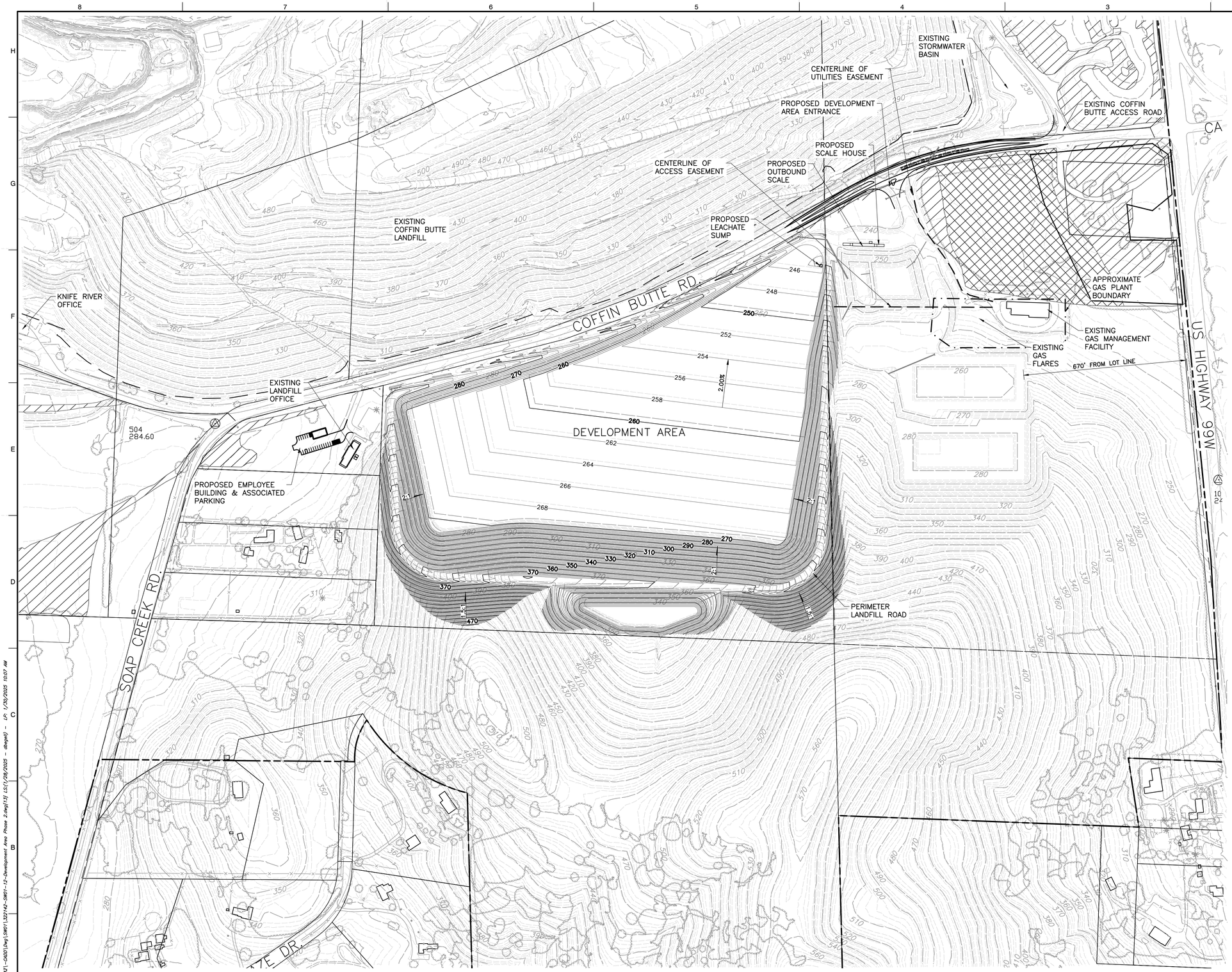
DEVELOPMENT AREA PHASE 1

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:	322-142	APPROVED BY:	JAS

DRAWING NO.: 12

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-11-Development Area Phase 1.dwg[12] LS:(1/28/2025 - dbegell) - LP: 2/7/2025 8:12 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

DEVELOPMENT AREA

1. CUT VOLUME = 3,254,107 CY
   FILL VOLUME = 107,454 CY
   TOTAL VOLUME (CUT) = 3,146,653 CY
2. EXCAVATION IN THE EXPANSION AREA WILL COMMENCE AS SOON AS POSSIBLE AFTER APPROVAL OF CUP.
3. THE LANDFILL WILL USE APPROXIMATELY 225,000 CY FOR DAILY COVER PER YEAR.
4. THE REMAINING PERMITTED CAPACITY IS APPROXIMATELY 14.5 MILLION CY, SO AT 15%, THE DAILY COVER REQUIREMENT IS APPROXIMATELY 2.2 MILLION CY.
5. CAPPING PROJECTS THAT WILL COMMENCE IN THE NEAR FUTURE WILL CONSUME APPROXIMATELY 500,000 CY.
6. REMAINING MATERIAL WILL BE STOCKPILED OR USED FOR ROAD CONSTRUCTION OR OTHER CONSTRUCTION ACTIVITIES.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

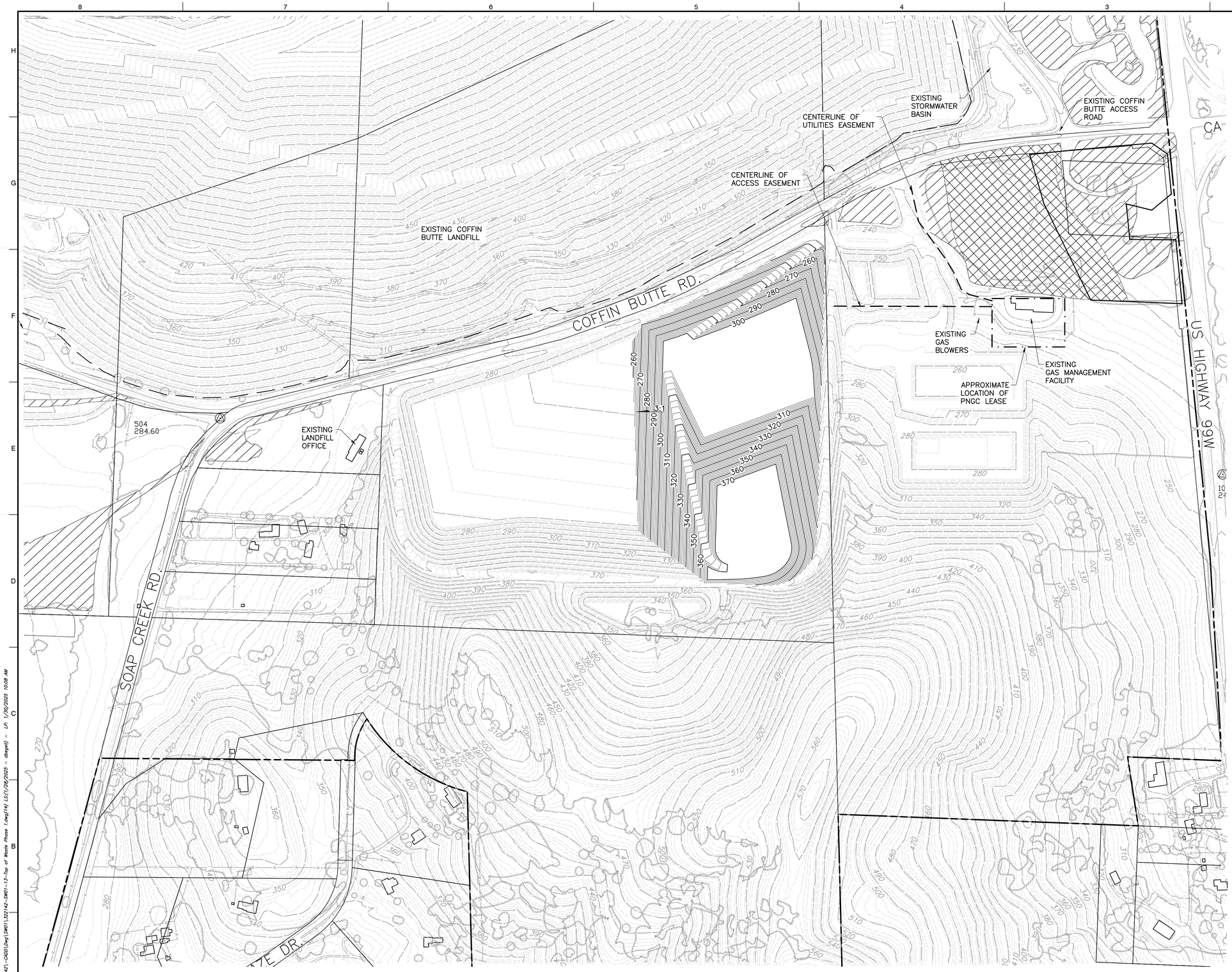
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

DEVELOPMENT AREA PHASE 2

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 13

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 — EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 — PROPOSED 10-FT TOP OF WASTE CONTOUR
- 254 — PROPOSD 2-FT TOP OF CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.
3. TIMELINE STARTS WHEN THE EXPANSION AREA HAS BEEN FULLY EXCAVATED AND LINED.

TOP OF WASTE PHASE 1 (YEAR 2)

1. FILL VOLUME = 1,500,000 CY

NORTH

SCALE IN FEET
0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph. 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

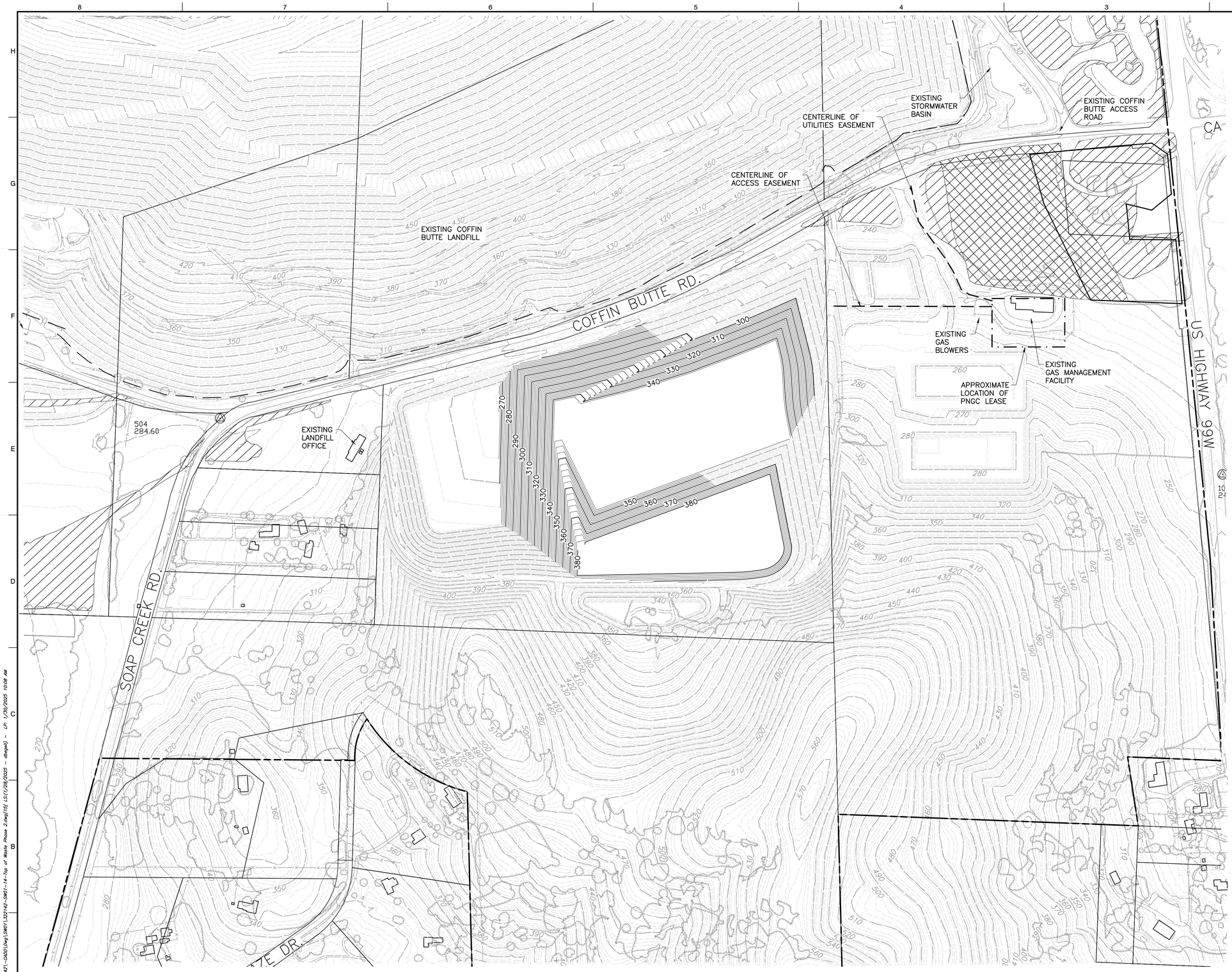
TOP OF WASTE PHASE 1

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:		322-142	
APPROVED BY:			JAS

DRAWING NO.:
14

P:\320-0001\322-1421-0400\dwg\SHT\[322142-SHT-13-Top of Waste Phase 1.dwg]14] LS1(28/2025 - dwgpl) - LP: 1/30/2025 10:08 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT TOP OF WASTE CONTOUR
- 254 PROPOSD 2-FT TOP OF CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.
3. TIMELINE STARTS WHEN THE EXPANSION AREA HAS BEEN FULLY EXCAVATED AND LINED.

TOP OF WASTE PHASE 2 (YEAR 3 AND 4)

1. FILL VOLUME = 1,500,000 CY

NORTH

SCALE IN FEET
0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

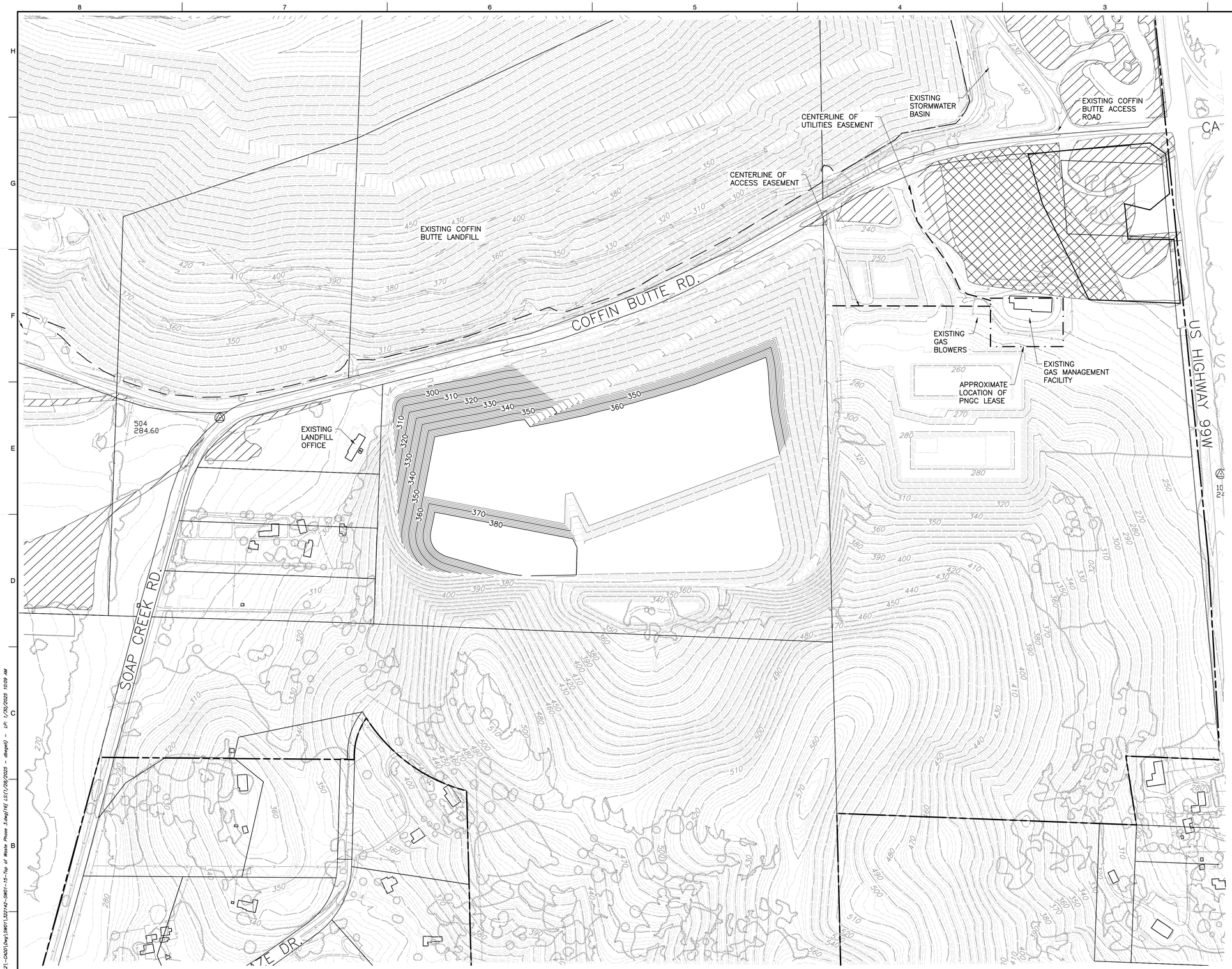
TOP OF WASTE PHASE 2

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:	322-142	APPROVED BY:	JAS

DRAWING NO.: 15

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-14-Top of Waste Phase 2.dwg[15] LS:(1/28/2025 - dbegell) - LP: 1/30/2025 10:08 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT TOP OF WASTE CONTOUR
- 254 PROPOSD 2-FT TOP OF CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.
3. TIMELINE STARTS WHEN THE EXPANSION AREA HAS BEEN FULLY EXCAVATED AND LINED.

TOP OF WASTE PHASE 3 (YEAR 5)

1. FILL VOLUME = 1,500,000 CY

NORTH

SCALE IN FEET
0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

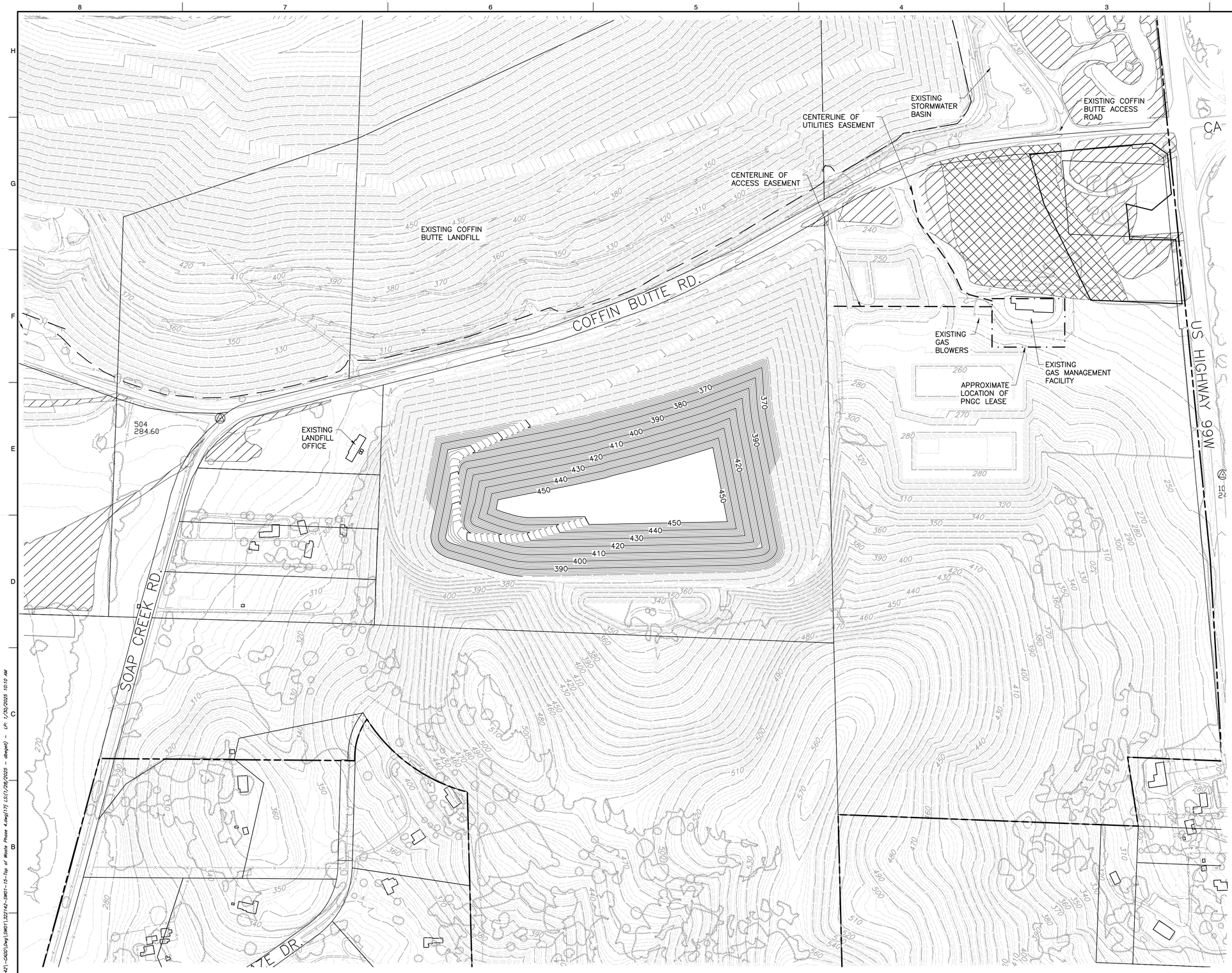
TOP OF WASTE PHASE 2

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 16

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-15-Top of Waste Phase 3.dwg[16] LS:(1/28/2025 - dbegeli) - LP: 1/30/2025 10:09 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT TOP OF WASTE CONTOUR
- 254 PROPOSD 2-FT TOP OF CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

TOP OF WASTE PHASE 4 (YEAR 6-7)

1. FILL VOLUME = 1,860,000 CY

NORTH

SCALE IN FEET
0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

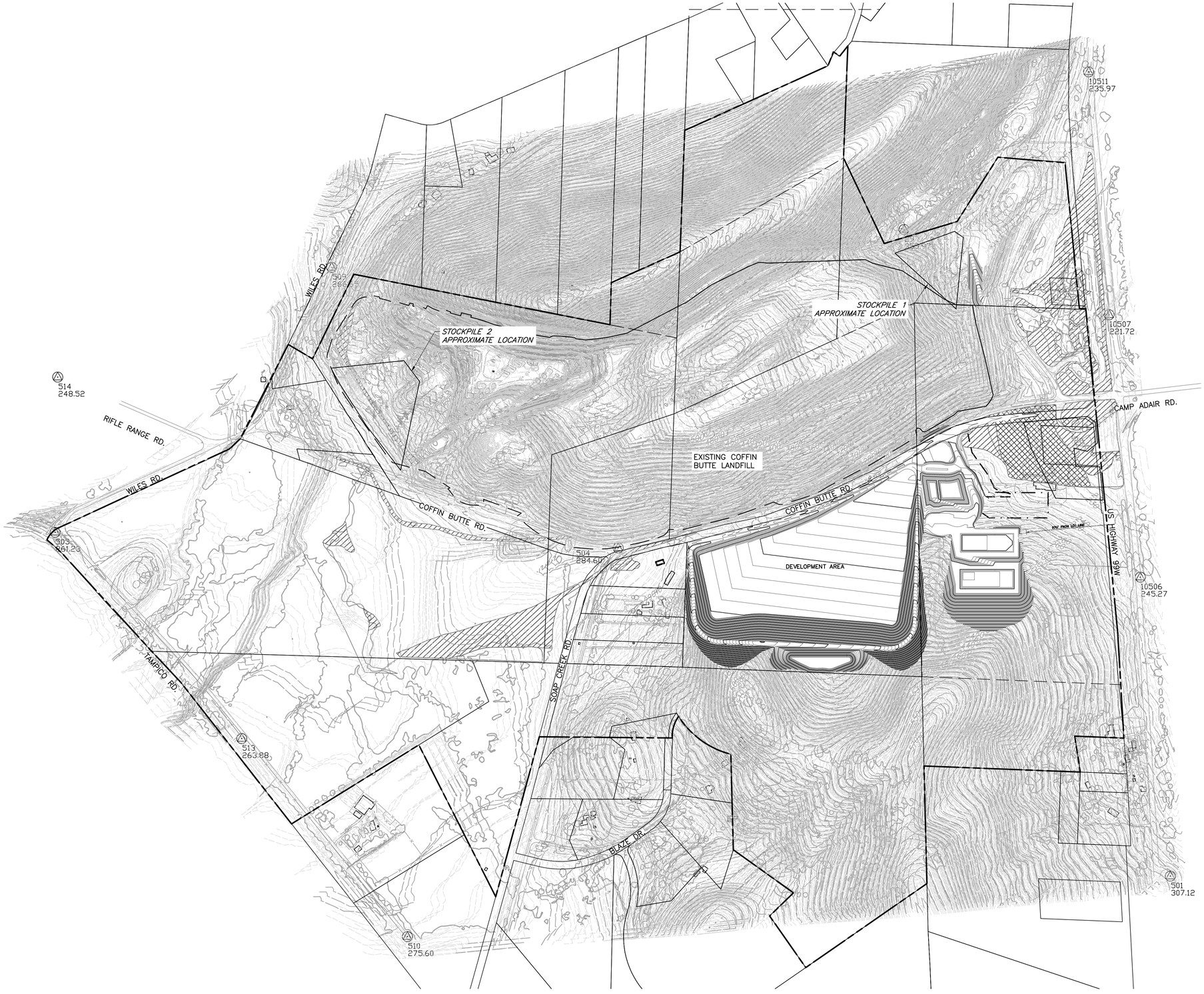
TOP OF WASTE PHASE 4

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 17

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-15-Top of Waste Phase 4.dwg[17] LS:(1/28/2025 - dbegell) - LP: 1/30/2025 10:10 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. SEE NOTES ON DRAWING NO. 13 FOR EXCAVATION VOLUMES.

NORTH

SCALE IN FEET

0 400 800

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

STOCKPILE PLAN

DATE:	JANUARY 2025
DRAWN BY:	JS
DWG SCALE:	AS SHOWN
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: 18

Exhibit E2

LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR
- PROPOSED TREES

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

NORTH

SCALE IN FEET

0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

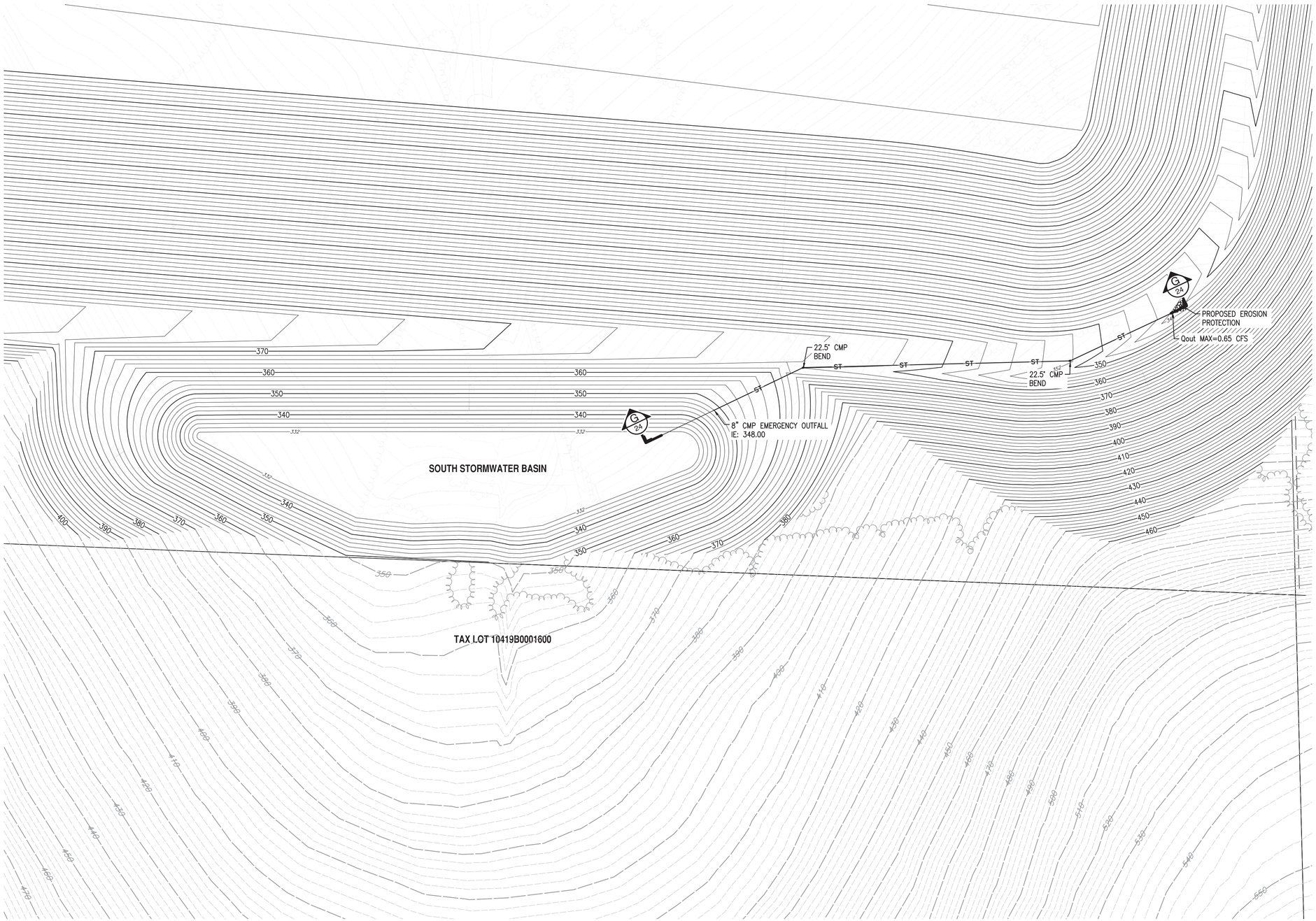
LANDSCAPE PLAN

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 19

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-18-Landscape Plan.dwg[18] LS:(1/22/2025 - dbegell) - LP: 1/30/2025 10:10 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR
- ST 8-INCH STORM PIPE
- STORM PIPE > 8-INCH
- 30-INCH CATCH BASIN
- HEADWALL
- EROSION PROTECTION
- TOP OF BERM
- G G SECTION

SOUTH BASIN	
REQUIRED VOLUME (Vr)	163,824 CF
PROVIDED VOLUME (Vp)	764,196 CF
POND BOTTOM	332.00
POND TOP	348.00
INFLOW	22.17 CFS
EMERGENCY OUTFALL ELEVATION	348.00
OUTFLOW	0.65 CFS MAX

NORTH

SCALE IN FEET
0 50 100

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

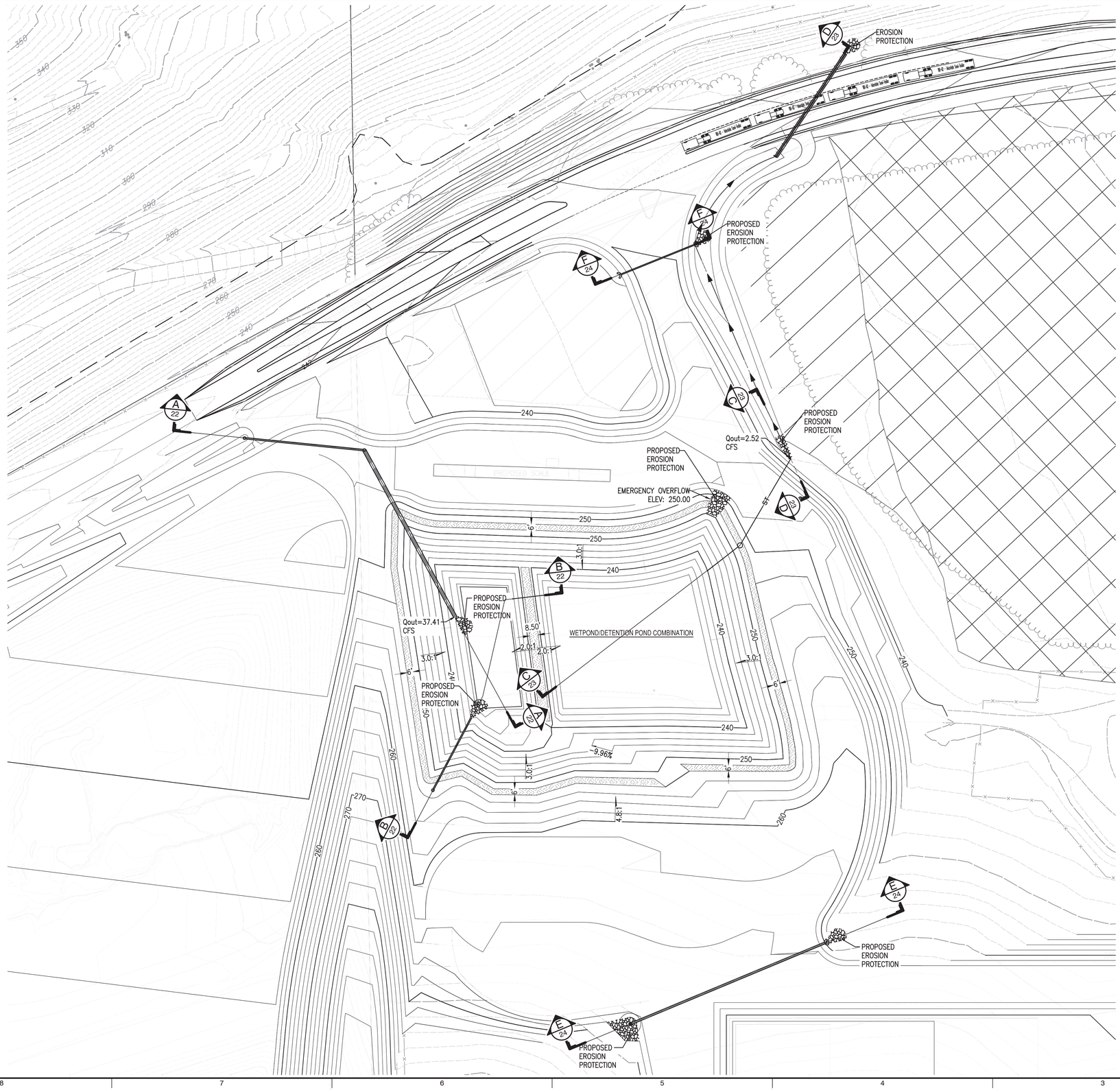
SOUTH STORMWATER BASIN

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: 20

P:\320-200\322-1421-CAD\Dwg\3901\322142-3901-10-Stormwater Management.dwg[20] LS(1/30/2025 - dwgpl) - LP: 2/7/2025 8:19 AM

Exhibit E2



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR
- DRAINAGE SWALE
- ST 8-INCH STORM PIPE
- STORM PIPE > 8-INCH
- 30-INCH CATCH BASIN
- HEADWALL
- RIPRAP
- TOP OF BERM
- SECTION

WETPOND / DETENTION POND COMBINATION	
REQUIRED VOLUME (Vr)	192,433 CF
PROVIDED VOLUME (Vp)	767,696 CF
POND BOTTOM	234.00
WQ DESIGN WS ELEVATION	242.00
DETENTION DESIGN WS ELEVATION	250.00
DETENTION OVERFLOW WS ELEVATION	251.00
EMERGENCY OVERFLOW WS ELEVATION	252.00

NORTH

SCALE IN FEET

0 50 100

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

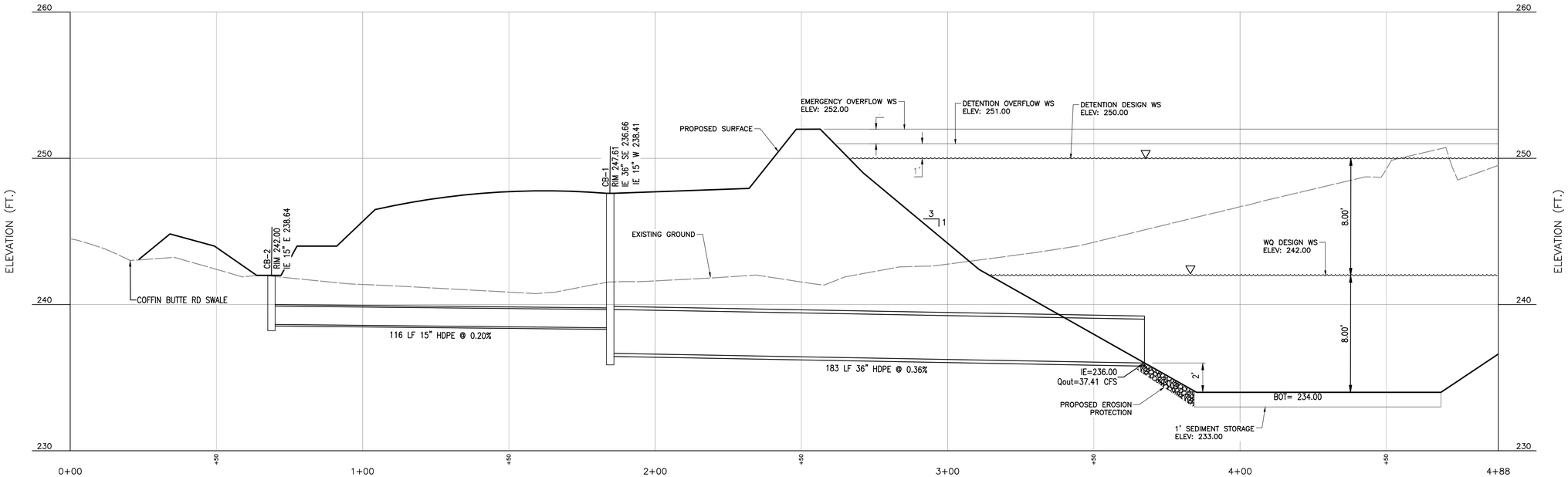
WETPOND-DETENTION POND COMBINATION PLAN

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 21

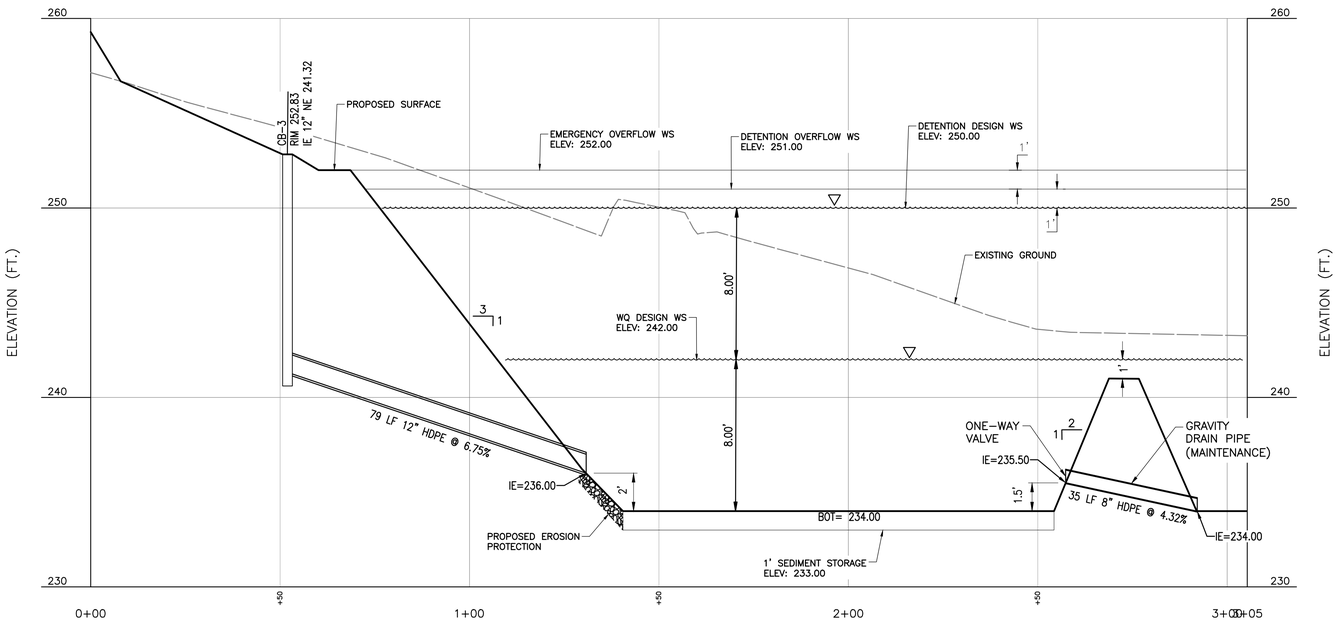
P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-10-Stormwater Management.dwg[21] LS:(1/30/2025 - dbegell) - LP: 2/7/2025 8:18 AM

Exhibit E2



CROSS-SECTION A-A

SCALE H:1"=20'; V:1"=4'



CROSS-SECTION B-B

SCALE H:1"=20'; V:1"=4'

NOTES:

WATER SURFACE ELEVATION DEVELOPED ACCORDING TO COMBINED DETENTION AND WET POND STANDARDS SPECIFIED IN CHAPTERS 2 AND 3 FROM THE CORVALLIS STORMWATER DESIGN STANDARDS 2015 EDITION.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

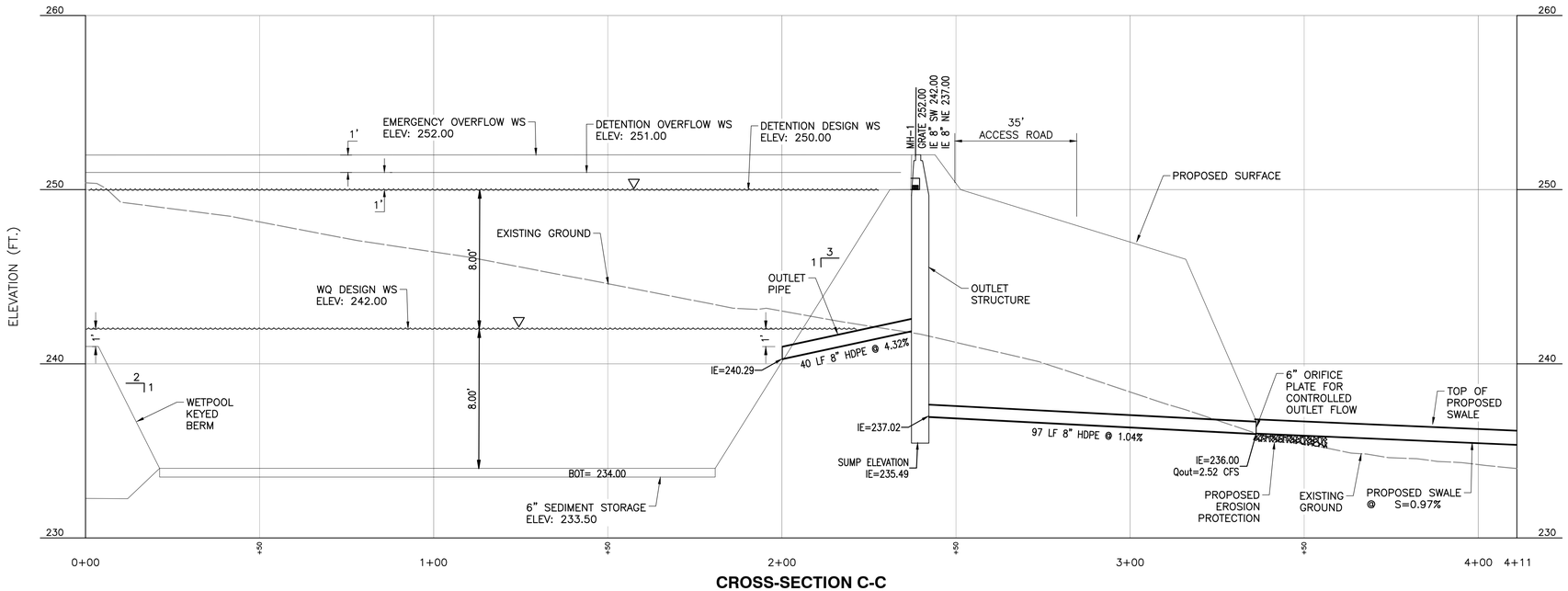
WETPOND-DETENTION POND
COMBINATION PROFILES

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

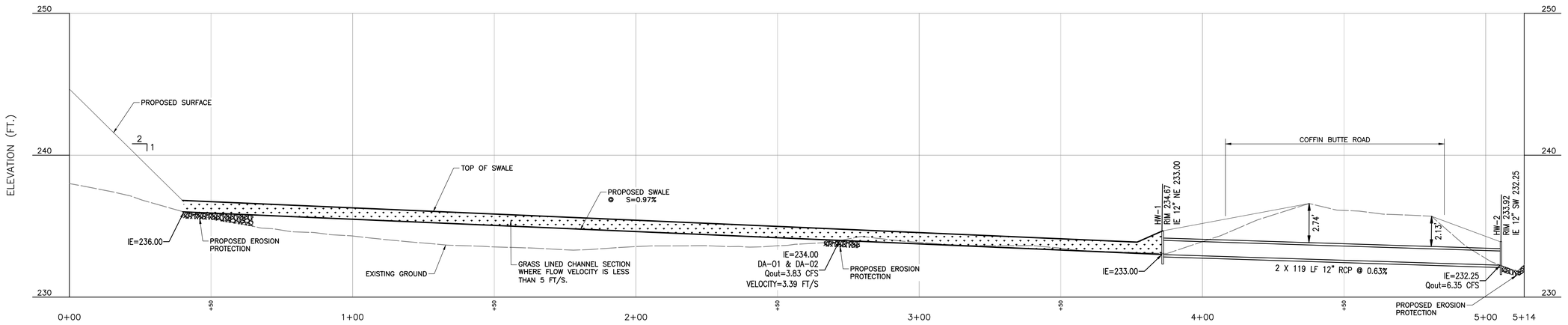
DRAWING NO.:

22

P:\320-0001\322-142\-CADD\Dwg\SW01\322142-SW01-10-Stormwater Management.dwg[22] LS(1/30/2025 - dbagwell) - LP: 1/30/2025 10:11 AM



CROSS-SECTION C-C
SCALE H:1"=20'; V:1"=4'



CROSS-SECTION D-D
SCALE H:1"=20'; V:1"=4'

NOTES:

1. ALL ORIFICE PLATES INSTALLED TO RESTRICT OUTFLOW AS NOTED ON PROFILE.
2. ONE-WAY VALVE INSTALLED TO PREVENT BACKFLOW INTO BASIN DURING AN OVERFLOW EVENT.
3. ALL FLOWS SHOWN ON PROFILES REPRESENT THE CALCULATED FLOWS FOR A 25-YEAR, 24-HOUR STORM EVENT.

DETENTION AND WETPOND OUTLET NOTE:

1. PER DETENTION AND WETPOND DESIGN CRITERIA SPECIFIED IN SECTION 2.3.4.1 OF THE CORVALLIS STORMWATER DESIGN STANDARDS 2015 EDITION THE OUTFLOW PIPE FOR THE WETPOND SHALL BE BACK-SLOPED AND EXTEND 1-FOOT BELOW THE WATER QUALITY DESIGN WATER SURFACE TO PROVIDE TRAPPING OF OIL AND FLOATABLES.
2. THE OUTFLOW MANHOLE STRUCTURE RECEIVES FLOW FROM THE POND OUTLET PIPE. RISER PIPES ARE INSTALLED IN THE OUTLET STRUCTURE AT THE DETENTION POND WATER SERVICE ELEVATION. THE GRATED LID PROVIDES AN OVERFLOW ROUTE IF THE POND OUTLET SHOULD BECOME CLOGGED OR IF THE DESIGN STORM EVENT IS EXCEEDED.
3. AN EMERGENCY SPILLWAY DESIGNED TO PASS THE 100-YEAR, 24-HOUR STORM EVENT IS PROVIDED ACCORDING TO THE CRITERIA FOR DETENTION PONDS SPECIFIED IN CHAPTER 3, SECTION 3.3.2 OF THE CORVALLIS STORMWATER DESIGN STANDARDS. The SPILLWAY ALLOWS EXCESS FLOW TO PASS IF THE OUTFLOW PIPE IS CLOGGED OR IF THE DESIGN STORM EVENT IS EXCEEDED.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

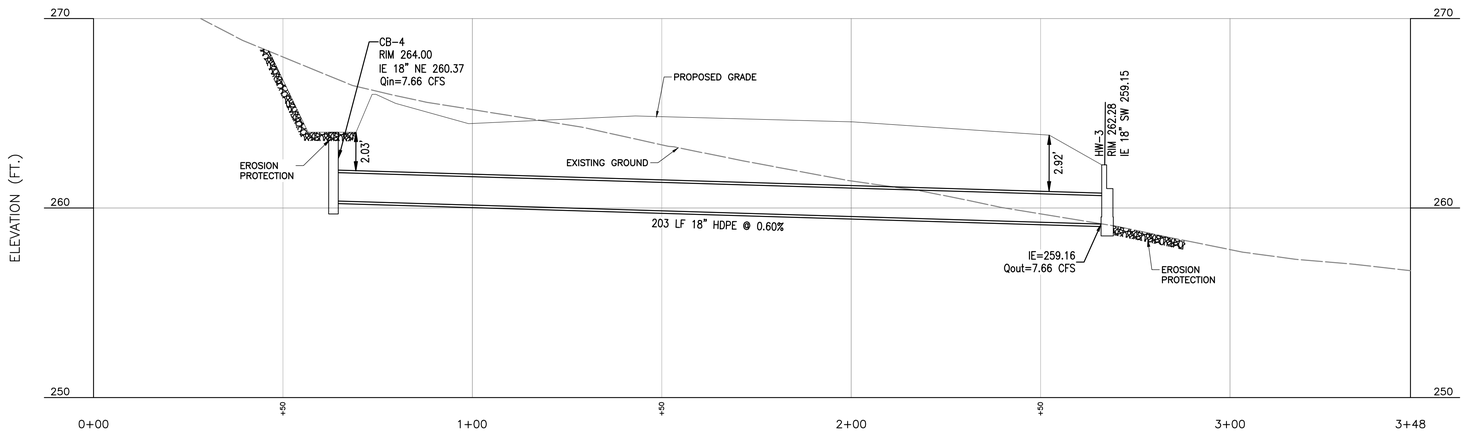
STORMWATER PROFILES

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

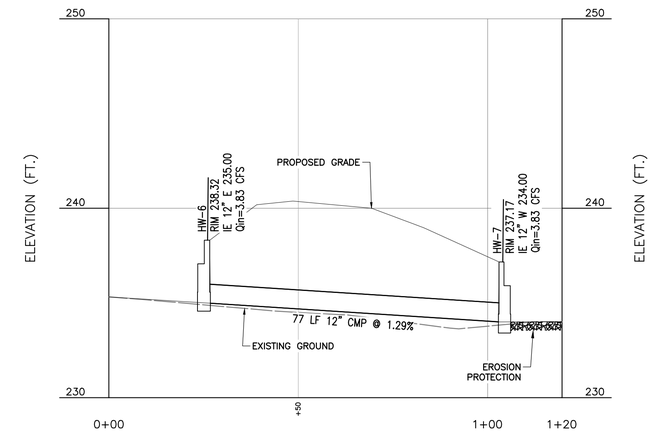
DRAWING NO.:
23

P:\320-0001\322-142\-CADD\Dwg\SWD\322142-SWD1-10-Stormwater Management.dwg[23] 1:5(1/30/2025 - dbagwell) - LP: 1/30/2025 10:11 AM

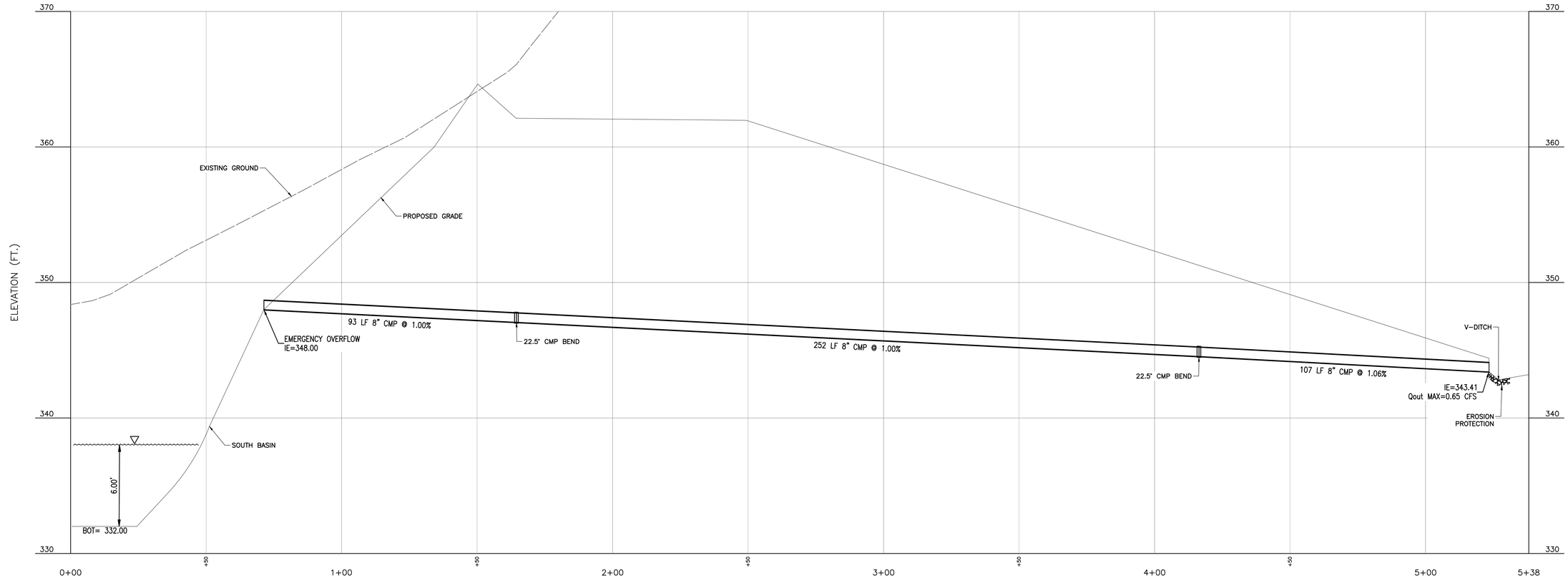
Exhibit E2



CROSS-SECTION E-E
SCALE H:1"=20'; V:1"=4'



CROSS-SECTION F-F
SCALE H:1"=20'; V:1"=4'



CROSS-SECTION G-G
SCALE H:1"=20'; V:1"=4'

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2007
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

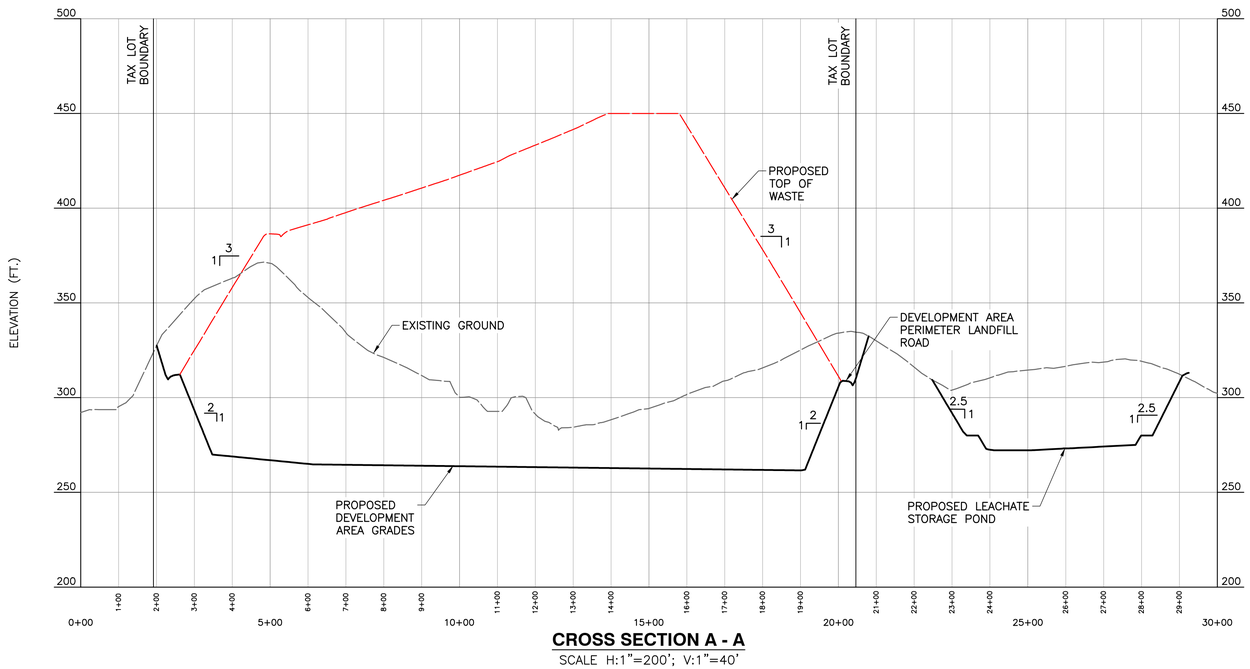
STORMWATER PROFILES

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.:
24

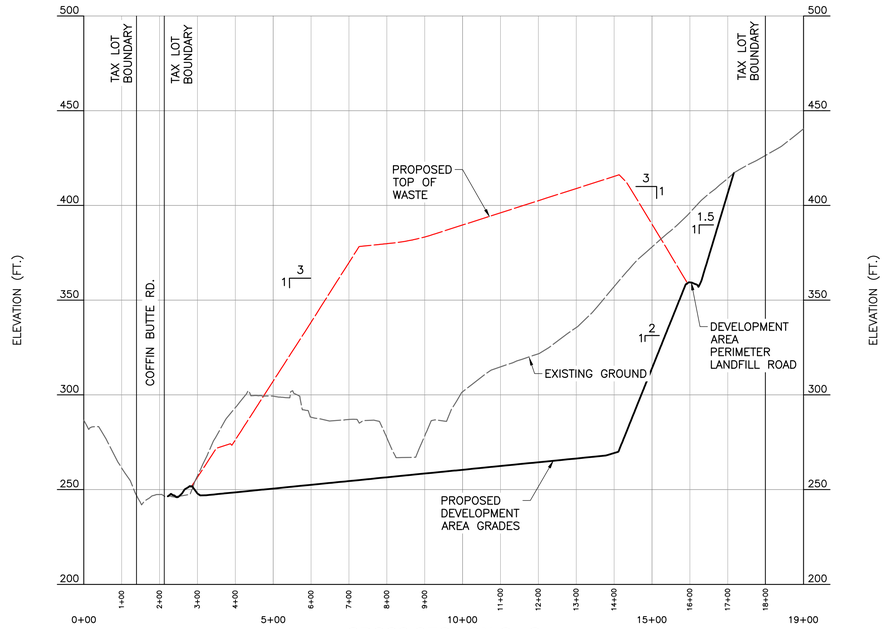
P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-10-Stormwater Management.dwg[24] LS(1/30/2025 - dbegal) - LP: 1/30/2025 10:11 AM

Exhibit E2



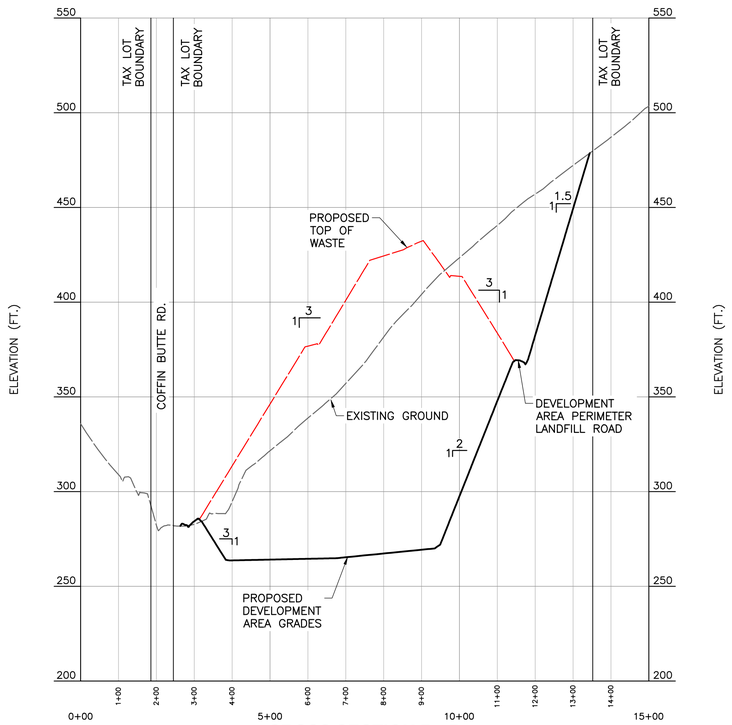
CROSS SECTION A - A

SCALE H:1"=200'; V:1"=40'



CROSS SECTION C - C

SCALE H:1"=200'; V:1"=40'



CROSS SECTION B - B

SCALE H:1"=200'; V:1"=40'

LEGEND

- EXISTING GROUND ON OCTOBER 07, 2021
- PROPOSED TOP OF WASTE GRADES
- PROPOSED DEVELOPMENT AREA GRADES

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

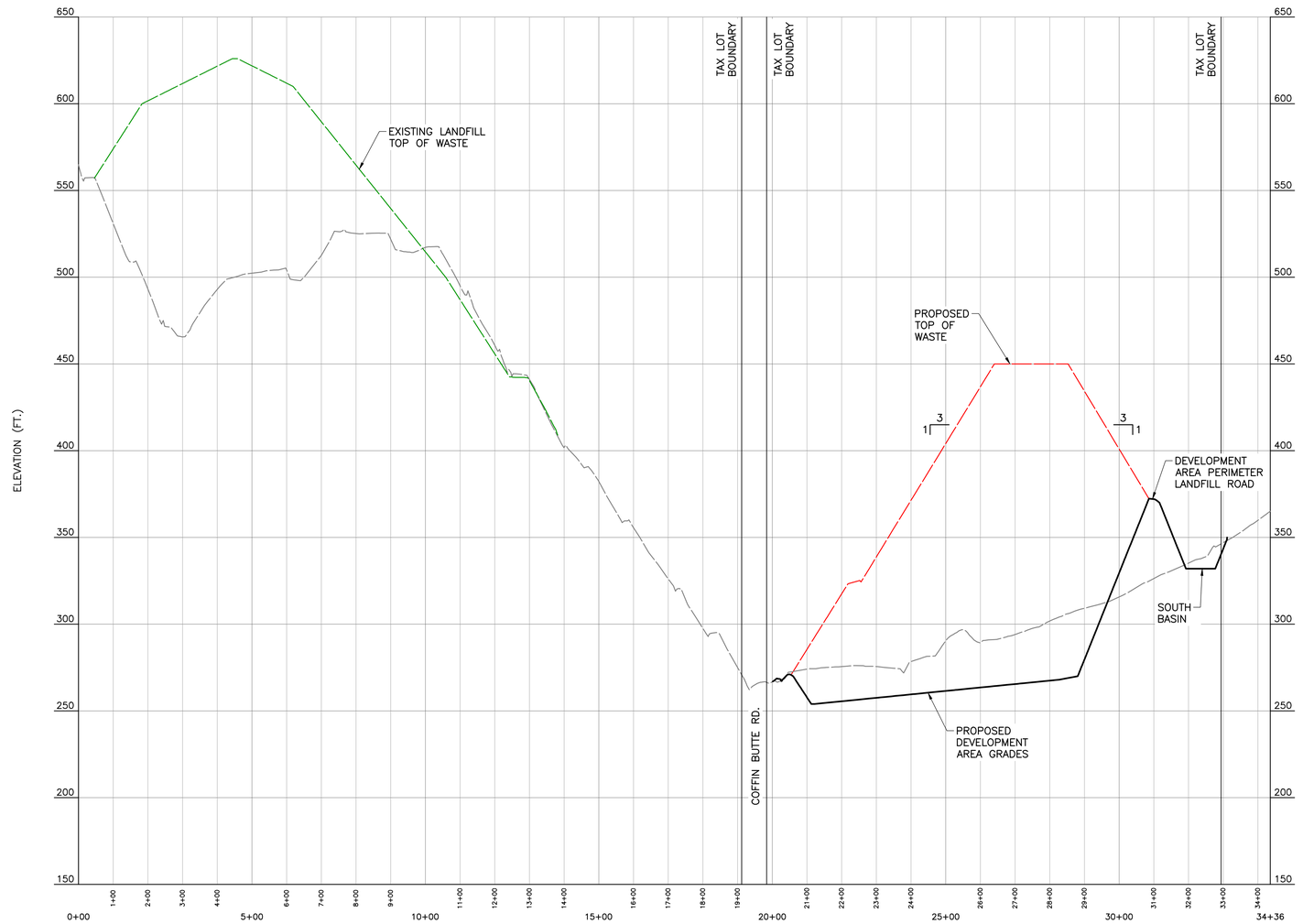
CROSS-SECTIONS

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 25

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-21-Cross Sections.dwg[22] LS:(1/23/2025 - dbegell) - LP: 1/30/2025 10:12 AM

Exhibit E2



CROSS SECTION D - D

SCALE H:1"=200'; V:1"=40'

LEGEND

- EXISTING GROUND ON OCTOBER 07, 2021
- PROPOSED TOP OF WASTE GRADES
- PROPOSED DEVELOPMENT AREA GRADES

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

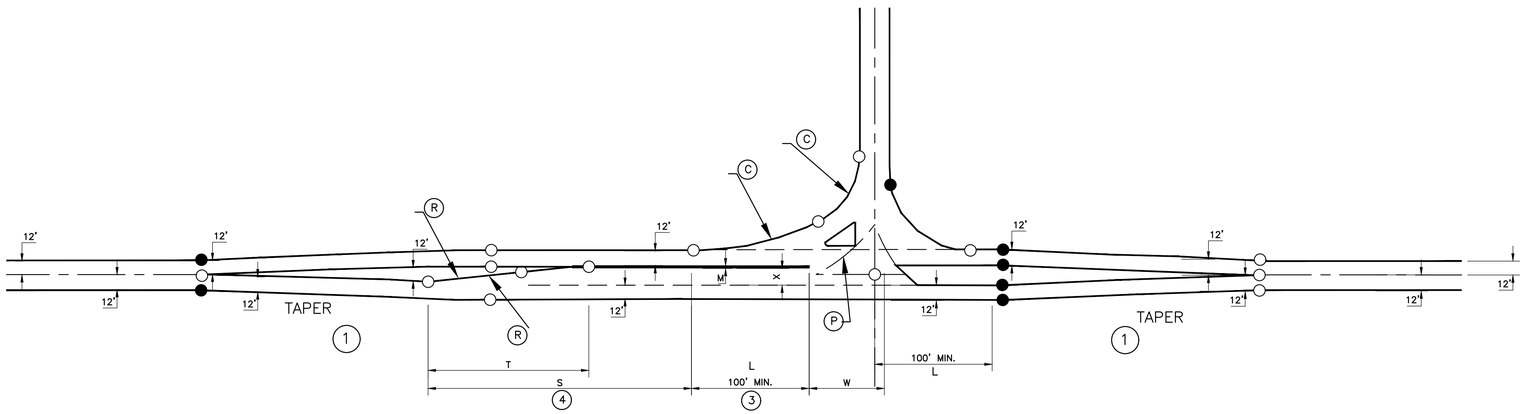
CROSS-SECTIONS

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
DRAWN BY:	JS
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: 26

P:\320-0001\322-142\~CADD\Dwg\SW01\322142-SW01-21-Cross Sections.dwg(21) 1:1(1/23/2025 - dbegell) - LP: 1/30/2025 10:12 AM

Exhibit E2



(C) THE SMALLEST RADIUS THAT WILL ACCOMMODATE THE APPROPRIATE DESIGN VEHICLE SHOULD BE USED. INTERSECTIONS ON ROUTE MAP 7 WITH MAJOR TRUCK MOVEMENT SHALL "ACCOMMODATE" THE INTERSTATE DESIGN VEHICLE. WHERE IT IS NECESSARY TO "DESIGN FOR" THE DESIGN VEHICLE, TWO-CENTERED CURVES MINIMIZE AREA OF PAVEMENT. VEHICLE TEMPLATES OR COMPUTER GENERATED PATHS SHOULD BE USED TO DETERMINE CLEARANCES. THE HDM CHAPTER 8 DISCUSSES "DESIGNING FOR" VS "ACCOMMODATING" THE DESIGN VEHICLE. IN MOST CASES, THE INTERSECTION SHOULD ONLY "ACCOMMODATE" THE DESIGN VEHICLE SINCE TIGHTER CURB RETURNS AND THUS SMALLER INTERSECTIONS ARE GENERALLY SAFER.

(P) INSIDE SWEPT PATH OF APPROPRIATE DESIGN VEHICLE. VEHICLE TEMPLATES OR COMPUTER GENERATED PATHS SHOULD BE USED TO DETERMINE THE INTERSECTION WIDTH "W". THIS PATH MUST HAVE A MINIMUM 2' OFFSET FROM THE LANE LINES OF OPPOSING DIRECTION TRAFFIC.

DATA TABLE				
DESIGN SPEED (mph)	(1) TAPER RATE	T (FT.)	(4) S (FT.)	X (FT.)
25	15:1	100	120	14
30	15:1	100	120	14
35	25:1	110	130	14
40	30:1	120	170	14
45	45:1	135	215	14
50	50:1	145	265	14
55	55:1	160	320	14
60	55:1	170	385	16
65	55:1	180	450	16
70	55:1	180	520	16

W = INTERSECTION WIDTH. 65' MINIMUM FOR 4-LEG. 90° INTERSECTIONS. SHALL BE LARGE ENOUGH TO ACCOMMODATE APPROPRIATE DESIGN VEHICLE.

T = DISTANCE TO DEVELOP LEFT TURN POCKET.

S = DECELERATION DISTANCE

L = STORAGE LENGTH

X = MEDIAN WIDTH

M = 4' WITH 16' OR WIDER MEDIAN IN CHANNELIZATION
2' WITH 14' MEDIAN IN CHANNELIZATION

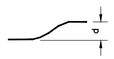
R = $T^2 + d^2 / 4 (d)$; d=LATERAL DISTANCE OF REVERSING CURVE

(1) TAPER RATE-SEE DATA TABLE

(2) SEE RIGHT TURN CHANNELIZATION FIG. 8-8

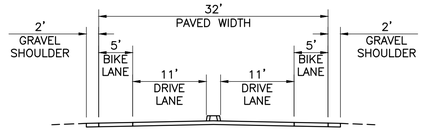
(3) THE STORAGE LENGTH L SHALL BE DETERMINED BY A TRAFFIC STUDY. L SHALL NOT BE LESS THAN 100 FT (THIS WILL ACCOMMODATE ONE TRUCK AND ONE PASSENGER VEHICLE).

(4) WHERE GRADES EXCEED 3%, CONSIDERATION SHOULD BE GIVEN TO ADJUSTING THE DECELERATION LENGTH (S). SEE AASHTO TABLE 10-5 FOR GUIDANCE.

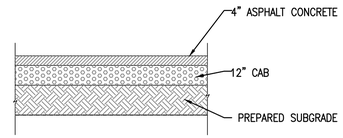


NOTE: USE STANDARD SHOULDER WIDTH THROUGH CHANNELIZED SECTION. FOR STAND ALONE SAFETY PROJECTS, THE ADJACENT SHOULDER WIDTH MAYBE USED WITH A MINIMUM OF 4' SHOULDER WIDTH FOR BICYCLE ACCOMMODATION.

FIGURE 8-9: LEFT-TURN CHANNELIZATION



TYPICAL MAJOR COLLECTOR ROAD SECTION A-A



TYPICAL MAJOR COLLECTOR PAVEMENT SECTION

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

ROADWAY ENGINEERING UNIT

LEFT TURN CHANNELIZATION

HIGHWAY DESIGN MANUAL

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

TRAFFIC DETAILS

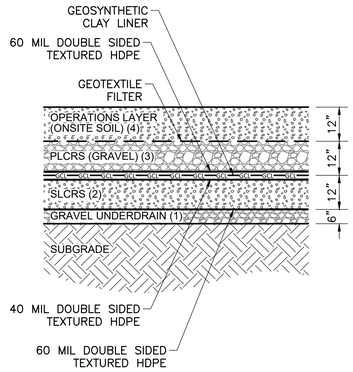
DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: 27

P:\320-0001\322-142\~CADD\Dwg\SM01\322142-SM01-22-Traffic Details.dwg[24] LS(1/21/2025 - jshah) - LP: 1/30/2025 10:12 AM

GRAVEL PLCS LAYER GRADATION	
U.S. SIEVE SIZE	PERCENT PASSING
1 INCH	100
3/4 INCH	75 – 100
1/2 INCH	40 – 65
3/8 INCH	15 – 40
1/4 INCH	0 – 12
No. 4	0 – 3
No. 200	0 – 1

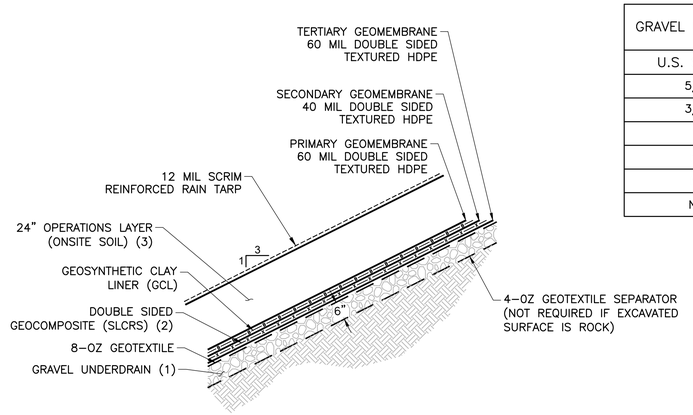
GRAVEL SLCS AND UNDERDRAIN LAYER (FLOOR) GRADATION	
U.S. SIEVE SIZE	PERCENT PASSING
3/4 INCH	100
1/2 INCH	65 – 100
3/8 INCH	40 – 65
1/4 INCH	0 – 25
No. 4	0 – 5
No. 200	0 – 1



1 BOTTOM LINER SYSTEM
NTS

NOTES:

1. AN ANALYSIS SHOWING THE 6–INCH THICK GRAVEL UNDERDRAIN IS ADEQUATE WILL BE SUBMITTED TO THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FOR THEIR REVIEW AND APPROVAL AS A PART OF THE SOLID WASTE PERMIT APPLICATION.
2. AN ANALYSIS SHOWING THE 12–INCH THICK SLCRS IS ADEQUATE WILL BE SUBMITTED TO THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FOR THEIR REVIEW AND APPROVAL AS A PART OF THE SOLID WASTE PERMIT APPLICATION.
3. AN ANALYSIS SHOWING THE 12–INCH THICK PLCRS IS ADEQUATE WILL BE SUBMITTED TO THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FOR THEIR REVIEW AND APPROVAL AS A PART OF THE SOLID WASTE PERMIT APPLICATION.
4. AN ANALYSIS SHOWING THE 12–INCH THICK OPERATIONS LAYER IS ADEQUATE WILL BE SUBMITTED TO THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FOR THEIR REVIEW AND APPROVAL AS A PART OF THE SOLID WASTE PERMIT APPLICATION.

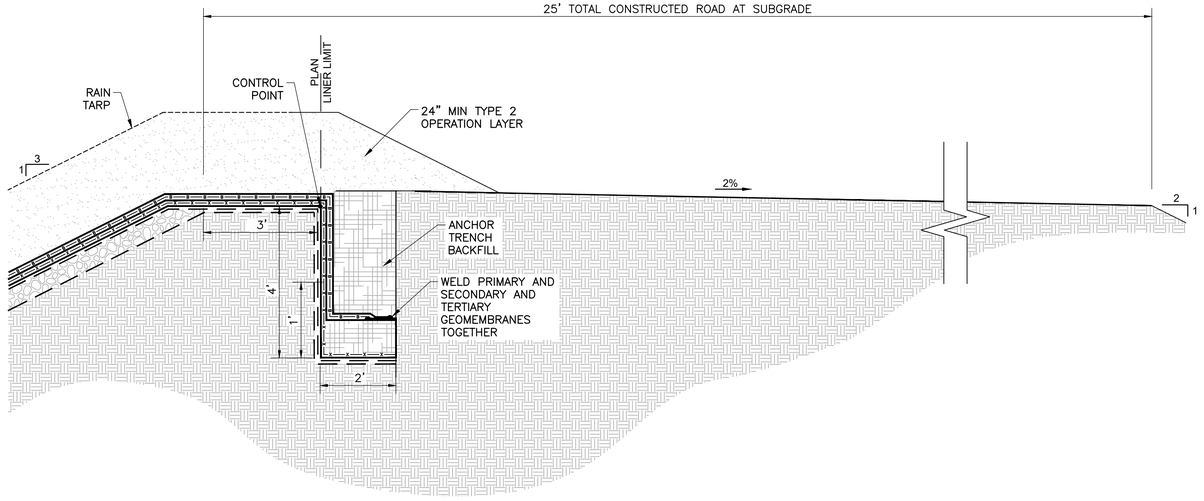


2 SIDESLOPE LINER SYSTEM
NTS

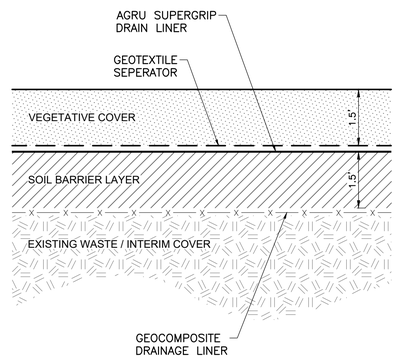
NOTES:

1. AN ANALYSIS SHOWING THE 6–INCH THICK GRAVEL UNDERDRAIN IS ADEQUATE WILL BE SUBMITTED TO THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY FOR THEIR REVIEW AND APPROVAL AS A PART OF THE SOLID WASTE PERMIT APPLICATION.

GRAVEL UNDERDRAIN LAYER (SIDE SLOPES) GRADATION	
U.S. SIEVE SIZE	PERCENT PASSING
5/8 INCH	100
3/8 INCH	50 – 100
No. 4	20 – 50
No. 10	0 – 20
No. 40	0 – 5
No. 200	0 – 2



3 ANCHOR TRENCH
NTS



4 FINAL COVER SYSTEM
NTS

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

DEVELOPMENT AREA LAYOUT

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
APPROVED BY:	JAS
CHECKED BY:	JAS
DRAWN BY:	JS

DRAWING NO.: 28

P:\320-0001\322-142\-CADD\Dwg\SHT01\322142-SHT01-23-Development Details.dwg[28] LS(1/28/2025 - Layout) - LP: 1/30/2025 10:12 AM

EXHIBIT 3

VESTING DEEDS TO THE TAX LOTS CONTAINED IN THE DEVELOPMENT SITE

BENTON COUNTY, OREGON **2011-483725**
DE-SP
Stn=9 PAIGE **10/13/2011 12:26:34 PM**
$20.00 $11.00 $10.00 $17.00 $20.00 **$78.00**

I, James V. Morales, County Clerk for Benton County, Oregon, certify that the instrument identified herein was recorded in the Clerk records.
James V. Morales - County Clerk

AFTER RECORDING RETURN TO:
Williams Mullen
200 South 10th Street, 16th Floor
Richmond, Virginia 23219
Attn: David A. Reed, Esq.

SPECIAL WARRANTY DEED

October 12, 2011

STATE OF OREGON §
§
COUNTY OF BENTON §

That VALLEY LANDFILLS, INC., an Oregon corporation ("Grantor"), for and in consideration of the sum of TEN AND NO/100 DOLLARS ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, has GRANTED, BARGAINED, SOLD, and CONVEYED, and by these presents does GRANT, BARGAIN, SELL and CONVEY unto VALLEY LANDFILLS, INC., an Oregon corporation ("Grantee") all of that certain lot, tract or parcel of land located in Benton County, Oregon and being more fully described on Exhibit "A" attached hereto and incorporated herein by reference.

TOGETHER WITH all improvements thereon, all personal property located at, on, upon, under or associated therewith, riparian and other water rights, oil, gas and mineral rights, and all privileges and easements appurtenant to the certain lot, tract or parcel of land described in Exhibit "A" (collectively, the "Property").

For the same consideration recited above, Grantor hereby BARGAINS, SELLS and TRANSFERS all interest, if any, of Grantor in (i) strips or gores lying adjacent to the Property and abutting or immediately adjacent properties, and (ii) any land underlying and adjacent streets or roads.

This conveyance is made subject to all covenants, easements, conditions, restrictions and other matters of record or which would be disclosed by a survey or physical inspection of the Property), but only to the extent they affect or relate to the property.

TO HAVE AND TO HOLD the Property, unto Grantee and Grantee's successors and assigns forever; and Grantor does hereby bind itself and its successors and assigns to WARRANT AND FOREVER DEFEND all and singular the Property unto Grantee, its

successors and assigns, against every person whomsoever lawfully claiming or to claim the same or any part thereof, by, through or under Grantor, but not otherwise.

WHEREFORE, the Special Warranty Deed is executed to be effective as of the date set forth above.

GRANTOR:

VALLEY LANDFILLS, INC.,
an Oregon corporation

By: _____
Printed Name: Tim M. Benter
Title: Vice President

STATE OF Arizona §
§
COUNTY OF Maricopa §

This instrument was acknowledged before me on this 12th day of October, 2011, by Tim M. Benter, as Vice President, of Valley Landfills, Inc., an Oregon corporation, for and on behalf of said corporation.

Notary Public in and for the State of Arizona

Jessica Beatty
Printed Name of Notary Public
My Commission Expires: 5/25/2014

Notary Public State of Arizona
Maricopa County
Jessica Ann Beatty
My Commission Expires 05/25/2014

EXHIBIT "A"
The Property

RESULTANT VALLEY LANDFILLS TRACT (TL 801+ portion TL 1106)

All of that land referred to as Parcel 1 as conveyed to Valley Landfills, Inc. by deed recorded as M-236945-97, Deed Records of Benton County, Oregon;

TOGETHER WITH the following-described tract:

A tract of land in Section 18, Township 10 South, Range 4 West, Willamette Meridian, Benton County, Oregon, said tract being that "parcel of land" conveyed to Valley Landfills, Inc. by deed recorded as M-102556-88, Deed Records of Benton County, and being more specifically described as follows:

Beginning at the Northwest corner of the Monroe Hodges DLC No. 46 in said Township and Range;
THENCE along the north line of Parcel I of that land conveyed to Valley Landfills, Inc. by deed recorded as M-236945-97, Deed Records of Benton County, S 63°12'20"W 688.06 feet to a 5/8" iron rod on the west one-sixteenth line of said Section 18;
THENCE along said one-sixteenth line, N 00°02'20"E 1479.53 feet to a 5/8" iron rod;
THENCE S 27°40'17"E 800.38 feet to a 5/8" iron rod;
THENCE N 71°09'04"E 600.00 feet to a 5/8" iron rod;
THENCE N 30°15'15"E 598.74 feet to a 5/8" iron rod;
THENCE S 87°52'19"E 532.63 feet to a 5/8" iron rod on a line parallel with and 100 feet westerly of, when measure perpendicular to, the centerline of the relocated Pacific Highway West as described and conveyed to the State of Oregon by deed recorded in Book 119 at Page 836, Deed Records of Benton County;
THENCE along said parallel line, S 07°30'41"E 921.39 feet to a 5/8" iron rod at the Northeast corner of that tract conveyed to Consumers Power, Inc. by deed recorded in Book 185 at Page 214, Deed Records of Benton County;

THENCE S 89°59'11"W 209.79 feet to a 5/8" iron rod at the Northwest corner of said Consumers Power tract;
THENCE S 07°30'41"E 209.79 feet to a 5/8" iron rod at the Southwest corner thereof, being on a line parallel with and 30 feet Northerly of, when measure perpendicular to, the north line of the Monroe Hodges DLC No. 46 in said Township and Range;
THENCE along said line parallel to the Hodges DLC line, S 89°59'11"W 1132.30 feet to the Northwest corner of that 30 foot-wide strip of land described as part of Parcel l as conveyed to Valley Landfills, Inc. by deed recorded as M-236945-97, Deed Records of Benton County;
THENCE S 00°00'49"E 30 feet to a point on the westerly projection of said north line of the Hodges DLC, said point being S 89°59'11"W 30 feet from the Northwest corner of said Hodges DLC;
THENCE N89°59'11"E 30 feet to the point of beginning at said Northwest DLC corner.

The Basis of Bearings and data for this description is Benton County survey CS 8020.
16022245_1.DOC

M-142396-91

WARRANTY DEED
(Statutory Form)

GRANTOR: DONALD E. RATLIFF and MAURINE C. RATLIFF, Trustees under Declaration of Trust dated May 7, 1986

CONVEYS AND WARRANTS TO

GRANTEE: VALLEY LANDFILLS, INC., an Oregon Corporation

the following described real property free of encumbrances except as specifically set forth herein:

SEE ATTACHED EXHIBIT "A"

10-111899

10-4-18 1101

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

The true and actual consideration for this transfer stated in terms of dollars is $ 115,000.00 . However, if the actual consideration consists of or includes other property or other value given or promised, such other property or value was part of the / the whole of the (indicate which) consideration.

If grantor is a corporation, this has been signed by authority of the Board of Directors.

DATED: December 12, 1991

GRANTOR: Donald E. Ratliff
Donald E. Ratliff, Trustee
Maurine C. Ratliff
Maurine C. Ratliff, Trustee

Until a change is requested, all tax statements shall be sent to the following address:

PO BOX 807, CORVALLIS OR 97339

STATE OF OREGON, County of Benton ss.
Date: DECEMBER 12, 1991
Personally appeared the above named Donald E. Ratliff and Maurine C. Ratliff and acknowledged the foregoing instrument to be their voluntary act and deed. Before me:

Notary Public for Oregon
My commission expires: 10/28/95

STATE OF OREGON, County of ss.
Date:
Personally appeared. who being sworn, stated that he/she is the of grantor corporation and that this instrument was voluntarily signed on behalf of the corporation. Before me:

Notary Public for Oregon
My commission expires:

WARRANTY DEED

RATLIFF TO VALLEY LANDFILL INC.

AFTER RECORDING RETURN TO
VALLEY LANDFILLS INC.
PO Box 807
Corvallis OR 97339

(DON'T USE THIS SPACE: RESERVED FOR RECORDING LABEL IN COUNTIES WHERE USED.)

STATE OF OREGON, County of ss.
I certify that the within instrument was received for record on the day of , 19 , at o'clock M., and recorded in book on page
Witness my hand and seal of County affixed.

County Clerk

By Deputy

NUMBER:

EXHIBIT "A"

Beginning at a point which is 142.00 feet South 89°52' East and 614.31 feet North from the Southeast corner of the J. T. Hugharts Donation Land Claim No. 41 in Township 10 South, Range 4 West and No. 61 in Township 10 South, Range 5 West of the Willamette Meridian, Benton County, Oregon; running thence North 389.03 feet to an iron rod in the center line of the County Road; thence along the center of said County Road as follows: South 73°35'06" West 477.79 feet, along a spiral curve to the left (the long chord of which bears South 68°15'06" West 199.38 feet) a distance of 200.00 feet, along a 16° curve to the left (the long chord of which bears South 43°30' West 175.00 feet) a distance of 176.09 feet, and along a spiral curve to the left a distance of 56.18 feet, more or less, to a point due West of the point of beginning; thence East, leaving said County Road, 782.04 feet, more or less, to the point of beginning.

Subject to:

1. The rights of the public in and to that portion of the premises herein described lying within the limits of roads, streets and highways.

2. An easement created by instrument, including the terms and provisions thereof, Dated March 6, 1940 Recorded August 4, 1941, in Book 98, Page 446, Deed Records of Benton County, Oregon in favor of Benton-Lincoln Electric Cooperative, Inc. for Electric and telephone transmission and distribution lines; affects No specific location given.

3. Conditions, restrictions and reservations as contained in that certain deed from the United States of America to Bernard W. Hanson, et ux, recorded February February 25, 1949, in Book 125, Page 647, Deed Records of Benton County, Oregon.

4. An easement created by instrument, including the terms and provisions thereof, Dated June 4, 1971 Recorded September 27, 1971, as M-27769, Microfilm Records of Benton County, Oregon in favor of Consumers Power, Inc. for Electric and telephone transmission and distribution lines; affects Westerly boundary along Co. Rd. No. 05450.

5. An easement created by instrument, including the terms and provisions thereof, Dated August 17, 1972 Recorded November 1, 1972, as M-36153, Microfilm Records of Benton County, Oregon in favor of Consumers Power, Inc. for Electric and telephone transmission and distribution lines; affects Northerly boundary along Coffin Butte Road and Easterly boundary.

Account No.: 10-4-18 1101 Data: 005839

STATE OF OREGON } ss. 131643
County of Benton }

I hereby certify that the within instrument was received for record

'91 DEC 13 PM 2 44

and assigned № 142396 1991

in the Microfilm records of said county

Witness My Hand and Seal of County Affixed

DANIEL G. BURK
DIRECTOR OF RECORDS & ELECTIONS
By Marilyn Hamilton
DEPUTY

M 278438-99

AFTER RECORDING, RETURN TO:

Valley Landfills Inc.
P.O. Box 807
Corvallis, Oregon 97339

Until a change is requested, all tax statements shall be sent to:

Valley Landfills Inc.
P.O. Box 807
Corvallis, Oregon 97339

TICOR TITLE INSURANCE CO. 80-617

STATUTORY WARRANTY DEED

Valley Landfills Inc., an Oregon Corporation *, who took title as* ***Valley Land Fills Inc., an Oregon Corporation*** *("Grantor"), conveys and warrants to* ***Valley Landfills Inc., an Oregon Corporation*** *("Grantee") the real property described on the attached* ***Exhibit A****, free of encumbrances except easements, covenants, conditions, restrictions and encumbrances of record.*

The true consideration for this conveyance is the correction of vesting.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

DATED ***this 16th day of August , 1999.***

Valley Land Fills Inc.
By: Duane Sorensen
Name/Title: Duane Sorensen, President

10-4-18 (28)

STATE OF OREGON

County of Benton | **ss**

The foregoing instrument was acknowledged before me this 16th ***day of*** August ***, 1999, by*** Duane Sorensen ***, as*** President ***of*** Valley Land Fills ***, on its behalf.***

George Abele
Notary Public for Oregon

OFFICIAL SEAL
GEORGE ABELE
NOTARY PUBLIC - OREGON
COMMISSION NO.051901
MY COMMISSION EXPIRES MAR. 07, 2000

EXHIBIT A

Legal Description

Beginning at the point of intersection of the centerline of Benton County Road No. 642 and the West line of the Monroe Hodges Donation Land Claim No. 46 in Section 18, Township 10 South, Range 4 West, Willamette Meridian, Benton County, Oregon; running thence South 3°33' East along the West line of said Donation Land Claim No. 46, 1,778.33 feet, more or less, to an iron pipe; thence North 89°52' West 1,897.40 feet to a point which is South 89°52' East, 142.00 feet from the Southeast corner of the Joseph T. Hughart Donation Land Claim No. 61; thence due North 1,003.34 feet to the centerline of said County Road No. 642; thence Northeasterly along the centerline of said County Road No. 642, 1,966.00 feet, more or less, to the point of beginning, in the County of Benton and State of Oregon.

273799

STATE OF OREGON } SS.
County of Benton

I hereby certify that the within instrument was received for record

'99DEC30 PM 1:22

AND ASSIGNED M278438 1999

In the microfilm records of said county

Witness My Hand and Seal of County Affixed
JOHN K. ANDERSON
County Administrative Officer

By _____ Deputy

49 5613

M278439-99

AFTER RECORDING, RETURN TO:

Valley Landfills Inc.
P.O. Box 807
Corvallis, Oregon 97339

Until a change is requested, all tax statements shall be sent to:

Valley Landfills Inc.
P.O. Box 807
Corvallis, Oregon 97339

TICOR TITLE INSURANCE CO. 80-617

STATUTORY WARRANTY DEED

Valley Landfills Inc., an Oregon Corporation, who took title as Valley Landfill Inc., an Oregon Corporation ("Grantor"), conveys and warrants to Valley Landfills Inc., an Oregon Corporation ("Grantee") the real property described on the attached Exhibit A, free of encumbrances except easements, covenants, conditions, restrictions and encumbrances of record.

The true consideration for this conveyance is the correction of vesting.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

DATED this 16th day of August, 1999.

Valley Landfills, Inc.
By: Duane Sorensen
Name/Title: Duane Sorensen, President

STATE OF OREGON
County of Benton
ss

The foregoing instrument was acknowledged before me this 16th *day of* August, *1999, by* Duane Sorensen, *as* President *of* Valley Landfills, Inc., *on its behalf.*

OFFICIAL SEAL
GEORGE ABELE
NOTARY PUBLIC - OREGON
COMMISSION NO.051901
MY COMMISSION EXPIRES MAR. 07, 2000

George Abele
Notary Public for Oregon

20 (21) 10-4-18 10-4-19 (2)

EXHIBIT A

Legal Description

TRACT A:

All that part of the following described tract of land lying and being West of U.S. Highway 99W as the same is now located:

Beginning at a point on the West boundary line of the former right of way of the Southern Pacific Co., formerly the Oregon and California Railroad Company, as said right of way was located on July 3, 1962, which point is North 27.50 chains and West 10.71 chains from the Southeast corner of Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West of the Willamette Meridian, Benton County, Oregon; and running thence West 66.01 chains to the West boundary line of said claim; thence North 3°21' West on said West boundary line, 32.20 chains; thence East 48.79 chains; thence South 2°30' West 12.43 chains; thence East 20.11 chains to a point on the West boundary line of the said railroad right of way; thence South 2°30' West, along the West boundary line of the said right of way, 19.58 chains to the point of beginning.

EXCEPTING THEREFROM the following described tract, to-wit:

Beginning at a point on the South line of the tract described in deed recorded in Book 125, Page 431, Benton County Deed Records, 27.50 chains North 3°13' West, along the claim line, and 18.36 chains North 89°55' East along the South line of said tract, from the Southwest corner of the Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West, of the Willamette Meridian, Benton County, Oregon; thence North 89°55' East, along the South line of said tract, 5.620 chains to the West line of the Corvallis-Monmouth State Highway; thence North 5°29' West, along the West line of said highway, 4.291 chains; thence South 89°55' West, parallel to the South line of said tract, 6.060 chains; thence South 11°12'30'' East 4.353 chains to the point of beginning.

TRACT B:

That portion of the following described property lying South of Coffin Butte Road, Benton County, Oregon.

All that part of the following described tract lying West of the Pacific Highway West (U.S. 99 West) and South of County Road No. 45-12:

Beginning at the Northwest corner of the Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West of the Willamette Meridian, Benton County, Oregon; thence East 50.865 chains along the North line of said claim; thence South 2°10' West 23.02 chains; thence West 49.01 chains to the West line of said claim; thence North 3°21' West 23.05 chains to the point of beginning.

EXHIBIT A

Legal Description

EXCEPTING THEREFROM the following described tract:

Beginning at a point on the West line of Highway 99 West at a point 300 feet North along the West line of said highway from the intersection with the South line of Tract 3 of deed recorded February 4, 1957 in Book 158, Page 313, Deed Records of Benton County, Oregon, in the Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West of the Willamette Meridian, Benton County, Oregon; thence West parallel to the South line of said Tract 3, a distance of 435.6 feet; thence Northerly parallel to the West line of said highway, 300 feet; thence East to a point on the West line of said highway at a point 300 feet North of the point of beginning; thence South along said highway line 300 feet to the point of beginning.

ALSO EXCEPTING from the above described property that portion thereof conveyed to the State of Oregon for highway purposes by deed from the United States of America, acting by and through the Federal Farm Mortgage Corporation, dated May 16, 1947 and recorded October 25, 1947, in Book 119, Page 836, Deed Records of Benton County, Oregon.

ALSO EXCEPTING from the above described property that portion thereof conveyed to Benton County, Oregon, for road purposes by deed from the United States of America, dated May 9, 1947, recorded August 7, 1947 in Book 118, Page 568, Deed Records of Benton County, Oregon.

27300

STATE OF OREGON } ss.
County of Benton

I hereby certify that the within instrument was received for record

'99 DEC 30 PM 1:22

AND ASSIGNED M278439

In the microfilm records of said county

Witness My Hand and Seal of County Affixed
JOHN K. ANDERSON
County Administrative Officer

By _____ Deputy

M278439-99

AFTER RECORDING, RETURN TO:

Valley Landfills Inc.
P.O. Box 807
Corvallis, Oregon 97339

Until a change is requested, all tax statements shall be sent to:

Valley Landfills Inc.
P.O. Box 807
Corvallis, Oregon 97339

TICOR TITLE INSURANCE CO. 80-617

STATUTORY WARRANTY DEED

Valley Landfills Inc., an Oregon Corporation, who took title as Valley Landfill Inc., an Oregon Corporation ("Grantor"), conveys and warrants to Valley Landfills Inc., an Oregon Corporation ("Grantee") the real property described on the attached Exhibit A, free of encumbrances except easements, covenants, conditions, restrictions and encumbrances of record.

The true consideration for this conveyance is the correction of vesting.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES AND TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES AS DEFINED IN ORS 30.930.

DATED this 16th day of August, 1999.

Valley Landfills, Inc.
By: Duane Sorensen
Name/Title: Duane Sorensen, President

STATE OF OREGON
County of Benton
ss

The foregoing instrument was acknowledged before me this 16th *day of* August, *1999, by* Duane Sorensen, *as* President *of* Valley Landfills, Inc., *on its behalf.*

OFFICIAL SEAL
GEORGE ABELE
NOTARY PUBLIC - OREGON
COMMISSION NO.051901
MY COMMISSION EXPIRES MAR. 07, 2000

George Abele
Notary Public for Oregon

20 (21) 10-4-18 10-4-19 (2)

EXHIBIT A

Legal Description

TRACT A:

All that part of the following described tract of land lying and being West of U.S. Highway 99W as the same is now located:

Beginning at a point on the West boundary line of the former right of way of the Southern Pacific Co., formerly the Oregon and California Railroad Company, as said right of way was located on July 3, 1962, which point is North 27.50 chains and West 10.71 chains from the Southeast corner of Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West of the Willamette Meridian, Benton County, Oregon; and running thence West 66.01 chains to the West boundary line of said claim; thence North 3°21' West on said West boundary line, 32.20 chains; thence East 48.79 chains; thence South 2°30' West 12.43 chains; thence East 20.11 chains to a point on the West boundary line of the said railroad right of way; thence South 2°30' West, along the West boundary line of the said right of way, 19.58 chains to the point of beginning.

EXCEPTING THEREFROM the following described tract, to-wit:

Beginning at a point on the South line of the tract described in deed recorded in Book 125, Page 431, Benton County Deed Records, 27.50 chains North 3°13' West, along the claim line, and 18.36 chains North 89°55' East along the South line of said tract, from the Southwest corner of the Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West, of the Willamette Meridian, Benton County, Oregon; thence North 89°55' East, along the South line of said tract, 5.620 chains to the West line of the Corvallis-Monmouth State Highway; thence North 5°29' West, along the West line of said highway, 4.291 chains; thence South 89°55' West, parallel to the South line of said tract, 6.060 chains; thence South 11°12'30'' East 4.353 chains to the point of beginning.

TRACT B:

That portion of the following described property lying South of Coffin Butte Road, Benton County, Oregon.

All that part of the following described tract lying West of the Pacific Highway West (U.S. 99 West) and South of County Road No. 45-12:

Beginning at the Northwest corner of the Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West of the Willamette Meridian, Benton County, Oregon; thence East 50.865 chains along the North line of said claim; thence South 2°10' West 23.02 chains; thence West 49.01 chains to the West line of said claim; thence North 3°21' West 23.05 chains to the point of beginning.

EXHIBIT A

Legal Description

EXCEPTING THEREFROM the following described tract:

Beginning at a point on the West line of Highway 99 West at a point 300 feet North along the West line of said highway from the intersection with the South line of Tract 3 of deed recorded February 4, 1957 in Book 158, Page 313, Deed Records of Benton County, Oregon, in the Monroe Hodges Donation Land Claim No. 46, Township 10 South, Range 4 West of the Willamette Meridian, Benton County, Oregon; thence West parallel to the South line of said Tract 3, a distance of 435.6 feet; thence Northerly parallel to the West line of said highway, 300 feet; thence East to a point on the West line of said highway at a point 300 feet North of the point of beginning; thence South along said highway line 300 feet to the point of beginning.

ALSO EXCEPTING from the above described property that portion thereof conveyed to the State of Oregon for highway purposes by deed from the United States of America, acting by and through the Federal Farm Mortgage Corporation, dated May 16, 1947 and recorded October 25, 1947, in Book 119, Page 836, Deed Records of Benton County, Oregon.

ALSO EXCEPTING from the above described property that portion thereof conveyed to Benton County, Oregon, for road purposes by deed from the United States of America, dated May 9, 1947, recorded August 7, 1947 in Book 118, Page 568, Deed Records of Benton County, Oregon.

STATE OF OREGON } ss.
County of Benton

I hereby certify that the within instrument was received for record

'99 DEC 30 PM 1:22

273800

AND
ASSIGNED M278439

In the microfilm records of said county

Witness My Hand and Seal of County Affixed
JOHN K. ANDERSON
County Administrative Officer

By _____ Deputy

EXHIBIT 4

WILDLIFE HABITAT ASSESSMENT AND SURVEYS AND ADDENDUM TO THE FINAL 2024 REPORT

Photo credit: S. James

Final 2024 Report:

Wildlife Habitat Assessment and Surveys

for the Coffin Butte Landfill Expansion Project

Submitted to:

Jeff Shepherd, P.E.
Civil & Environmental Consultants, Inc.

Submitted by:
Turnstone Environmental Consultants, Inc.
PO Box 83362
Portland, OR 97283

Submitted:

July 12, 2024

Contents

Introduction 1

Avian Monitoring 1

Grassland Bird Habitat 2
Great Blue Heron Rookery Monitoring 2

Year 1 Surveys (2022) 3

Year 2 Surveys (2023) 4

Year 3 Surveys (2024) 5

Conclusion 6

Mitigation and Protection Strategy for Great Blue Heron 7

Bald Eagle Activity 9

Year 1 (2022) 9

Year 2 (2023) 9

Year 3 (2024) 10

Conclusion 10

Deer and Elk Study 11

Habitat Assessment 11
Deer and Elk Habitat Assessment Results 11
Trail Camera Study 15

Appendix A: Avian Monitoring Plan 1

Appendix B: Communications with ODFW and ODF Wildlife Biologists 2

Appendix C: Field Forms 3

List of Tables and Figures

Table 1. 2022 Great Blue Heron Survey Results for the Western Rookery (#2683) 3
Table 2. 2022 Great Blue Heron Survey Results for the Eastern Rookery (#2716) 3
Table 3. 2023 Great Blue Heron Survey Results for the Western Rookery (#2683) 4
Table 4. 2023 Great Blue Heron Survey Results for the Eastern Rookery (#2716) 5
Table 5. 2024 Great Blue Heron Survey Results for the Western Rookery (#2683) 5
Table 6. 2024 Great Blue Heron Survey Results for the Eastern Rookery (#2716) 6
Table 5. 2022 Bald Eagle Survey Results 9
Table 6. 2023 Bald Eagle Survey Results 9
Table 6. 2024 Bald Eagle Survey Results 10
Table 7. Elk Habitat within the Coffin Butte Landfill Expansion Project Study Area 15
Table 8. Black-tailed Deer Detections per Day on Trail Cameras 15
Table 9. Detections for Each Mammal Species Observed in the Camera Study Area 18

Figure 1. Great Blue Heron Rookeries in the Project Area and Observation Points 2
Figure 2. Great Blue Heron Protection Zone Surrounding the Eastern Rookery #2716 8
Figure 3. Study Area for the Elk Habitat Assessment 13
Figure 4. Deer and Elk Habitat in the Coffin Butte Landfill Expansion Project Study Area 14
Figure 5. Trail Camera Locations in the Coffin Butte Landfill Expansion Project Study Area 16
Figure 6. Black-tailed Deer Detections Per Month at Each Trail Camera 17
Figure 7. Large Mammals (excluding deer) Observed on Trail Cameras 19
Figure 8. Adult Female Black-tailed Deer with Young of the Year in July on Camera A-1 20
Figure 9. A herd of elk in the Young Coniferous Forest in Mid-November on Camera A-4 20
Figure 10. Adult Male black-tailed Deer on Camera A-5 on an August Morning 21

INTRODUCTION

Civil & Environmental Consultants, Inc. ("CEC") contracted Turnstone Environmental Consultants, Inc. ("Turnstone") to perform a wildlife study for the Coffin Butte Landfill Expansion Project Area ("Project Area"). This study seeks to understand the following:

- Avian Monitoring
  - Likelihood of usage of the Project Area by protected grassland bird species
  - Occupancy status of the great blue heron nesting in the two known rookery sites
  - Behavior of bald eagles at the Coffin Butte Landfill Expansion Project Area
- Deer and Elk Study
  - Distribution and relative importance of deer and elk habitat surrounding and within the Coffin Butte Landfill Expansion Project Area

This report describes the findings of the habitat assessment and surveys as of July 12, 2024.

AVIAN MONITORING

Turnstone developed an Avian Monitoring Plan for the Coffin Butte Landfill Expansion Project (Appendix A). Wildlife biologists Jennifer Ringo and Gregory Reed from the Oregon Department of Fish and Wildlife (ODFW) and Jennifer Weikel from the Oregon Department of Forestry (ODF) reviewed the draft plan, suggested various edits, and ultimately approved the final monitoring plan. Communications with ODFW and ODF wildlife biologists are included in Appendix B. A copy of the draft report with imbedded ODFW and ODF wildlife biologist comments are available upon request.

The methods for the surveys are described in the Avian Monitoring Plan (Appendix A). The following topics are covered during training of all avian survey personnel:

Protocol and Data Procedures:

- General safety and survey techniques
- Scheduling
- General discussion of site maps
- Proper completion of forms
- Data management schedule

Great Blue Heron and Bald Eagle Life History:

- Ethology
- Suitable habitat
- Nesting chronology

Survey Procedures

- Basic flight patterns and vocalizations of the great blue heron and bald eagle
- Protocol and non-protocol weather conditions

Orienteering:

- GPS, UTM coordinates, map, and compass use
- Orthophoto interpretation

Grassland Bird Habitat

The project area contains closed landfill cells with open areas dominated by graminoids. These closed landfill cells are potential habitat for grassland birds, including the streaked horned lark (*Eremophila alpestris strigata*), a species protected by the Endangered Species Act of 1973.

In January of 2022, Turnstone ecologist Stephanie James visited the potential grassland bird habitat with ODFW grassland bird specialist Anne Mary Myers and ODFW wildlife biologist Gregory Reed to assess the likelihood of protected bird species using the Project Area as foraging and/or nesting habitat. Weather conditions were agreeable to observing the nest sites, with no rain or fog to impede visibility.

ODFW biologists determined the potential grassland habitat and rock quarry areas north of Coffin Butte Road are not likely used as nesting habitat by protected grassland birds, specifically the streaked horned lark (*Eremophila alpestris strigata*) and Oregon vesper sparrow (*Pooecetes gramineus* ssp. *affinis*); therefore, species-specific surveys for grassland birds are not needed.

Great Blue Heron Rookery Monitoring

Turnstone biologists are monitoring two great blue heron rookeries located within the Coffin Butte Landfill Expansion Project Area (Figure 1). In 2022 and 2023, Turnstone biologists conducted six reproductive productivity surveys each year for nesting great blue herons in the two known rookery locations. In 2024, at the time this report was finalized (July 12, 2024), Turnstone biologists have completed five out of six planned reproductive surveys. The survey forms for all years of monitoring are in Appendix C.

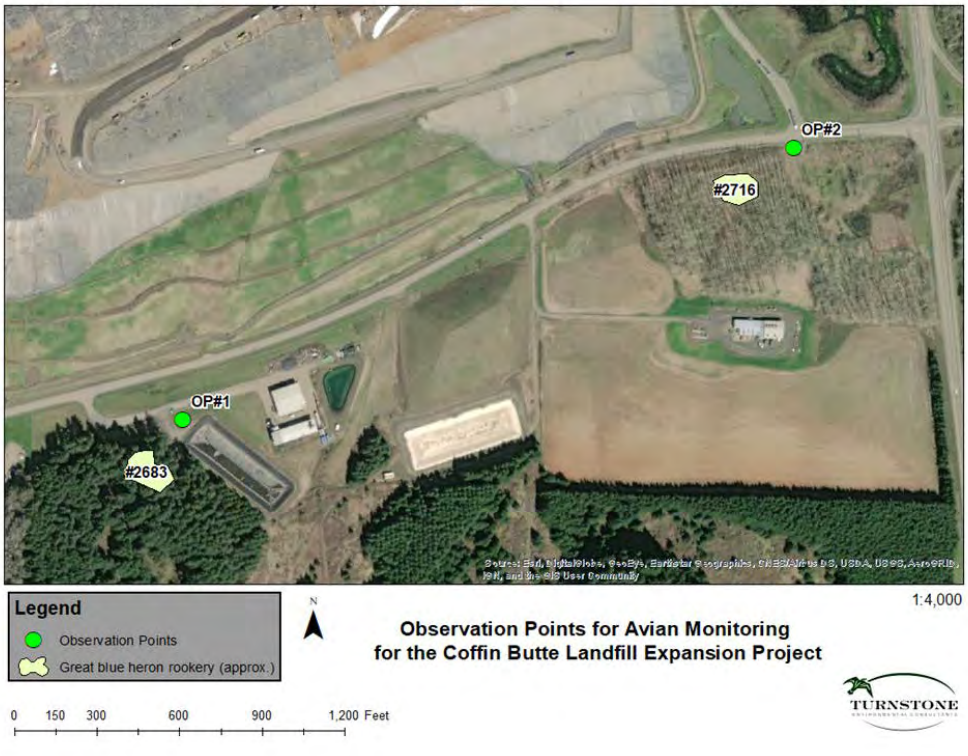


Figure 1. Great Blue Heron Rookeries in the Project Area and Observation Points

Year 1 Surveys (2022)

Turnstone biologists conducted six daytime surveys at each rookery site from February 17 through August 15, 2022 (Table 1 and Table 2). Turnstone biologists did not observe or detect any great blue herons nesting during any of the six visits at the western rookery (#2683). All surveys were conducted during mild weather conditions. One red-tailed hawk was observed several times during the survey and may be nesting in one of the potentially abandoned heron stick nests.

The great blue herons at the eastern site (#2716) occupied 14 stick nests during the first three surveys, from February through the end of April. The herons were generally standing and building on the nests, indicating a nest building period and possibly the initiation of an incubation period. In June, bald eagle juveniles invaded the colony and were observed moving between 10 of the 14 nests. All surveys were conducted during mild weather conditions.

Table 1. 2022 Great Blue Heron Survey Results for the Western Rookery (#2683)

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests [1]
2/15 to 3/15	2/17	Stephanie James	10 inactive nests	RTHA
3/15 to 4/15	3/22	Stephanie James	10 inactive nests	RTHA
4/15 to 5/15	4/28	Stephanie James	10 inactive nests	RTHA
5/15 to 6/15	6/01	Stephanie James	10 inactive nests	RTHA
6/15 to 7/15	7/12	Stephanie James	10 inactive nests	RTHA
7/15 to 8/15	8/15	Stephanie James	10 inactive nests	RTHA, BAEA

Table 2. 2022 Great Blue Heron Survey Results for the Eastern Rookery (#2716)

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	2/17	Stephanie James	1 active nest	None
3/15 to 4/15	3/22	Stephanie James	11 active nests	None

[1] RTHA = red-tailed hawk, BAEA = bald eagle, CORA = common raven

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests
4/15 to 5/15	4/28	Stephanie James	14 active nests	None
5/15 to 6/15	6/01	Stephanie James	14 inactive nests	BAEA
6/15 to 7/15	7/12	Stephanie James	14 inactive nests	None
7/15 to 8/15	8/15	Stephanie James	14 inactive nests	None

Year 2 Surveys (2023)

Biologists conducted six daytime surveys at each rookery site from March 1 through July 21, 2023 (Table 3 and Table 4). Turnstone biologists did not observe or detect any great blue herons nesting during any of the six visits at the two observation points. All surveys were conducted during mild weather conditions.

Table 3. 2023 Great Blue Heron Survey Results for the Western Rookery (#2683)

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	3/01	Stephanie James, Sarah McCord	10 inactive nests	CORA, RTHA, BAEA
3/15 to 4/15	3/31	Sarah McCord	10 inactive nests	RTHA, BAEA
4/15 to 5/15	5/05	Sarah McCord	10 inactive nests	RTHA
5/15 to 6/15	5/19	Sarah McCord	10 inactive nests	RTHA
6/15 to 7/15	6/16	Sarah McCord	10 inactive nests	RTHA
7/15 to 8/15	7/21	Sarah McCord	10 inactive nests	RTHA

Table 4. 2023 Great Blue Heron Survey Results for the Eastern Rookery (#2716)

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	3/01	Stephanie James, Sarah McCord	13 inactive nests	RTHA
3/15 to 4/15	3/31	Sarah McCord	13 inactive nests	RTHA
4/15 to 5/15	5/05	Sarah McCord	13 inactive nests	None
5/15 to 6/15	5/19	Sarah McCord	13 inactive nests	BAEA
6/15 to 7/15	6/16	Sarah McCord	13 inactive nests	None
7/15 to 8/15	7/21	Sarah McCord	13 inactive nests	None

Year 3 Surveys (2024)

At the time of the finalization of this report (July 12, 2024), Turnstone biologists had conducted five of the six required daytime surveys at each rookery site from February 22 through June 28, 2024 (Table 3). Turnstone biologists did not observe any great blue herons using the stick nests for nesting during any of the six visits at the two observation points. All surveys were conducted during mild weather conditions.

Table 5. 2024 Great Blue Heron Survey Results for the Western Rookery (#2683)

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	2/22	Sarah McCord	10 inactive nests	None
3/15 to 4/15	4/4	Sarah McCord	10 inactive nests	None
4/15 to 5/15	4/19	Sarah McCord	10 inactive nests	None
5/15 to 6/15	5/30	Sarah McCord	10 inactive nests	None
6/15 to 7/15	6/28	Sarah McCord	10 inactive nests	None
7/15 to 8/15	TBD	TBD	TBD	TBD

Table 6. 2024 Great Blue Heron Survey Results for the Eastern Rookery (#2716)

Observation Period	Survey Date	Surveyor	Results	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	2/22	Sarah McCord	13 inactive nests	None
3/15 to 4/15	4/4	Sarah McCord	13 inactive nests	None
4/15 to 5/15	4/19	Sarah McCord	13 inactive nests	None
5/15 to 6/15	5/30	Sarah McCord	13 inactive nests	None
6/15 to 7/15	6/28	Sarah McCord	13 inactive nests	None
7/15 to 8/15	TBD	TBD	TBD	TBD

Conclusion

Western Rookery (#2683)

During two years of protocol surveys (2022-2023), Turnstone biologists observed no active nesting by great blue herons within the western rookery (#2683). Three bird species were recorded visiting the stick nests during that time, including the common raven (*Corvus corax*), red-tailed hawk (*Buteo jamaicensis*), and bald eagle. A pair of red-tailed hawks were present during each survey, acting defensively, and are likely nesting in the in an abandoned stick nest the rookery in 2023.

Turnstone is continuing surveys in Year 3 (2024) to confirm the abandoned status, which requires three consecutive years of inactive status. At the time this report was finalized (July 12, 2024), Turnstone biologists completed five of the six required surveys. No nesting herons were observed as yet in 2024.

The western rookery is likely abandoned by great blue herons; however, the official status of the heron nests cannot be determined until the conclusion of the final sixth survey in 2024. Once the final visit is complete, Turnstone will submit an addendum to this report with the results.

Eastern Rookery (#2716)

During Year 1 (2022) surveys, Turnstone biologists observed active nesting by great blue herons within the eastern rookery (#2716) during the first three survey periods; however, in early June the colony had failed, and juvenile bald eagles were observed visiting the majority of the nests.

A red-tailed hawk pair was observed nesting in an abandoned stick nest in the rookery in Year 2 (2023). No great blue herons were observed in the eastern rookery (#2716) during any of the six 2023 reproductive productivity surveys; therefore, the rookery is considered inactive for 2023.

As with the western rookery, the eastern rookery is likely also abandoned by great blue herons. The official status of the heron nests cannot be determined until the conclusion of the final sixth survey in 2024. Once the final visit is complete, Turnstone will submit an addendum to this report with the results.

Mitigation and Protection Strategy for Great Blue Heron

As of the date of this final report, biologists have not observed any great blue heron nesting activity in the western rookery (#2683), which would be removed by the Landfill Expansion Project. If it is determined that there might be nesting activity during the final sixth survey of 2024, then mitigation measures would be implemented with the guidance of the state biologists with ODFW and ODF for compliance with state laws governing protections of resource sites.

If herons are found to be using the eastern rookery (#2716) during the final survey of 2024, then a Protection Strategy would be implemented during the Landfill Expansion Project activities, using a two-tiered approach with protection within the rookery itself (resource site) and within a buffer zone. This strategy provides effective protection within the rookery while allowing compatible activities at greater distances.

The relatively flat forested structure of the eastern rookery (#2716), existing tall hardwood trees in the contiguous forest extending away from Coffin Butte Road, and high human activity surrounding the rookery affect the shape of the buffer zones. The strategy for protecting the eastern rookery (#2716) includes providing protections within the resource site and a buffer zone extending 300 feet, measured from the perimeter of the rookery (Figure 2).

Great Blue Heron Rookery (within resource site)

The extent of the great blue heron rookery resource site was mapped on the ground to include active nest trees. Within the resource site, the land managers would retain all trees. There would be no habitat modification, such as overstory tree removal, vegetation clearing, construction of new roads, trails, buildings. Only actions allowed within the resource site would be deemed necessary by ODFW and the State Forester for improving the nesting habitat.

Vegetated Buffer Zone (within 300-ft buffer)

The Vegetated Buffer Zone would occur within the contiguous hardwood forest area which includes key components, perching and fledging trees, and replacement trees. No habitat modification, such as timber cutting, vegetation clearing, and development of new roads, trails, or buildings would occur within this zone.

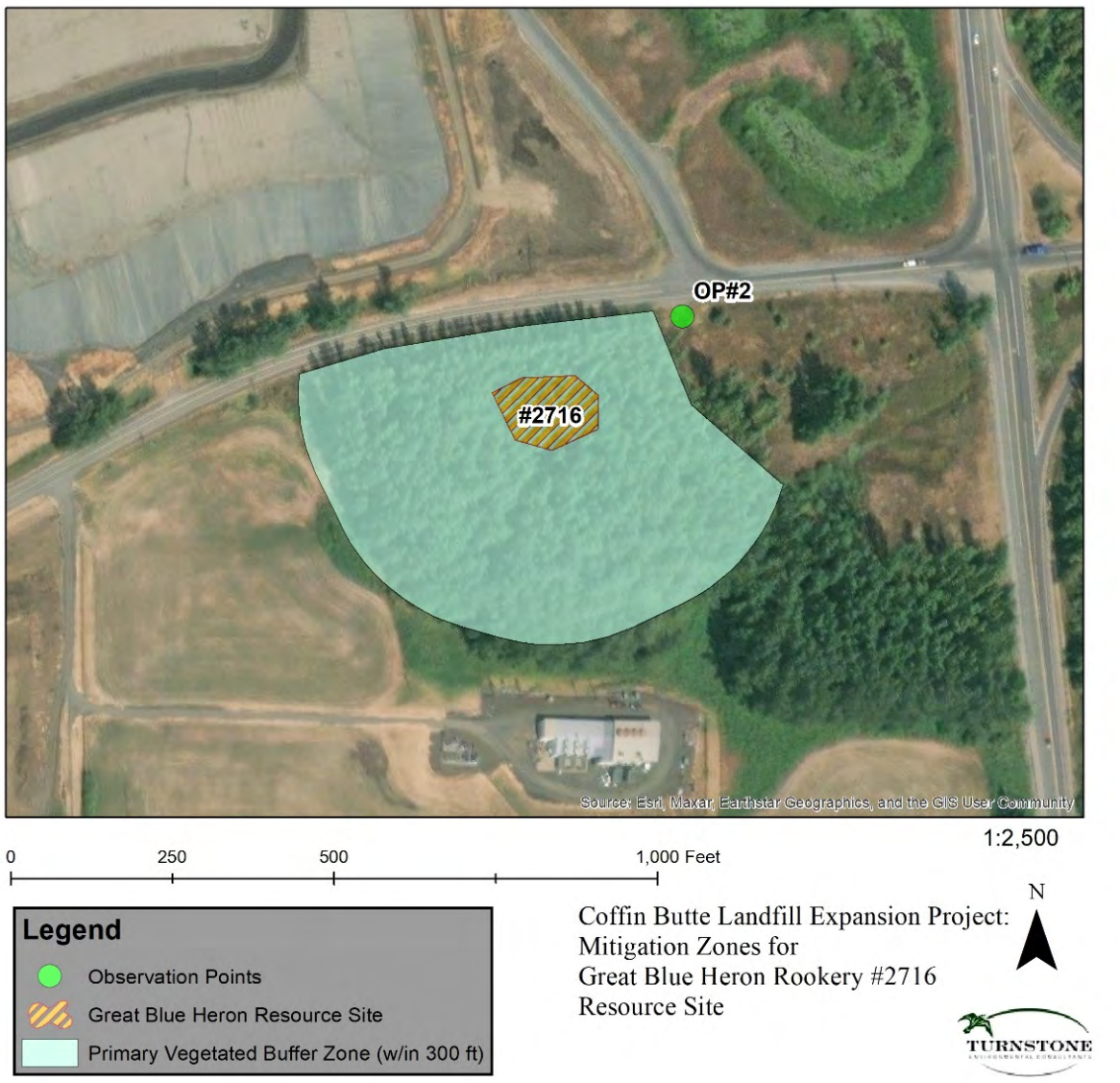


Figure 2. Great Blue Heron Protection Zone Surrounding the Eastern Rookery #2716

Due to the proximity of a high-use road, the great blue herons using the eastern rookery are likely habituated to the traffic noise; therefore, vehicular use of Coffin Butte Road within 300 feet of the rookery would be allowed during the great blue heron nesting period (February 15th to July 31st). The highest priority for protections within the Primary Vegetated Buffer Zone is the forest cover located between the resource site and Coffin Butte Road which acts as a visual screen. Forest management activities would only occur within the Primary Vegetated Buffer Zone with the approval of ODFW and the State Forester and for the enhancement of great blue heron nesting habitat. These enhancements may include tree topping to reduce windthrow potential and would only occur outside of the great blue heron nesting period (February 15th to July 31st).

Bald Eagle Activity

Turnstone conducted monthly monitoring of the behavior of bald eagles within Coffin Butte Landfill Expansion Project Area. The methods for the surveys are described in the Avian Monitoring Plan (Appendix A).

Year 1 (2022)

Turnstone biologists completed five surveys in 2022 for bald eagles during mild weather conditions which allowed for good visibility of the entire Coffin Butte Landfill Expansion Project Area. Biologists observed foraging and soaring behaviors in groups of eagles with as many as eleven juvenile bald eagles and six adult bald eagles. Biologists did not observe any bald eagles using nest sites within the study area.

Table 7. 2022 Bald Eagle Survey Results

Observation Period	Survey Date	Surveyor	Highest Number of Bald Eagles Observed at One Time	
			Juveniles	Adults
2/15 to 3/15	2/17	Stephanie James	4	6
3/15 to 4/15	3/22	Stephanie James	4	6
4/15 to 5/15	4/28	Stephanie James	4	6
5/15 to 6/15	6/01	Stephanie James	4	6
6/15 to 7/15	7/12	Stephanie James	4	6

Year 2 (2023)

Turnstone biologists completed five surveys in 2023 for bald eagles during mild weather conditions which allowed for good visibility of the entire Coffin Butte Landfill Expansion Project Area. Biologists observed foraging and soaring behaviors in groups of eagles with as many as four juvenile bald eagles and six adult bald eagles. Biologists did not observe any bald eagles using nest sites within the study area.

Table 8. 2023 Bald Eagle Survey Results

Observation Period	Survey Date	Surveyor	Highest Number of Bald Eagles Observed at One Time	
			Juveniles	Adults
2/15 to 3/15	2/17	Stephanie James, Sarah McCord	5	6
3/15 to 4/15	3/22	Sarah McCord	11	3

Observation Period	Survey Date	Surveyor	Highest Number of Bald Eagles Observed at One Time	
			Juveniles	Adults
4/15 to 5/15	4/28	Sarah McCord	3	2
5/15 to 6/15	6/01	Sarah McCord	5	3
6/15 to 7/15	7/12	Sarah McCord	0	0

Year 3 (2024)

Turnstone biologist Sarah McCord has completed all five surveys in 2024 for bald eagles during mild weather conditions which allowed for good visibility of the entire Coffin Butte Landfill Expansion Project Area. McCord observed roosting, foraging, and soaring behaviors in groups of eagles with as many as seven (7) juvenile bald eagles and (10) adult bald eagles.

McCord observed a golden eagle flying over the landfill with a blond nape and white based primaries during the first visit on February 22, 2024. Biologists did not observe any bald or golden eagles using nest sites within the study area in 2024.

Table 9. 2024 Bald Eagle Survey Results

Observation Period	Survey Date	Surveyor	Highest Number of Bald Eagles Observed at One Time	
			Juveniles	Adults
2/15 to 3/15	2/17	Sarah McCord	3	1
3/15 to 4/15	3/22	Sarah McCord	2	1
4/15 to 5/15	4/28	Sarah McCord	7	10
5/15 to 6/15	6/01	Sarah McCord	4	4
6/15 to 7/15	7/12	Sarah McCord	2	2

Conclusion

During three years (2022, 2023, and 2024) of monitoring bald eagle activity within the Coffin Butte Landfill Expansion Project Area, Turnstone biologists observed bald eagle juveniles and adults foraging, soaring, gliding, calling, and perching in adjacent trees. No bald eagles were observed nesting during any of the five surveys in each year; therefore, bald eagles are not likely nesting in the Coffin Butte Landfill Expansion Project.

DEER AND ELK STUDY

Turnstone is tasked with gathering existing information, performing field reconnaissance, and conducting a review of the use of the Coffin Butte Landfill Expansion Project Area by resident and/or migratory Columbian black-tailed deer (*Odocoileus hemionus columbianus*) and Roosevelt elk (*Cervus canadensis roosevelti*). The elk study uses a two-phase approach to gather information on deer and elk near the Project Area, integrating remote sensing, regional habitat analysis, and field reconnaissance by wildlife biologists.

The first phase of the deer and elk study includes a review of existing information, which is ongoing. The second phase of the deer and elk study included gathering additional baseline habitat data through field reconnaissance which aids in establishing locations for an array of trail cameras to document seasonal timing of deer and elk movement.

Habitat Assessment

The findings of this interim report are based on the information gathered during field investigation, recent aerial photographs, and the desktop evaluation of spatial data, including anecdotal observations within the 804-acre deer and elk Study Area, which includes all Coffin Butte Landfill Properties. The Deer and Elk Assessment Area includes the areas within a 5-mile radius of the Coffin Butte Study Area. The surrounding 5-mile Assessment Area includes 67,577 acres (Figure 3).

Turnstone wildlife biologists and geographic information system (GIS) analysts reviewed deer and elk habitat mapping created by ODFW in 2017.

The ODFW habitat categorization includes five habitat types with the following characteristics:

- **Summer Concentration Areas (Category 2):** provide essential and limited functions and values for concentrated migratory deer or elk typically from May through October
- **Winter Concentration Areas (Category 2):** provide essential and limited functions and values for concentrated migratory deer or elk typically from November through April
- **Year-round Major Habitat (Category 3):** provide essential functions and values for non-migratory deer or elk; not limited on a physiographic basis
- **Year-round Peripheral Habitat (Category 4):** provide important, but not essential functions and values for deer or elk
- **Impacted habitat (Category 4):** areas where the presence of deer and elk are considered in conflict with primary land uses

Deer and Elk Habitat Assessment Results

The study area contained no summer or winter concentration areas, which are essential for deer and elk that exhibit predominantly migratory behavior. These summer and winter concentration areas provide essential functions, such as thermal cover, protection from predation, and calving and fawning areas that are generally limited on the landscape. Over half of the surrounding 5-mile Assessment Area is considered Impacted Habitat, which are generally developed areas.

Year-round Major Habitat, which provides essential but not limited habitat for non-migratory deer and elk, occurs within about 27-percent of the surrounding 5-mile Assessment Area but

does not occur within the Coffin Butte study area. One hundred percent of the Coffin Butte study area is considered Year-round Peripheral Habitat, which provides important but not essential or limited functions, such as cover and forage. Table 10 summarizes the extent of elk habitat types within the Coffin Butte Study Area and surrounding 5-mile Assessment Area.

Turnstone biologists agree with the 2017 ODFW habitat mapping that found the deer and elk habitat within the Coffin Butte Study Area is likely important but not essential habitat for resident and migratory deer and elk populations.

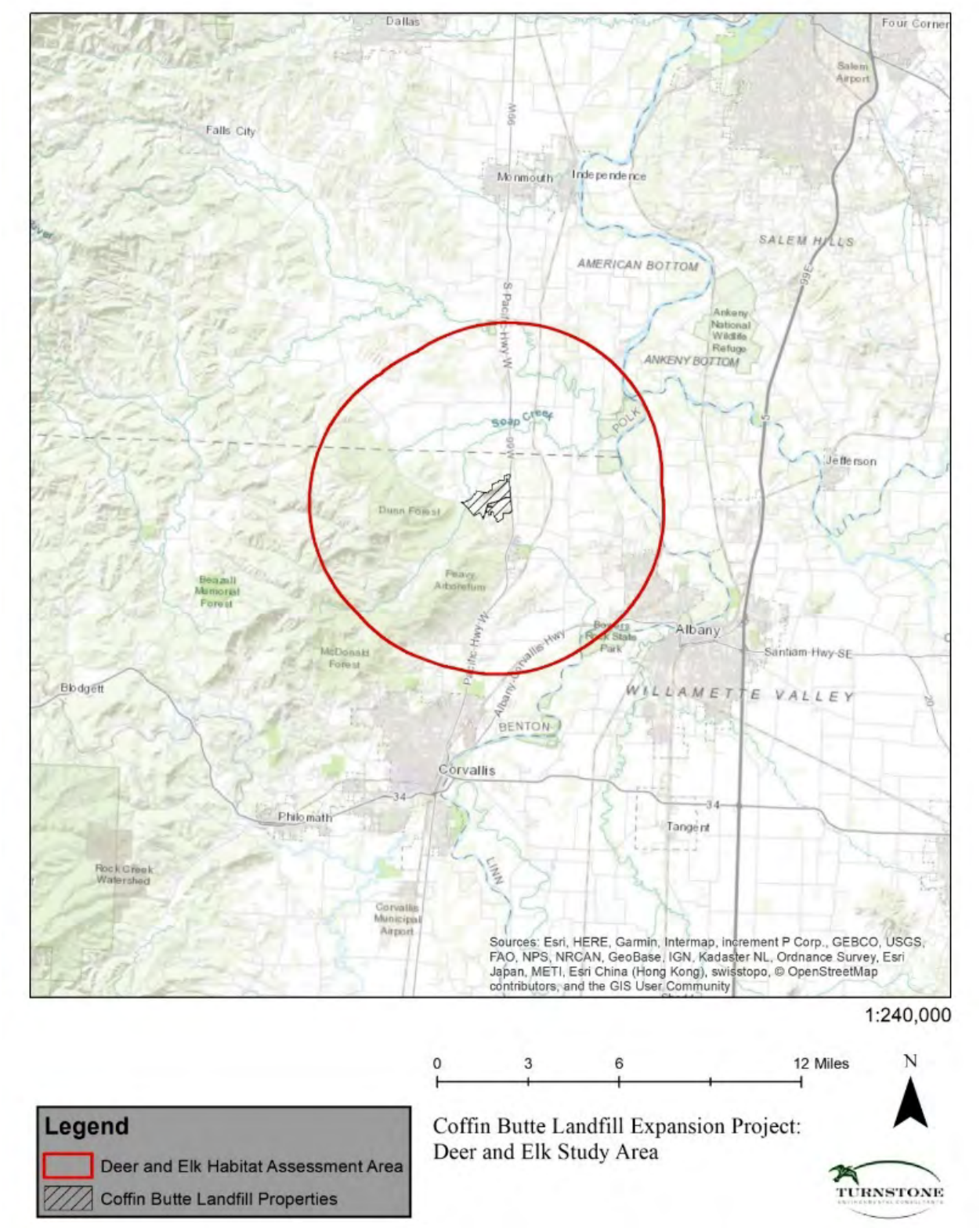


Figure 3. Study Area for the Elk Habitat Assessment

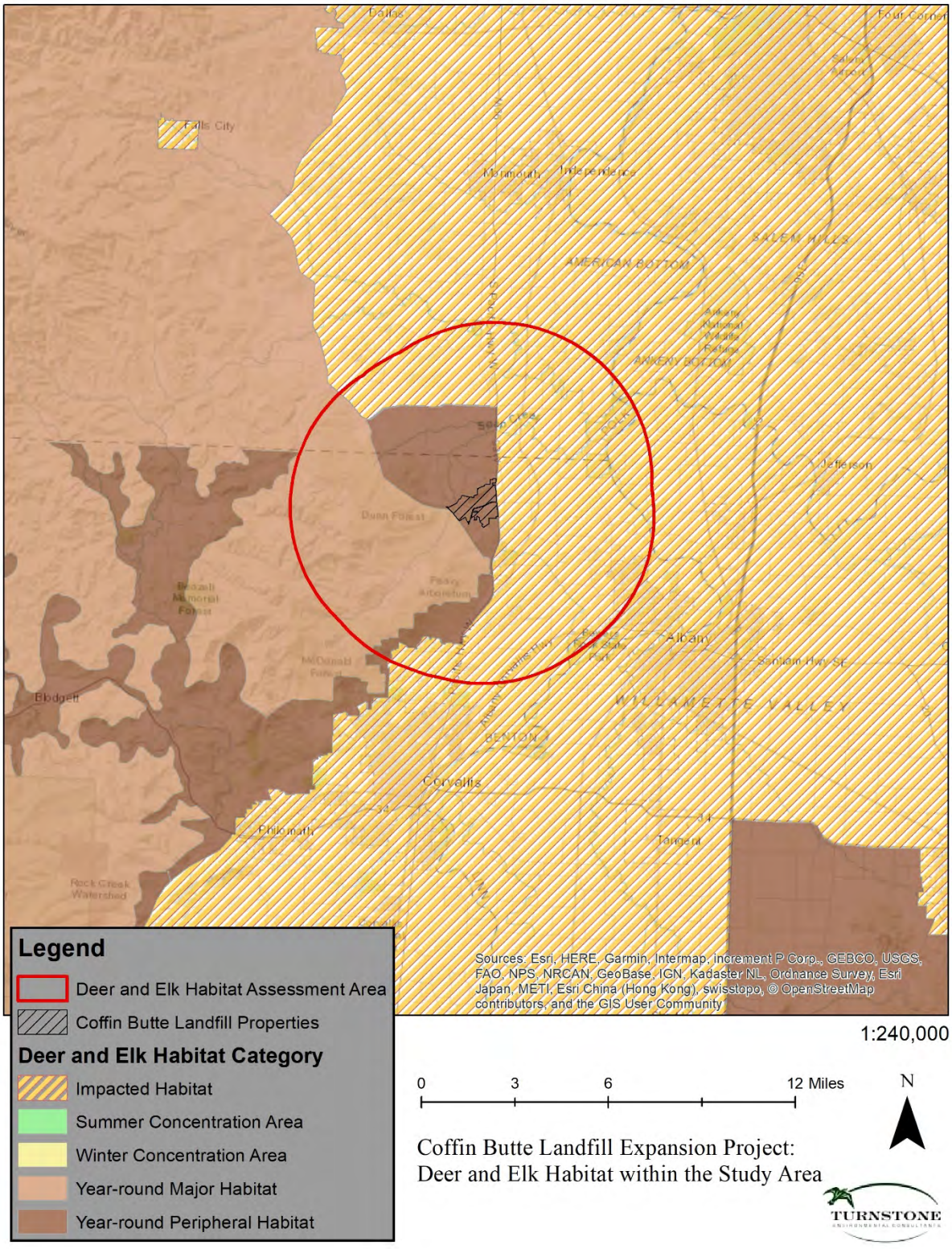


Figure 4. Deer and Elk Habitat in the Coffin Butte Landfill Expansion Project Study Area

Table 10. Elk Habitat within the Coffin Butte Landfill Expansion Project Study Area

Habitat Type	Habitat Category	Project Area (acres)	Percent of Project Area	Study Area (acres)	Percent of Study Area
Summer Concentration Area	2	0	0	0	0.0%
Winter Concentration Area	2	0	0	0	0.0%
Year-round Major Habitat	3	0	0	18,121	26.8%
Year-round Peripheral Habitat	4	804	100%	10,765	15.9%
Impacted Habitat	4	0	0	38,691	57.3%
Totals	**--**	**804**	**100%**	**67,577**	**100%**

Trail Camera Study

Turnstone wildlife biologists installed five trail cameras affixed to trees in five sampling areas with one camera in each sampling area in late May 2022. Two of the five cameras (A-4 and A-5) are located within the construction limits of the proposed landfill expansion site and three are outside the project site (A-1, A-3, and A-6). Turnstone biologists placed trail cameras along abandoned roads, game trails, and in forested areas with an open understory.

Large mammal species that occasionally use the Coffin Butte Landfill Expansion Project Area include the bobcat (*Lynx rufus*), cougar (*Puma concolor*), coyote (*Canis latrans*), Roosevelt elk (*Cervus canadensis roosevelti*), raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*).

Black-tailed deer use the project area throughout the year with the highest usage in the edge habit near Camera A-1, with an average of less than one (0.76) detection per day. All other trail cameras detected black-tailed deer an average of about once or twice per week (Table 11).

Table 11. Black-tailed Deer Detections per Day on Trail Cameras

Common Name	A-1	A-3	A-4	A-5	A-6
Black-tailed deer	276	76	160	143	134
Detections per day	0.76	0.21	0.13	0.39	0.37

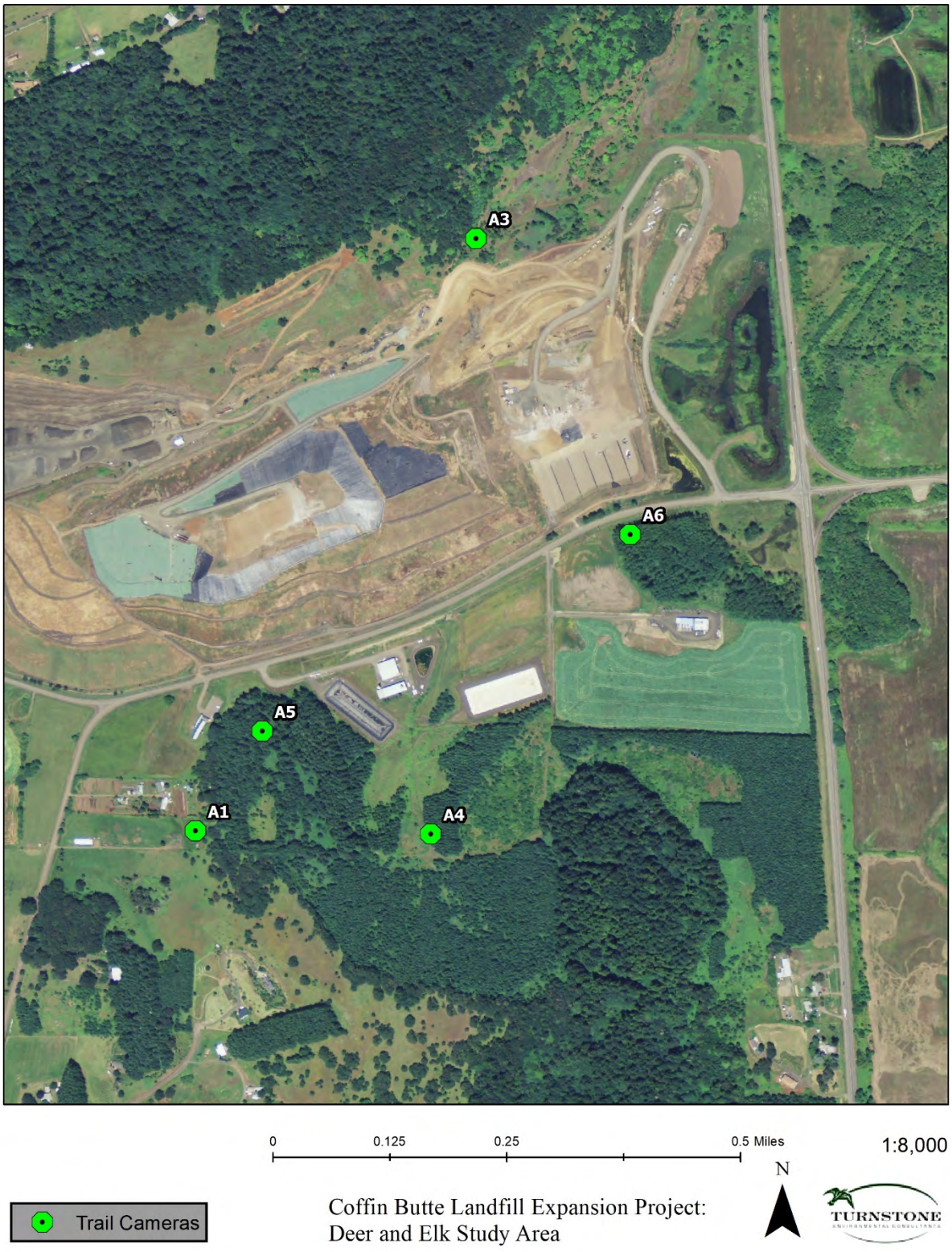


Figure 5. Trail Camera Locations in the Coffin Butte Landfill Expansion Project Study Area

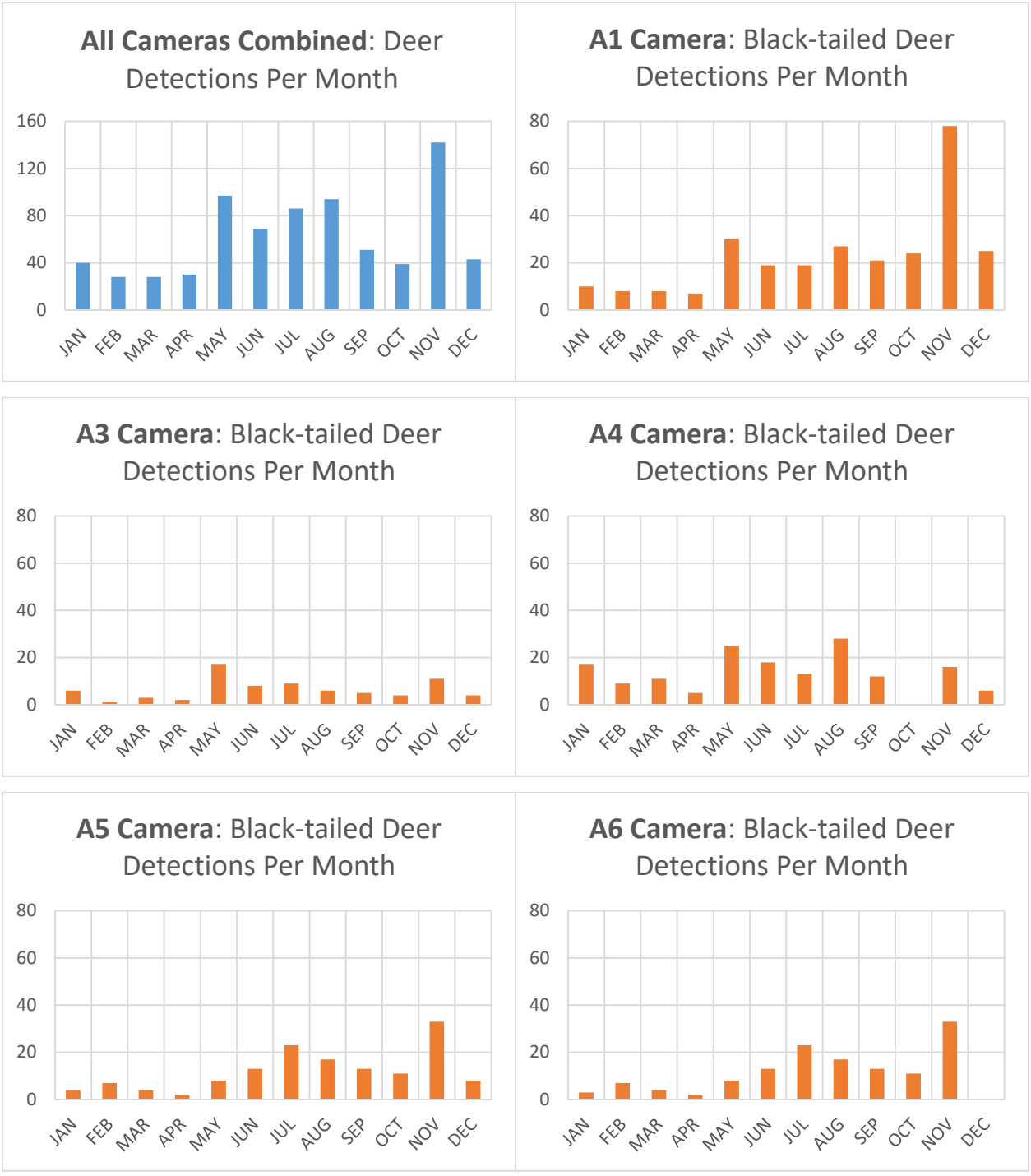


Figure 6. Black-tailed Deer Detections Per Month at Each Trail Camera

Table 12. Detections for Each Mammal Species Observed in the Camera Study Area

Common Name	A-1	A-3	A-4	A-5	A-6	Totals
Black-tailed deer	276	76	160	143	134	789
Bobcat	1	-	-	-	1	2
Cougar	1	-	1	-	-	2
Coyote	5	3	3	7	6	24
Elk	-	-	12	-	2	14
Raccoon	1	-	-	2	1	4
Skunk	-	-	-	-	3	3
All mammal species	283	80	176	152	148	838

A single cow and calf elk twosome were detected in late August and early September on Camera A-1 and A-4. A herd of elk were detected in mid-November during an 11-day period, numbering approximately 10 adults and 6 young of the year. A large herd of elk, numbering around 46 individuals visited the young coniferous forest stand in which Camera A-4 is placed for a 2-day period in early January.

The trail camera monitoring confirms the Coffin Butte study area is considered year-round habitat for black-tailed deer and peripheral habitat for elk and other large mammal species. This deer and elk habitat within the Coffin Butte Study Area provides cover and forage, that is likely important but not essential for resident and migratory deer and elk populations.

Figure 7. Large Mammals (excluding deer) Observed on Trail Cameras

Figure 8. Adult Female Black-tailed Deer with Young of the Year in July on Camera A-1

Figure 9. A herd of elk in the Young Coniferous Forest in Mid-November on Camera A-4

Figure 10. Adult Male black-tailed Deer on Camera A-5 on an August Morning

APPENDIX A: AVIAN MONITORING PLAN

Photo credit: S. James

Final:

Avian Monitoring Plan

for Coffin Butte Landfill Expansion Project Area

Submitted to:

Civil & Environmental Consultants, Inc.
4045 NW 64th Street, Suite 415
OK City, OK 73116

Submitted by:

Turnstone Environmental Consultants, I
PO Box 83362
Portland, OR 97283

Date:

April 14, 2022

Contents

Introduction 3
Habitat Assessment 3
Species-Specific Studies 4
Great Blue Heron 4
Survey Schedule 4
Survey Methodology 5
Bald Eagle Surveys 6
Survey Methods 7
Reporting 7

List of Tables and Figures

Table 1. Survey Visit Timing and Great Blue Heron Nesting Stages 5
Table 2. Survey Timing for Bald Eagle Monitoring 6
Figure 1. Observation Points for Avian Monitoring 4

INTRODUCTION

Turnstone Environmental Consultants, Inc. (Turnstone) proposes to conduct surveys for protected avian species within the Coffin Butte Landfill Expansion Project Area (Project Area) located in Benton County. Turnstone conducted a habitat assessment for the presence of protected bird species' habitat within the Project Area and found nesting habitat for the great blue heron (*Ardea herodias*) and foraging habitat for the bald eagle (*Haliaeetus leucocephalus*). Bald eagles are protected under the federal 1940 Bald Eagle Protection Act (16 USC 668–668d) and Heron rookeries are protected under the Oregon Forest Practices Act ("FPA"; OAR 629-665-0120). This monitoring plan details the species-specific survey methods for great blue herons and bald eagles which are known or suspected to occur within the Project Area.

HABITAT ASSESSMENT

Turnstone ecologist Stephanie James visited the western great blue heron rookery (#2683) and potential grassland bird habitat covering the closed landfill cells with wildlife biologists Anne Mary Myers and Gregory Reed from the Oregon Department of Fish and Wildlife (ODFW) in January 2022 to assess the likelihood of protected bird species using the Project Area as habitat. Weather conditions were agreeable to observing the nest sites, with no rain or fog to impede visibility.

ODFW biologists determined the potential grassland habitat and rock quarry areas north of Coffin Butte Road are not likely to be used as nesting habitat by protected grassland birds, specifically the streaked horned lark (*Eremophila alpestris strigata*) and Oregon vesper sparrow (*Pooecetes gramineus ssp. affinis*); therefore, surveys for grassland birds will not be needed.

Bald eagles were observed soaring and foraging in the Project Area. The bald eagle uses the Project Area as foraging habitat; however, it is unlikely bald eagles use the Project Area as nesting habitat.

Great blue herons likely use the western rookery (#2683) as nesting habitat. James and the ODFW wildlife biologists accessed the western rookery on foot and observed 24 stick nests in 17 nest trees. James documented the likely use of the eastern rookery (#2716) in October 2021 noting the signs of recent use such as the presence of stick nests with whitewash below. In January 2022, James observed 11 stick nests in 9 trees at the eastern rookery.

Monitoring Great blue heron nests could be accomplished from an observation point outside the forest stand and at least 150 feet from the closest nest, where there is low risk of disturbing or disrupting nesting (Figure 1).

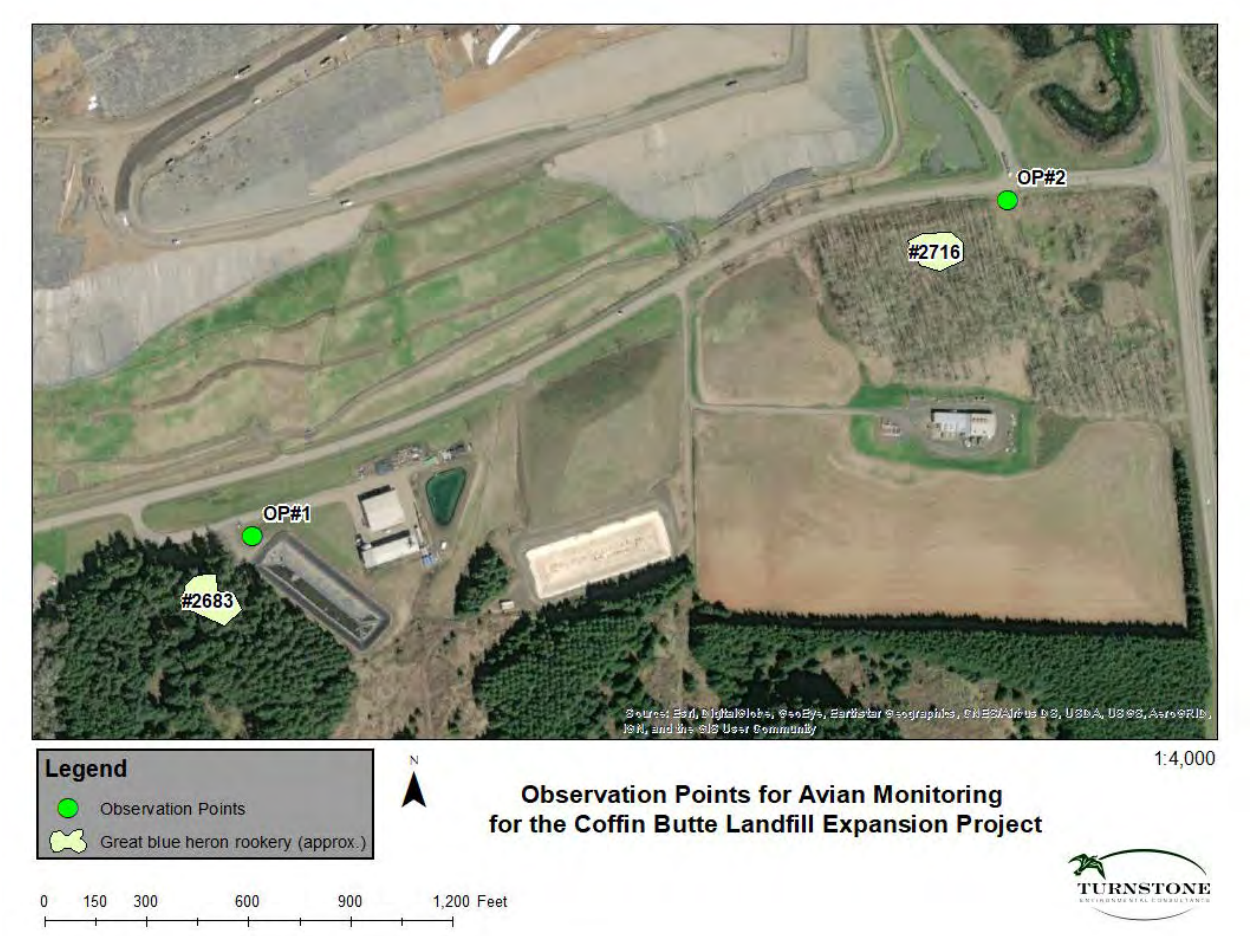


Figure 1. Observation Points for Avian Monitoring

SPECIES-SPECIFIC STUDIES

Great Blue Heron

Turnstone biologists will assess the extent of each rookery and conduct surveys during the breeding season. Mapping the extent of key components of each rookery will include the drip line of trees with stick nests and perching, fledgling, and replacement trees plus a forested buffer area as described in Forest Practice Rules.

Survey Schedule

In 2022, Turnstone will install one observation point for each of the two great blue heron rookeries. Turnstone will survey the two known sites for heron nesting, when heron court and initiate their breeding season and into the egg laying/incubation breeding stage. Turnstone biologists will assess the current nesting status of the known sites by conducting at surveys once per month during the breeding season. Turnstone recommends surveying the two known sites for occupancy and breeding status by conducting five survey visits during the breeding season (February 15 to Aug 15).

Survey Methodology

Surveys for the great blue heron will include estimating the number of occupied nests and breeding success, if possible, at the two known rookery sites located within the Project Area.

Biologists will survey each of the two rookeries to assess the current occupancy status. At the western rookery (#2683), biologists will monitor as many of the 24 great blue heron nests as possible from a single observation point (OP#1). Biologists will also determine breeding status for as many as possible of the 24 nests and any newly constructed nests. At the eastern rookery (#2716), biologists will monitor as many of the 11 great blue heron nests as possible from a single observation point (OP#2). Biologists will also determine breeding status for as many as possible of the 11 known nests and any newly constructed nests.

Table 1. Survey Visit Timing and Great Blue Heron Nesting Stages

Visit #	Date	Nesting Stage	Information Collected
1	February 15 to March 15	Nest building	Mapping and photographing each nest visible from the observation point at each rookery, noting if it is active or inactive, and noting any human disturbances and heron response during the observation period
2	March 15 to April 15	Egg laying/ Incubation	Mapping any new nests, recording active/inactive status for each visible nest, and noting any human disturbances and heron response during the observation period
3	April 15 to May 15	Incubation/Nestling	Recording active/inactive status and juvenile presence for each visible nest, and noting any human disturbances and heron response during the observation period
4	May 15 to June 15	Nestling/Fledgling	Recording active/inactive status and juvenile presence for each visible nest, and noting any human disturbances and heron response during the observation period
5	June 15 to July 15	Fledgling	Recording active/inactive status and juvenile presence for each visible nest, and noting any human disturbances and heron response during the observation period

Visit #	Date	Nesting Stage	Information Collected
6	July 15 to August 15	Fledgling	Recording active/inactive status and juvenile presence for each visible nest, and noting any human disturbances and heron response during the observation period

During each visit, surveyors would observe each heron nesting site for a 2-hour observation period during daylight hours when weather conditions are mild. Biologists will note any key components associated with a nest site, such as perching trees, fledging trees, and replacement nest trees, by observing herons use during visits.

A heron nest would be considered active if it has known or inferred presence of a mated pair as indicated by observance of at least one of the following activity patterns:

- Two adult herons are present on or near a nest, which has recently been repaired with fresh sticks (clean breaks) or fresh boughs on top, and/or having droppings and/or molted feathers on its rim or the ground underneath
- One adult heron is sitting low in the nest, presumably incubating
- Adult observed feeding young
- Eggs are present
- Young in nest or fledglings are present, by audio or visual detection

A heron nest would be considered unoccupied for the year if no presence activity (as described above) is observed during all five visits. If activity is observed initially but then no activity is observed for three consecutive visits the rookery would be considered active, but the nest failed.

Bald Eagle Surveys

Bald eagles are known to forage at the Coffin Butte landfill site; however, there are no known nest sites in or adjacent to the Project Area. Turnstone recommends surveying from a prominent point for a 2-hour observation period during daylight hours during the following survey windows. Additionally, the landfill site will be surveyed for bald eagle usage to determine if they are nesting, roosting, and/or foraging in the vicinity during nesting season which starts in February.

Table 2. Survey Timing for Bald Eagle Monitoring

Visit #	Date	Information Collected
1	February 15 to March 15	Record bald eagle activity within project area
2	March 15 to April 15	Record bald eagle activity within project area
3	April 15 to May 15	Record bald eagle activity within project area

Visit #	Date	Information Collected
4	May 15 to June 15	Record bald eagle activity within project area
5	June 15 to July 15	Record bald eagle activity within project area

Survey Methods

Turnstone biologists will assess the use of the Project Area as foraging habitat for bald eagles by observing their behavior from one of the two observation points (Figure 1) for a 2-hour observation period during daylight hours, concurrent with great blue heron observation period. During each visit, surveyors will record the greatest number of bald eagle adults and the greatest number of bald eagle juveniles seen at one time during the observation period.

If a new bald eagle nest is observed in or adjacent to the Project Area, then Turnstone biologists will assess the current nesting status of the bald eagle sites. This would be accomplished by conducting four-hour visits one per month between March 1 and July 15, coinciding with the primary nest initiation and young rearing periods, and from a vantage point using scope and binoculars that do not disturb eagles during suitable observation conditions.

Reporting

Within 4 weeks of the survey completion, Turnstone will submit a field survey technical memorandum that includes the survey methods, results, and mapping that depicts complete survey area and results. Turnstone will submit detection location information in GIS format within 2 weeks of completion and in a technical memo, which also documents the survey approach, protocols, and mapped results within 4 weeks of completion.

APPENDIX B: COMMUNICATIONS WITH ODFW AND ODF WILDLIFE BIOLOGISTS

From: WEIKEL Jennifer * ODF
To: Stephanie James; REED Gregory C * ODFW
Cc: AnneMary Myers
Subject: RE: Coffin Butte site visit
Date: Wednesday, March 16, 2022 12:00:04 PM
Attachments: CB_monitoring_plan_2022-03-02 - ODF edits.docx

Looks good Stephanie. I only have one comment in the document.

Your plan would exceed what we'd need for any Forest Practices-related issues. If you find that one of the rookeries is not active in 2022, I would recommend at least two additional years of surveys. If we have three consecutive years surveys with no nesting, we can change the status of that rookery to abandoned under the FPA.

Jennifer Weikel
Wildlife Biologist, Forest Resources Division
Oregon Department of Forestry
jennifer.weikel@odf.oregon.gov

From: Stephanie James <stephanie@turnstoneenvironmental.com>
Sent: Wednesday, March 02, 2022 2:59 PM
To: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Cc: AnneMary Myers <AnneMary.Myers@state.or.us>; WEIKEL Jennifer * ODF <Jennifer.WEIKEL@odf.oregon.gov>
Subject: RE: Coffin Butte site visit

Greetings,

Greg and Jennifer R – Thank you for reviewing and providing input. This draft monitoring plan includes responses to your comments/edits. Turnstone is currently under contract to survey for 2022 only. However, the plan at this point is to conduct surveys each year indefinitely.

Jennifer W – Please review the attached monitoring plan for the Coffin Butte Landfill Expansion project.

Thanks,
Stephanie

Stephanie A. James - Environmental Scientist
Turnstone Environmental Consultants, Inc.
(503) 283-5338 x103

From: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>

Sent: Wednesday, February 23, 2022 5:12 PM
To: Stephanie James <stephanie@turnstoneenvironmental.com>
Cc: AnneMary Myers <AnneMary.Myers@state.or.us>
Subject: RE: Coffin Butte site visit

Hi Stephanie,

Thanks for sending the survey plan. Overall, I think the plan looks good. We made a few edits and asked a few questions with track changes. Our manager, Jennifer Ringo, also added some suggestions throughout. We were also curious how many years the surveys are planned?

If you haven't done so already, I would also recommend coordinating with ODF's private lands wildlife biologist, Jennifer Weikel (jennifer.weikel@odf.oregon.gov) or the Stewardship Forester for this area. They would probably have some guidance on what would be deemed an inactive or unoccupied rookery based on the FPA rules. Let us know if there are any follow up questions or clarifications needed.

Best,

Greg Reed
District Wildlife Biologist
Oregon Department of Fish and Wildlife
7118 NE Vandenberg Ave
Corvallis, OR 97330
Office: 541-757-5226
Cell: 541-961-6381

My email address has changed to: gregory.c.reed@odfw.oregon.gov

---

From: Stephanie James <stephanie@turnstoneenvironmental.com>
Sent: Wednesday, February 16, 2022 6:53 AM
To: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Cc: AnneMary Myers <AnneMary.Myers@state.or.us>
Subject: RE: Coffin Butte site visit

Hi Greg and Anne Mary,

Please find attached a survey plan for the Coffin Butte Expansion Project. Let us know if there are any modifications needed. We plan to conduct the first surveys in early March.

Thanks,
Stephanie

Stephanie A. James - Environmental Scientist
Turnstone Environmental Consultants, Inc.
(503) 283-5338 x103

From: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Sent: Wednesday, January 19, 2022 11:44 AM
To: Stephanie James <stephanie@turnstoneenvironmental.com>
Subject: RE: Coffin Butte site visit

Sounds good. I assume we will just meet at the main office building for the Coffin Butte?

From: Stephanie James <stephanie@turnstoneenvironmental.com>
Sent: Wednesday, January 19, 2022 11:35 AM
To: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Subject: RE: Coffin Butte site visit

That would be great to have Anne Mary join. Wednesday at 1pm works for me. I'll make sure that we have a decent path for accessing the western rookery. Please be ready to encounter lots of poison oak!

Stephanie A. James - Environmental Scientist
Turnstone Environmental Consultants, Inc.
(503) 283-5338 x103

From: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Sent: Wednesday, January 19, 2022 11:31 AM
To: Stephanie James <stephanie@turnstoneenvironmental.com>
Subject: RE: Coffin Butte site visit

Does 1 pm on Wed work for you? I would also like the Assistant District Wildlife Biologist, Anne Mary Myers, to come along, if that is alright? Previously, she was ODFW's Grasslands Biologist, so she is a great asset if we are going to look at grassland bird habitat.

-Greg

From: Stephanie James <stephanie@turnstoneenvironmental.com>
Sent: Wednesday, January 19, 2022 11:14 AM
To: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Subject: RE: Coffin Butte site visit

Hi Greg –

Wednesday or Thursday next week would work for me. I would like to access the western GBHE rookery in the conifers on Poison Oak Hill, and then also look at potential grassland bird habitat (SHLA and VESP) on some of the closed landfill cells north of Coffin Butte road. It shouldn't take more than 2 hours.

Also, please let me know if ODFW can release the location(s) of any other GBHE rookeries in the area.

Thanks,
Stephanie

Stephanie A. James - Environmental Scientist
Turnstone Environmental Consultants, Inc.
(503) 283-5338 x103

From: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Sent: Wednesday, January 19, 2022 11:02 AM
To: Stephanie James <stephanie@turnstoneenvironmental.com>
Subject: RE: Coffin Butte site visit

Hi Stephanie,

Sorry for not getting back to you. I would be happy to meet with you next week. What are you wanting to look at on the site visit? I am available Tues afternoon, and most of Wed-Fri next week. There is a very small chance we will start our elk helicopter surveys next week, which would limit my availability.

Thanks,

Greg Reed
District Wildlife Biologist
Oregon Department of Fish and Wildlife
7118 NE Vandenberg Ave
Corvallis, OR 97330
Office: 541-757-5226
Cell: 541-961-6381

My email address has changed to: gregory.c.reed@odfw.oregon.gov

---

From: Stephanie James <stephanie@turnstoneenvironmental.com>

Sent: Wednesday, January 19, 2022 10:48 AM
To: REED Gregory C * ODFW <Gregory.C.REED@odfw.oregon.gov>
Subject: RE: Coffin Butte site visit

Hi Greg – Please let me know if you're available for a site visit next week.

Thanks,
Stephanie

Stephanie A. James - Environmental Scientist
Turnstone Environmental Consultants, Inc.
(503) 283-5338 x103

From: Stephanie James
Sent: Monday, January 17, 2022 10:35 AM
To: Gregory.C.Reed@odfw.oregon.gov
Subject: Coffin Butte site visit

Hi Greg,

Are you available the week of January 24 to visit the GBH rookeries at the Coffin Butte site?

Stephanie A. James - Environmental Scientist
Turnstone Environmental Consultants, Inc.
(503) 283-5338 x103

APPENDIX C: FIELD FORMS

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 02/22/2024 **Visit No:** 1 **Previous Visit Date: N/A**

Arrival Time: 07:45 **Departure Time:** 09:45

Observers: Sarah McCord

Weather: Partly cloudy, dry, calm

Comments: No GBHE observed in the rookery during survey. One RTHA seen in and around the nests, calling and perched, likely using stand for nesting.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 04/04/2024 **Visit No:** 2 **Previous Visit Date:** 02/22/2024

Arrival Time: 07:47 **Departure Time:** 09:47

Observers: Sarah McCord

Weather: Overcast, dry, calm

Comments: RTHA in the stand. No heron activity.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 04/19/2024 **Visit No:** 3 **Previous Visit Date:** 04/04/2024

Arrival Time: 12:46 **Departure Time:** 14:46

Observers: Sarah McCord

Weather: Breezy, dry, clear

Comments: No GBHE observed in the rookery during survey.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 05/30/2024 **Visit No:** 4 **Previous Visit Date:** 04/19/2024

Arrival Time: 07:56 **Departure Time:** 09:56

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: Two adult BAEA, three sub-adult BAEA, and two adult RTHA in the stand. No heron activity.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 05/30/2024 **Visit No:** 5 **Previous Visit Date:** 04/19/2024

Arrival Time: 06:52 **Departure Time:** 08:52

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: Two juvenile BAEA in stand upon arrival. Two STJA juveniles begging and being fed by adult. No herons.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 7/11/2024 **No. of Visits:** 5
Observers: S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6988, -123.2235
Comments: No GBHE observed in the rookery. 6th survey is planned to occur between July 15 and August 15, 2024, and will be included in an addendum report.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 02/22/2024			2nd Visit Date: 04/04/2024			3rd Visit Date: 04/19/2024					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB1	A	1	70%												INACTIVE
OB1	A	2	55%												INACTIVE
OB1	B	3	65%												INACTIVE
OB1	C	4	80%												INACTIVE
OB1	C	5	55%												INACTIVE
OB1	D	6	70%												INACTIVE
OB1	E	7	60%												INACTIVE
OB1	F	8	55%												INACTIVE
OB1	G	9	45%												INACTIVE
OB1	H	10	85%												INACTIVE

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 7/11/2024 **No. of Visits:** 5
Observers: S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6988, -123.2235
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 05/30/2024			5th Visit Date: 6/28/24			6th Visit Date:			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB1	A	1	70%												INACTIVE
OB1	A	2	55%												INACTIVE
OB1	B	3	65%												INACTIVE
OB1	C	4	80%												INACTIVE
OB1	C	5	55%												INACTIVE
OB1	D	6	70%												INACTIVE
OB1	E	7	60%												INACTIVE
OB1	F	8	55%												INACTIVE
OB1	G	9	45%												INACTIVE
OB1	H	10	85%												INACTIVE

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 02/22/2024 **Visit No:** 1 **Previous Visit Date:** N/A

Arrival Time: 09:48 **Departure Time:** 11:48

Observers: Sarah McCord

Weather: Partly cloudy, dry, calm

Comments: 13 stick nests observed with no GBHE.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	55%	N						
OB2	J	13	45%	N						
OB2	K	14	60%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 04/04/2024 **Visit No:** 2 **Previous Visit Date:** 02/22/2024

Arrival Time: 09:50 **Departure Time:** 11:50

Observers: Sarah McCord

Weather: overcast, dry, calm

Comments: Songbirds observed. No heron activity.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	55%	N						
OB2	J	13	45%	N						
OB2	K	14	60%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 04/19/2024 **Visit No:** 3 **Previous Visit Date:** 04/04/2024

Arrival Time: 10:44 **Departure Time:** 12:44

Observers: Sarah McCord

Weather: Clear, dry, breezy

Comments: No herons, only songbirds observed.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	55%	N						
OB2	J	13	45%	N						
OB2	K	14	60%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 05/30/2024 **Visit No:** 4 **Previous Visit Date:** 04/19/2024

Arrival Time: 10:00 **Departure Time:** 12:00

Observers: Sarah McCord

Weather: Scattered clouds, dry, breezy

Comments: No herons observed.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	55%	N						
OB2	J	13	45%	N						
OB2	K	14	60%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 06/28/2024 **Visit No:** 5 **Previous Visit Date:** 05/30/2024

Arrival Time: 09:00 **Departure Time:** 11:00

Observers: Sarah McCord

Weather: Scattered clouds, dry, breezy

Comments: No herons observed, only songbirds

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	55%	N						
OB2	J	13	45%	N						
OB2	K	14	60%	N						

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 7/11/2024 **No. of Visits:** 5
Observers: S. McCord
Weather: Surveys conditions were dry and calm or breezy
GPS Coordinates: 44.6959, -123.2316
Comments: No GBHE observed in the stand.. STJA, RTHA and BAEA were observed in the stand. The final 6th survey will occur between July 15 and August 15, 2024.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 02/22/2024			2nd Visit Date: 03/31/2023			3rd Visit Date: 04/19/2024					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB2	A	1	50%												INACTIVE
OB2	B	2	45%												INACTIVE
OB2	C	3	70%												INACTIVE
OB2	D	4	65%												INACTIVE
OB2	B	5	60%												INACTIVE
OB2	E	6	60%												INACTIVE
OB2	F	7	60%												INACTIVE
OB2	F	8	0%												Nest missing
OB2	G	9	55%												INACTIVE
OB2	G	10	50%												INACTIVE
OB2	H	11	60%												INACTIVE
OB2	I	12	55%												INACTIVE
OB2	J	13	45%												INACTIVE
OB2	E	14	60%												INACTIVE.

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 7/11/2024 **No. of Visits:** 5
Observers: S. McCord
Weather: Surveys conditions were dry and calm or breezy
GPS Coordinates: 44.6959, -123.2316
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 05/30/2024			5th Visit Date: 6/28/24			6th Visit Date:			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB2	A	1	50%												INACTIVE
OB2	B	2	45%												INACTIVE
OB2	C	3	70%												INACTIVE
OB2	D	4	65%												INACTIVE
OB2	B	5	60%												INACTIVE
OB2	E	6	60%												INACTIVE
OB2	F	7	60%												Nest missing
OB2	F	8	0%												INACTIVE
OB2	G	9	55%												INACTIVE
OB2	G	10	50%												INACTIVE
OB2	H	11	60%												INACTIVE
OB2	I	12	55%												INACTIVE
OB2	J	13	45%												INACTIVE
OB2	E	14	60%												INACTIVE

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 03/01/2023 **Visit No:** 1 **Previous Visit Date:**

Arrival Time: 10:25 **Departure Time:**12:25

Observers: Stephanie James, Sarah McCord

Weather: Partly cloudy, dry, calm

Comments: No GBHE observed in the rookery during survey. On separate occasions, 1 COHA, 2 RTHA adults, 1 BAEA juv, and 2 BAEA adults visited the rookery.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 03/31/2023 **Visit No:** 2 **Previous Visit Date:** 03/01/2023

Arrival Time: 10:37 **Departure Time:** 12:37

Observers: Sarah McCord

Weather: Overcast, drizzling rain, calm

Comments: No GBHE observed in the rookery during survey. On separate occasions, 2 RTHA adults, 2 BAEA juv, and 1 BAEA adult visited the rookery.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 05/05/2023 **Visit No:** 3 **Previous Visit Date:** 03/31/2023

Arrival Time: 11:05 **Departure Time:** 13:05

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry until last 45 mins then misty rain

Comments: Ravens. RTHA pair begging and chatting, keeping close watch on me and escorting ravens away from stand. Coopers hawk fly-over.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 05/19/2023 **Visit No:** 4 **Previous Visit Date:** 05/05/2023

Arrival Time: 08:13 **Departure Time:** 10:13

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: No GBHE observed in the rookery during survey. RTHA pair in stand, calling, chasing off other birds and scolding me for my presence.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 06/16/2023 **Visit No:** 5 **Previous Visit Date:** 05/19/2023

Arrival Time: 08:47 **Departure Time:** 10:47

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: No GBHE observed in the rookery during survey. RTHA screaming soft raspy but not a juv, pair responses, may be on nest.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 07/21/2023 **Visit No:** 6 **Previous Visit Date:** 06/16/2023

Arrival Time: 08:35 **Departure Time:** 10:35

Observers: Sarah McCord

Weather: calm, clear, dry

Comments: No GBHE observed in the rookery during survey. RTHA present and calling in stand, vultures and small birds.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 3/24/2023 **No. of Visits:** 6
Observers: S. James, S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6988, -123.2235
Comments: No GBHE observed in the rookery site. RTHA are likely nesting in an abandoned stick nest within the rookery site.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 03/01/2023			2nd Visit Date: 03/31/2023			3rd Visit Date: 05/05/2023					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB1	A	1	70%												INACTIVE
OB1	A	2	55%												INACTIVE
OB1	B	3	65%												INACTIVE
OB1	C	4	80%												INACTIVE
OB1	C	5	55%												INACTIVE
OB1	D	6	70%												INACTIVE
OB1	E	7	60%												INACTIVE
OB1	F	8	55%												INACTIVE
OB1	G	9	45%												INACTIVE
OB1	H	10	85%												INACTIVE

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 3/24/2023 **No. of Visits:** 6
Observers: S. James, S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6988, -123.2235
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 05/19/2023			5th Visit Date: 6/16/23			6th Visit Date: 07/21/2023			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB1	A	1	70%												INACTIVE
OB1	A	2	55%												INACTIVE
OB1	B	3	65%												INACTIVE
OB1	C	4	80%												INACTIVE
OB1	C	5	55%												INACTIVE
OB1	D	6	70%												INACTIVE
OB1	E	7	60%												INACTIVE
OB1	F	8	55%												INACTIVE
OB1	G	9	45%												INACTIVE
OB1	H	10	85%												INACTIVE

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 03/01/2023 **Visit No:** 1 **Previous Visit Date:**

Arrival Time: 08:15 **Departure Time:** 10:15

Observers: Stephanie James, Sarah McCord

Weather: Partly cloudy, dry, calm

Comments: 14 stick nests observed with no GBHE. One nest is likely occupied by a breeding pair of RTHA, one of which was stilling low in Nest #6.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	Y		2	0		1AS, EX, ASN	RTHA nesting, defending
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	0%	N						
OB2	J	13	0%	N						
OB2	K	14	0%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 03/31/2023 **Visit No:** 2 **Previous Visit Date:** 03/01/2023

Arrival Time: 08:32 **Departure Time:** 10:32

Observers: Sarah McCord

Weather: Overcast, drizzling rain, calm

Comments: 14 stick nests observed with no GBHE. One nest is likely occupied by a breeding pair of RTHA

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	Y		2	0		ASN	RTHA nesting, defending
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	0%	N						
OB2	J	13	0%	N						
OB2	K	14	0%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 05/05/2023 **Visit No:** 3 **Previous Visit Date:** 03/31/2023

Arrival Time: 08:20 **Departure Time:** 10:28

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: No GBHE observed in the rookery during survey. Turkey vulture and ravens soaring above stand.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 05/19/2023 **Visit No:** 4 **Previous Visit Date:** 05/05/2023

Arrival Time: 10:20 **Departure Time:** 12:20

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: No GBHE observed in the rookery during survey. 1 adult BAEA chased out of stand by blackbird. 1 J BAEA perched in stand before flying back to landfill. 1 GBHE fly-over.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 06/16/2023 **Visit No:** 5 **Previous Visit Date:** 05/19/2023

Arrival Time: 10:49 **Departure Time:** 12:49

Observers: Sarah McCord

Weather: Breezy, clear, dry

Comments: No GBHE observed in the rookery during survey. Vultures and small birds, one GBHE fly-by headed to field to the west.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 07/21/2023 **Visit No:** 6 **Previous Visit Date:** 06/16/2023

Arrival Time: 10:40 **Departure Time:** 12:40

Observers: Sarah McCord

Weather: Breezy, clear, dry

Comments: No GBHE observed in the rookery during survey. Vultures and small birds, large group of ravens circling landfill.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 3/24/2023 **No. of Visits:** 6
Observers: S. James, S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6959, -123.2316
Comments: No GBHE adults observed, RTHA defending and sitting low in Nest #6

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 03/01/2023			2nd Visit Date: 03/31/2023			3rd Visit Date: 05/05/2023					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB2	A	1	50%												INACTIVE
OB2	B	2	45%												INACTIVE
OB2	C	3	70%												INACTIVE
OB2	D	4	65%												INACTIVE
OB2	B	5	60%												INACTIVE
OB2	E	6	60%	STD	0										RTHA nesting
OB2	F	7	60%												INACTIVE
OB2	F	8	0%												Nest missing
OB2	G	9	55%												INACTIVE
OB2	G	10	50%												INACTIVE
OB2	H	11	60%												INACTIVE
OB2	I	12	55%												INACTIVE
OB2	J	13	45%												INACTIVE
OB2	E	14	60%												INACTIVE.

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 3/24/2023 **No. of Visits:** 6
Observers: S. James, S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6959, -123.2316
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 05/19/2023			5th Visit Date: 6/16/23			6th Visit Date: 07/21/2023			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB2	A	1	50%												INACTIVE
OB2	B	2	45%												INACTIVE
OB2	C	3	70%												INACTIVE
OB2	D	4	65%												INACTIVE
OB2	B	5	60%												INACTIVE
OB2	E	6	60%												INACTIVE
OB2	F	7	60%												Nest missing
OB2	F	8	0%												INACTIVE
OB2	G	9	55%												INACTIVE
OB2	G	10	50%												INACTIVE
OB2	H	11	60%												INACTIVE
OB2	I	12	55%												INACTIVE
OB2	J	13	45%												INACTIVE
OB2	E	14	60%												INACTIVE

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 02/17/2022 **Visit No:** 1 **Previous Visit Date:**

Arrival Time: 12:51 **Departure Time:** 14:51

Observers: Stephanie James

Weather: Partly cloudy, misty, calm

Comments: No GBHE observed during survey. A RTHA adult was aggravated calling, seen flying to/from the forest stand

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 03/22/2022 **Visit No:** 2 **Previous Visit Date:** 02/17/2022

Arrival Time: 09:33 **Departure Time:** 11:33

Observers: Stephanie James

Weather: Cloudy, dry, light breeze

Comments: No GBHE observed during survey. Two RTHA adults calling from the forest stand.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 04/28/2022 **Visit No:** 3 **Previous Visit Date:** 03/22/2022

Arrival Time: 12:40 **Departure Time:** 14:40

Observers: Stephanie James

Weather: Cloudy, dry, light breeze

Comments: No GBHE observed during survey. Two RTHA adults seen and heard, likely occupying a stick nest in the rookery.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 06/01/2022 **Visit No:** 4 **Previous Visit Date:** 04/28/2022

Arrival Time: 12:27 **Departure Time:** 14:27

Observers: Stephanie James

Weather: Clear, calm, dry

Comments: No GBHE observed during survey. Two RTHA adults seen and heard, likely occupying a stick nest in the rookery.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 07/12/2022 **Visit No:** 5 **Previous Visit Date:** 06/01/2022

Arrival Time: 11:20 **Departure Time:** 13:20

Observers: Stephanie James

Weather: Clear, calm, dry

Comments: No GBHE observed during survey. Two RTHA adults seen and heard, likely occupying a stick nest in the rookery.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 08/15/2022 **Visit No:** 6 **Previous Visit Date:** 07/12/2022

Arrival Time: 18:20 **Departure Time:** 20:20

Observers: Stephanie James

Weather: Clear, calm, dry

Comments: No GBHE observed. Two juv BAEA inspected some of the stick nests. Two RTHA adults seen and heard, likely occupying a stick nest in the rookery.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 8/20/2022 **No. of Visits:** 6
Observers: S. James
Weather: Surveys conditions were calm and dry or with light pricipitation
GPS Coordinates: 44.6988, -123.2235
Comments: No GBHE observed in the rookery site. RTHA are likely nesting in an abandoned stick nest within the rookery site.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 02/17/2022			2nd Visit Date: 03/22/2022			3rd Visit Date: 04/28/2022					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB1	A	1	70%												INACTIVE
OB1	A	2	55%												INACTIVE
OB1	B	3	65%												INACTIVE
OB1	C	4	80%												INACTIVE
OB1	C	5	55%												INACTIVE
OB1	D	6	70%												INACTIVE
OB1	E	7	60%												INACTIVE
OB1	F	8	55%												INACTIVE
OB1	G	9	45%												INACTIVE
OB1	H	10	85%												INACTIVE

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: **Colony Code:**
Date: 8/20/2022 **No. of Visits:** 6
Observers: S. James
Weather: Surveys conditions were calm and dry or with light pricipitation
GPS Coordinates: 44.6988, -123.2235
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 06/01/2022			5th Visit Date: 7/12/22			6th Visit Date: 08/15/2022			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB1	A	1	70%										N	0	INACTIVE
OB1	A	2	55%										N	0	INACTIVE
OB1	B	3	65%										N	0	INACTIVE
OB1	C	4	80%										N	0	INACTIVE
OB1	C	5	55%										N	0	INACTIVE
OB1	D	6	70%										N	0	INACTIVE
OB1	E	7	60%										N	0	INACTIVE
OB1	F	8	55%										N	0	INACTIVE
OB1	G	9	45%										N	0	INACTIVE
OB1	H	10	85%										N	0	INACTIVE

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 02/17/2022 **Visit No:** 1 **Previous Visit Date:**

Arrival Time: 10:42 **Departure Time:**12:42

Observers: Stephanie James

Weather: Partly cloudy, misty, calm

Comments: Eleven stick nests observed, one active.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	Y	STD	1	0		1AS, STICK	
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	50%	N						
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 03/22/2022 **Visit No:** 2 **Previous Visit Date:** 02/17/2022

Arrival Time: 11:39 **Departure Time:** 13:48

Observers: Stephanie James

Weather: Partly cloudy, misty, calm

Comments: Eleven stick nests observed, eleven active.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	Y	STD	1	0		1AS, STICK	
OB2	B	2	45%	Y	STD	2	0		2AS	
OB2	C	3	70%	Y	STD	1	0		1AS	
OB2	D	4	65%	Y	STD	1	0		1AS	
OB2	B	5	60%	Y	STD	3	0		2AS, ASN	
OB2	E	6	60%	Y	STD	1	0		1AS, STICK	
OB2	F	7	60%	Y	STD	2	0		1AS, ASN	
OB2	F	8	50%	Y	STD	1	0		ASN	
OB2	G	9	55%	Y	STD	2	0		1AS, ASN	
OB2	G	10	50%	Y	STD	2	0		1AS, ASN, STICK	
OB2	H	11	60%	Y	STD	1	0		1AS, STICK	

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 04/28/2022 **Visit No:** 3 **Previous Visit Date:** 03/22/2022

Arrival Time: 10:02 **Departure Time:** 12:36

Observers: Stephanie James

Weather: Partly cloudy, misty, calm

Comments: Fouteen stick nests observed, all active.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	Y	STD	1	0		1AS	
OB2	B	2	45%	Y	STD	2	0		2AS	
OB2	C	3	70%	Y	STD	1	0		1AS	
OB2	D	4	65%	Y	STD	1	0		1AS	
OB2	B	5	60%	Y	STD	3	0		2AS	
OB2	E	6	60%	Y	INC	1	0		1AS	Possibly turning eggs in nest
OB2	F	7	60%	Y	STD	2	0		1AS, ASN	
OB2	F	8	50%	Y	STD	1	0		ASN	
OB2	G	9	55%	Y	STD	2	0		1AS, ASN	
OB2	G	10	50%	Y	STD	2	0		1AS, ASN	
OB2	H	11	60%	Y	STD	1	0		1AS, STICK	
OB2	I	12	55%	Y	STD	1	0		1AS, STICK	
OB2	J	13	45%	Y	STD	1	0		1AS	
OB2	K	14	60%	Y	STD	1	0		1AS	

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 06/01/2022 **Visit No:** 4 **Previous Visit Date:** 04/28/2022

Arrival Time: 14:33 **Departure Time:** 16:38

Observers: Stephanie James

Weather: Clear, dry, calm

Comments: Four BAEA juveniles visited most of the nests, in groups of two or four. No GBHE observed during survey.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N	FN	0	0			4 Juv BAEAs visited nest
OB2	B	2	45%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	C	3	70%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	D	4	65%	N	FN	0	0			4 Juv BAEAs visited nest
OB2	B	5	60%	N	FN	0	0			
OB2	E	6	60%	N	FN	0	0			4 Juv BAEAs visited nest
OB2	F	7	60%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	F	8	50%	N	FN	0	0			
OB2	G	9	55%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	G	10	50%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	H	11	60%	N	FN	0	0			
OB2	I	12	55%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	J	13	45%	N	FN	0	0			2 Juv BAEAs visited nest
OB2	K	14	60%	N	FN	0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 07/12/2022 **Visit No:** 5 **Previous Visit Date:** 06/01/2022

Arrival Time: 09:08 **Departure Time:** 11:08

Observers: Stephanie James

Weather: Clear, dry, calm

Comments: No GBHE observed during survey.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N	FN	0	0			
OB2	B	2	45%	N	FN	0	0			
OB2	C	3	70%	N	FN	0	0			
OB2	D	4	65%	N	FN	0	0			
OB2	B	5	60%	N	FN	0	0			
OB2	E	6	60%	N	FN	0	0			
OB2	F	7	60%	N	FN	0	0			
OB2	F	8	50%	N	FN	0	0			
OB2	G	9	55%	N	FN	0	0			
OB2	G	10	50%	N	FN	0	0			
OB2	H	11	60%	N	FN	0	0			
OB2	I	12	55%	N	FN	0	0			
OB2	J	13	45%	N	FN	0	0			
OB2	K	14	60%	N	FN	0	0			

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 08/15/2022 **Visit No:** 6 **Previous Visit Date:** 07/12/2022

Arrival Time: 16:15 **Departure Time:** 18:15

Observers: Stephanie James

Weather: Clear, dry, calm

Comments: No GBHE observed during survey.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N	FN	0	0			
OB2	B	2	45%	N	FN	0	0			
OB2	C	3	70%	N	FN	0	0			
OB2	D	4	65%	N	FN	0	0			
OB2	B	5	60%	N	FN	0	0			
OB2	E	6	60%	N	FN	0	0			
OB2	F	7	60%	N	FN	0	0			
OB2	F	8	50%	N	FN	0	0			
OB2	G	9	55%	N	FN	0	0			
OB2	G	10	50%	N	FN	0	0			
OB2	H	11	60%	N	FN	0	0			
OB2	I	12	55%	N	FN	0	0			
OB2	J	13	45%	N	FN	0	0			
OB2	K	14	60%	N	FN	0	0			

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 8/20/2022 **No. of Visits:** 6
Observers: S. James
Weather: Surveys conditions were calm and dry or with light pricipitation
GPS Coordinates: 44.6959, -123.2316
Comments: GBHE adults were observed nest building, potentially, incubating eggs during March, April. After June 1, no GBHE observed, 2-4 juvenile BAEA visited/raided most nests.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 02/17/2022			2nd Visit Date: 03/22/2022			3rd Visit Date: 04/28/2022					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB2	A	1	50%	STD	0		STD	0		STD	0				
OB2	B	2	45%				STD	0		STD	0				
OB2	C	3	70%				STD	0		STD	0				
OB2	D	4	65%				STD	0		STD	0				
OB2	B	5	60%				STD	0		STD	0				
OB2	E	6	60%				STD	0		INC	0				
OB2	F	7	60%				STD	0		STD	0				
OB2	F	8	50%				STD	0		STD	0				
OB2	G	9	55%				STD	0		STD	0				
OB2	G	10	50%				STD	0		STD	0				
OB2	H	11	60%				STD	0		STD	0				
OB2	I	12	55%							STD	0				New nest in Apr.
OB2	J	13	45%							STD	0				New nest in Apr.
OB2	E	14	60%							NV	0				New nest in Apr.

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 8/20/2022 **No. of Visits:** 6
Observers: S. James
Weather: Surveys conditions were calm and dry or with light pricipitation
GPS Coordinates: 44.6959, -123.2316
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 06/01/2022			5th Visit Date: 7/12/22			6th Visit Date: 08/15/2022			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB2	A	1	50%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	B	2	45%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	C	3	70%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	D	4	65%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	B	5	60%	FN	0		FN	0		FN	0		N		
OB2	E	6	60%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	F	7	60%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	F	8	50%	FN	0		FN	0		FN	0		N		
OB2	G	9	55%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	G	10	50%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	H	11	60%	FN	0		FN	0		FN	0		N		
OB2	I	12	55%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	J	13	45%	FN	0		FN	0		FN	0		N		Juv. BAEA
OB2	E	14	60%	FN	0		FN	0		FN	0		N		

Bald Eagle Observation Data Sheet - Coffin Butte Landfill

Date:	02/22/2024	**Visit No:**	1	**Most BAEA adults observed at one time:**	1
Observer(s):	S. McCord	**Arrival Time:**	07:45	**Most BAEA juveniles observed at one time:**	3
Weather:	Some fog, scattered clouds, calm,dry	**Departure Time:**	11:48	**Most GOEA adults observed at one time:**	1
Comments:	GOEA seen soaring over landfill. BAEA adult and 3 immature seen soaring over landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	04/04/2024	**Visit No:**	2	**Most BAEA adults observed at one time:**	1
Observer(s):	S. McCord	**Arrival Time:**	07:47	**Most BAEA juveniles observed at one time:**	2
Weather:	Dry, calm, overcast	**Departure Time:**	11:50	**Most GOEA adults observed at one time:**	0
Comments:	1 adult BAEA, 2 juvenile BAEA observed over the landfill			**Most GOEA juveniles observed at one time:**	0

Date:	04/19/2024	**Visit No:**	3	**Most BAEA adults observed at one time:**	10
Observer(s):	S. McCord	**Arrival Time:**	10:44	**Most BAEA juveniles observed at one time:**	7
Weather:	Breezy, clear, dry	**Departure Time:**	14:46	**Most GOEA adults observed at one time:**	0
Comments:	10 adults and 7 juveniles (17 soaring a thermal together!) BAEA			**Most GOEA juveniles observed at one time:**	0

Date:	05/30/2024	**Visit No:**	4	**Most BAEA adults observed at one time:**	4
Observer(s):	S. McCord	**Arrival Time:**	07:56	**Most BAEA juveniles observed at one time:**	4
Weather:	Breezy, scattered clouds, dry	**Departure Time:**	12:00	**Most GOEA adults observed at one time:**	0
Comments:	4 adults and 4 juvenile BAEA observed over the landfill			**Most GOEA juveniles observed at one time:**	0

Date:	06/28/2024	**Visit No:**	5	**Most BAEA adults observed at one time:**	2
Observer(s):	S. McCord	**Arrival Time:**	06:52	**Most BAEA juveniles observed at one time:**	2
Weather:	Breezy, scattered clouds, dry	**Departure Time:**	11:00	**Most GOEA adults observed at one time:**	0
Comments:	2 adults and 2 juvenile BAEA observed over the landfill			**Most GOEA juveniles observed at one time:**	0

Date:		**Visit No:**		**Most BAEA adults observed at one time:**	
Observer(s):		**Arrival Time:**		**Most BAEA juveniles observed at one time:**	
Weather:		**Departure Time:**		**Most GOEA adults observed at one time:**	
Comments:				**Most GOEA juveniles observed at one time:**	

Bald Eagle Observation Data Sheet - Coffin Butte Landfill

Date:	03/01/2023	**Visit No:**	1	**Most BAEA adults observed at one time:**	6
Observer(s):	S. James	**Arrival Time:**	08:25	**Most BAEA juveniles observed at one time:**	5
Weather:	Partly cloudy, dry, calm	**Departure Time:**	12:30	**Most GOEA adults observed at one time:**	0
Comments:	BAEA adults and juveniles were seen soaring, perching, foraging, and commingling above and near the landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	03/31/2023	**Visit No:**	2	**Most BAEA adults observed at one time:**	3
Observer(s):	S. McCord	**Arrival Time:**	08:32	**Most BAEA juveniles observed at one time:**	11
Weather:	Overcast,drizzlingrain,calm	**Departure Time:**	12:37	**Most GOEA adults observed at one time:**	0
Comments:	AEA adults and juveniles were seen soaring, perching, foraging, and commingling above and near the landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	05/05/2023	**Visit No:**	3	**Most BAEA adults observed at one time:**	2
Observer(s):	S. McCord	**Arrival Time:**	08:20	**Most BAEA juveniles observed at one time:**	3
Weather:	Breezy, scattered clouds, dry	**Departure Time:**	13:05	**Most GOEA adults observed at one time:**	0
Comments:	Surprisingly few raptors visible this morning. Eagles soaring among some turkey vultures. May have been more on other side of landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	05/19/2023	**Visit No:**	4	**Most BAEA adults observed at one time:**	3
Observer(s):	S. McCord	**Arrival Time:**	08:13	**Most BAEA juveniles observed at one time:**	5
Weather:	Breezy, scattered clouds, dry	**Departure Time:**	12:20	**Most GOEA adults observed at one time:**	0
Comments:	One adult BAEA perched in cottonwood rookery stand before flying back to dump. Eagles soaring and foraging above and near landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	06/16/2023	**Visit No:**	5	**Most BAEA adults observed at one time:**	0
Observer(s):	S. McCord	**Arrival Time:**	08:47	**Most BAEA juveniles observed at one time:**	0
Weather:	Breezy, clear, dry	**Departure Time:**	12:49	**Most GOEA adults observed at one time:**	0
Comments:	No bald eagles observed. Vultures and corvids seen around landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	07/21/2023	**Visit No:**	6	**Most BAEA adults observed at one time:**	2
Observer(s):	S. McCord	**Arrival Time:**	08:35	**Most BAEA juveniles observed at one time:**	0
Weather:	Clear, calm, dry	**Departure Time:**	12:40	**Most GOEA adults observed at one time:**	0
Comments:	2 adult bald eagles seen near landfill. No juveniles oberved. Vultures and corvids present.			**Most GOEA juveniles observed at one time:**	0

Bald Eagle Observation Data Sheet - Coffin Butte Landfill

Date:	02/22/2024	**Visit No:**	1	**Most BAEA adults observed at one time:**	1
Observer(s):	S. McCord	**Arrival Time:**	07:45	**Most BAEA juveniles observed at one time:**	3
Weather:	Some fog, scattered clouds, calm,dry	**Departure Time:**	11:48	**Most GOEA adults observed at one time:**	1
Comments:	GOEA seen soaring over landfill. BAEA adult and 3 immature seen soaring over landfill.			**Most GOEA juveniles observed at one time:**	0

Date:	04/04/2024	**Visit No:**	2	**Most BAEA adults observed at one time:**	1
Observer(s):	S. McCord	**Arrival Time:**	07:47	**Most BAEA juveniles observed at one time:**	2
Weather:	Dry, calm, overcast	**Departure Time:**	11:50	**Most GOEA adults observed at one time:**	0
Comments:	1 adult BAEA, 2 juvenile BAEA observed over the landfill			**Most GOEA juveniles observed at one time:**	0

Date:	04/19/2024	**Visit No:**	3	**Most BAEA adults observed at one time:**	10
Observer(s):	S. McCord	**Arrival Time:**	10:44	**Most BAEA juveniles observed at one time:**	7
Weather:	Breezy, clear, dry	**Departure Time:**	14:46	**Most GOEA adults observed at one time:**	0
Comments:	10 adults and 7 juveniles (17 soaring a thermal together!) BAEA			**Most GOEA juveniles observed at one time:**	0

Date:	05/30/2024	**Visit No:**	4	**Most BAEA adults observed at one time:**	4
Observer(s):	S. McCord	**Arrival Time:**	07:56	**Most BAEA juveniles observed at one time:**	4
Weather:	Breezy, scattered clouds, dry	**Departure Time:**	12:00	**Most GOEA adults observed at one time:**	0
Comments:	4 adults and 4 juvenile BAEA observed over the landfill			**Most GOEA juveniles observed at one time:**	0

Date:	06/28/2024	**Visit No:**	5	**Most BAEA adults observed at one time:**	2
Observer(s):	S. McCord	**Arrival Time:**	06:52	**Most BAEA juveniles observed at one time:**	2
Weather:	Breezy, scattered clouds, dry	**Departure Time:**	11:00	**Most GOEA adults observed at one time:**	0
Comments:	2 adults and 2 juvenile BAEA observed over the landfill			**Most GOEA juveniles observed at one time:**	0

Date:		**Visit No:**		**Most BAEA adults observed at one time:**	
Observer(s):		**Arrival Time:**		**Most BAEA juveniles observed at one time:**	
Weather:		**Departure Time:**		**Most GOEA adults observed at one time:**	
Comments:				**Most GOEA juveniles observed at one time:**	

Photo credit: S. James

Addendum to the Final 2024 Report:

Wildlife Habitat Assessment and Surveys

for the Coffin Butte Landfill Expansion Project

Submitted to:

Jeff Shepherd, P.E.
Civil & Environmental Consultants, Inc.

Submitted by:
Turnstone Environmental Consultants, Inc.
PO Box 83362
Portland, OR 97283

Submitted:

August 6, 2024

Contents

Introduction 1
Great Blue Heron Rookery Monitoring 1
Year 3 Surveys (2024) 2
Conclusion 3
Appendix A: Field Forms 4

List of Tables and Figures

Table 1. 2024 Great Blue Heron Survey Results for the Western Rookery (#2683) 2
Table 2. 2024 Great Blue Heron Survey Results for the Eastern Rookery (#2716) 2

Figure 1. Great Blue Heron Rookeries in the Project Area and Observation Points 1

INTRODUCTION

Civil & Environmental Consultants, Inc. ("CEC") contracted Turnstone Environmental Consultants, Inc. ("Turnstone") to perform a wildlife study for the Coffin Butte Landfill Expansion Project Area ("Project Area"). This document is an addendum to the *Final 2024 Report: Wildlife Habitat Assessment and Surveys for the Coffin Butte Landfill Expansion Project* (Turnstone, 2024).

Great Blue Heron Rookery Monitoring

Turnstone biologists are monitoring two great blue heron rookeries located within the Coffin Butte Landfill Expansion Project Area (Figure 1). In 2022 and 2023, Turnstone biologists conducted six reproductive productivity surveys each year for nesting great blue herons in the two known rookery locations. In 2024, at the time the Final 2024 Report was finalized (July 12, 2024), Turnstone biologists had completed five out of six planned reproductive surveys for the great blue heron reproductive monitoring. The survey forms for the final sixth visit of 2024 great blue heron rookery monitoring are in Appendix A.

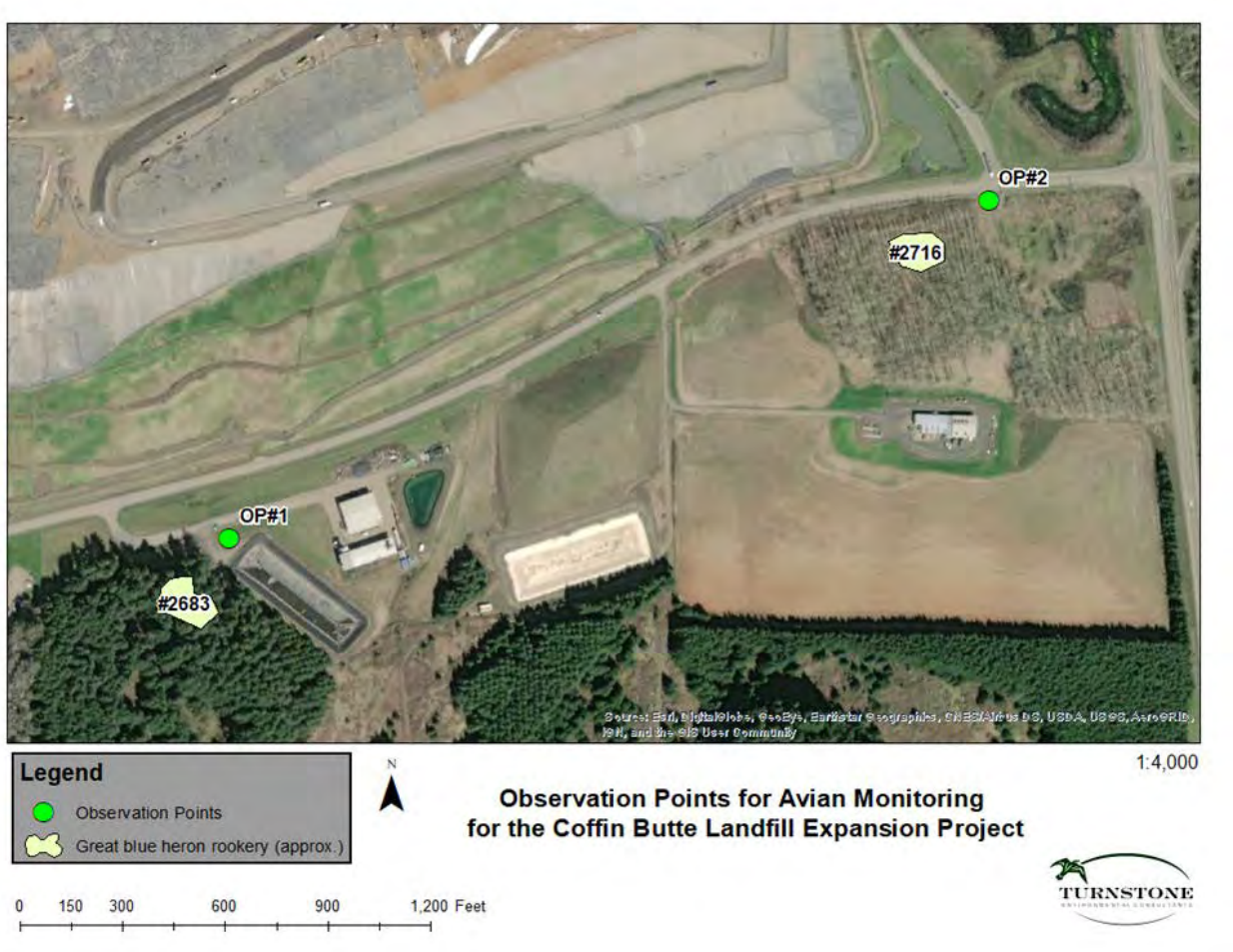


Figure 1. Great Blue Heron Rookeries in the Project Area and Observation Points

Year 3 Surveys (2024)

At the time of the finalization of this report (July 12, 2024), Turnstone biologists had conducted five of the six required daytime surveys at each rookery site from February 22 through June 28, 2024 (Turnstone, 2024). The final visit was conducted on July 18, 2024, and Turnstone biologists did not observe any great blue herons using the stick nests for nesting during any of the six visits at the two observation points. All surveys were conducted during mild weather conditions.

Table 1. 2024 Great Blue Heron Survey Results for the Western Rookery (#2683)

Observation Period	Survey Date	Surveyor	Results of Reproductive Monitoring	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	2/22	Sarah McCord	10 inactive nests	None
3/15 to 4/15	4/4	Sarah McCord	10 inactive nests	None
4/15 to 5/15	4/19	Sarah McCord	10 inactive nests	None
5/15 to 6/15	5/30	Sarah McCord	10 inactive nests	None
6/15 to 7/15	6/28	Sarah McCord	10 inactive nests	None
7/15 to 8/15	7/18	Sarah McCord	10 inactive nests	None

Table 2. 2024 Great Blue Heron Survey Results for the Eastern Rookery (#2716)

Observation Period	Survey Date	Surveyor	Results	
			Great Blue Heron	Other Birds Observed in Nests
2/15 to 3/15	2/22	Sarah McCord	13 inactive nests	None
3/15 to 4/15	4/4	Sarah McCord	13 inactive nests	None
4/15 to 5/15	4/19	Sarah McCord	13 inactive nests	None
5/15 to 6/15	5/30	Sarah McCord	13 inactive nests	None
6/15 to 7/15	6/28	Sarah McCord	13 inactive nests	None
7/15 to 8/15	7/18	Sarah McCord	13 inactive nests	None

Conclusion

Western Rookery (#2683)

During consecutive three years of protocol surveys (2022-2024), Turnstone biologists observed no active nesting by great blue herons within the western rookery (#2683). Three bird species were recorded visiting the stick nests during that time, including the common raven (*Corvus corax*), red-tailed hawk (*Buteo jamaicensis*), and bald eagle. A pair of red-tailed hawks were present during each survey, acting defensively, and are likely nesting in the in an abandoned stick nest the rookery in 2023. The western rookery is likely abandoned by great blue herons; therefore, the western rookery (#2683) is an abandoned Great Blue Heron Resource Site.

Eastern Rookery (#2716)

During Year 1 (2022) surveys, Turnstone biologists observed active nesting by great blue herons within the eastern rookery (#2716) during the first three survey periods; however, in early June the colony had failed, and juvenile bald eagles were observed visiting the majority of the nests.

A red-tailed hawk pair was observed nesting in an abandoned stick nest in the rookery in Year 2 (2023). No great blue herons were observed in the eastern rookery (#2716) during any of the six 2023 reproductive productivity surveys; therefore, the rookery is considered inactive for 2023.

As with the western rookery, the eastern rookery is likely also abandoned by great blue herons. The eastern rookery (#2716) is considered inactive for 2024. Turnstone recommends continuing surveys in 2025 to determine if the eastern rookery is inactive for a third consecutive year, which would deem this Great Blue Heron Resource Site officially abandoned.

APPENDIX A: FIELD FORMS

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - West **Colony Code:** #2683

Date: 07/18/2024 **Visit No:** 5 **Previous Visit Date:** 05/30/2024

Arrival Time: 07:22 **Departure Time:** 09:22

Observers: Sarah McCord

Weather: Breezy, scattered clouds, dry

Comments: No herons observed.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB1	A	1	70%	N		0	0			
OB1	A	2	55%	N		0	0			
OB1	B	3	65%	N		0	0			
OB1	C	4	80%	N		0	0			
OB1	C	5	55%	N		0	0			
OB1	D	6	70%	N		0	0			
OB1	E	7	60%	N		0	0			
OB1	F	8	55%	N		0	0			
OB1	G	9	45%	N		0	0			
OB1	H	10	85%	N		0	0			

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 8/6/2024 **No. of Visits:** 6
Observers: S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6988, -123.2235
Comments: No GBHE observed in the rookery.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 02/22/2024			2nd Visit Date: 04/04/2024			3rd Visit Date: 04/19/2024					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB1	A	1	70%												INACTIVE
OB1	A	2	55%												INACTIVE
OB1	B	3	65%												INACTIVE
OB1	C	4	80%												INACTIVE
OB1	C	5	55%												INACTIVE
OB1	D	6	70%												INACTIVE
OB1	E	7	60%												INACTIVE
OB1	F	8	55%												INACTIVE
OB1	G	9	45%												INACTIVE
OB1	H	10	85%												INACTIVE

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - West **Colony Code:** #2683
Date: 8/6/2024 **No. of Visits:** 6
Observers: S. McCord
Weather: Surveys conditions were calm and dry or with light precipitation
GPS Coordinates: 44.6988, -123.2235
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 05/30/2024			5th Visit Date: 6/28/24			6th Visit Date: 07/18/2024			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB1	A	1	70%										N	0	INACTIVE
OB1	A	2	55%										N	0	INACTIVE
OB1	B	3	65%										N	0	INACTIVE
OB1	C	4	80%										N	0	INACTIVE
OB1	C	5	55%										N	0	INACTIVE
OB1	D	6	70%										N	0	INACTIVE
OB1	E	7	60%										N	0	INACTIVE
OB1	F	8	55%										N	0	INACTIVE
OB1	G	9	45%										N	0	INACTIVE
OB1	H	10	85%										N	0	INACTIVE

Great Blue Heron Data Sheet - Colony Reproductive Productivity

Colony Name: Coffin Butte - East **Colony Code:** #2716

Date: 07/18/2024 **Visit No:** 5 **Previous Visit Date:** 06/28/2024

Arrival Time: 09:29 **Departure Time:** 11:29

Observers: Sarah McCord

Weather: Scattered clouds, dry, breezy

Comments: No herons observed.

Nest Status Codes	Nest Activity Code eg's
STD - adult standing	**1AS/2AS -** 1 or 2 adult stand
INC - incubation	**ASN -** adult stand near
YNG - young in nest	**EX -** adult exchange
NV - birds not visible	**COP -** copulatory behaviour
FN - failed nest	**STICK** - stick brought to nest

Young Age Codes	
1 - 1 to 2 wks old	**3 -** 4 to 6 wks old
2 - 2 to 4 wks old	**4 -** 6 to 8 wks old

Observer Location	Tree No.	Nest No.	Nest Location	Nest Active? (Y/N)	Nest Status	No. Adults	No. Young	Age of Young	Nest Activities	Comments
OB2	A	1	50%	N						
OB2	B	2	45%	N						
OB2	C	3	70%	N						
OB2	D	4	65%	N						
OB2	B	5	60%	N						
OB2	E	6	60%	N						
OB2	F	7	60%	N						
OB2	F	8	0%	N						Nest missing from tree
OB2	G	9	55%	N						
OB2	G	10	50%	N						
OB2	H	11	60%	N						
OB2	I	12	55%	N						
OB2	J	13	45%	N						
OB2	K	14	60%	N						

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 8/6/2024 **No. of Visits:** 6
Observers: S. McCord
Weather: Surveys conditions were dry and calm or breezy
GPS Coordinates: 44.6959, -123.2316
Comments: No GBHE observed in the stand.. STJA, RTHA and BAEA were observed in the stand.

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				1st Visit Date: 02/22/2024			2nd Visit Date: 03/31/2023			3rd Visit Date: 04/19/2024					Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young			
OB2	A	1	50%												INACTIVE
OB2	B	2	45%												INACTIVE
OB2	C	3	70%												INACTIVE
OB2	D	4	65%												INACTIVE
OB2	B	5	60%												INACTIVE
OB2	E	6	60%												INACTIVE
OB2	F	7	60%												INACTIVE
OB2	F	8	0%												Nest missing
OB2	G	9	55%												INACTIVE
OB2	G	10	50%												INACTIVE
OB2	H	11	60%												INACTIVE
OB2	I	12	55%												INACTIVE
OB2	J	13	45%												INACTIVE
OB2	E	14	60%												INACTIVE.

Great Blue Heron - Coffin Butte Landfill Annual Colony Visits Summary

Colony Name: Coffin Butte - East **Colony Code:** #2716
Date: 8/6/2024 **No. of Visits:** 6
Observers: S. McCord
Weather: Surveys conditions were dry and calm or breezy
GPS Coordinates: 44.6959, -123.2316
Comments:

No. Data Sheets Used in Season:	
	Summary
	Tree Mapping
	Disturbance
X	Reproductive Productivity
	Arrival/Departure
	Colony Floor Search
	Climbing

Individual Nest Information				4th Visit Date: 05/30/2024			5th Visit Date: 6/28/24			6th Visit Date: 07/18/2024			Nest Success Summary		Comments
From Where	Tree No.	Nest No.	Nest Location	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Nest Status	No. Young	Age of Young	Y/N	No. Fledged	
OB2	A	1	50%										N	0	INACTIVE
OB2	B	2	45%										N	0	INACTIVE
OB2	C	3	70%										N	0	INACTIVE
OB2	D	4	65%										N	0	INACTIVE
OB2	B	5	60%										N	0	INACTIVE
OB2	E	6	60%										N	0	INACTIVE
OB2	F	7	60%										N	0	Nest missing
OB2	F	8	0%										N	0	INACTIVE
OB2	G	9	55%										N	0	INACTIVE
OB2	G	10	50%										N	0	INACTIVE
OB2	H	11	60%										N	0	INACTIVE
OB2	I	12	55%										N	0	INACTIVE
OB2	J	13	45%										N	0	INACTIVE
OB2	E	14	60%										N	0	INACTIVE

EXHIBIT 5
PHASE II GEOTECHNICAL EXPLORATION REPORT

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

PHASE II GEOTECHNICAL EXPLORATION REPORT
COFFIN BUTTE LANDFILL SOUTH EXPANSION AREA
28972 COFFIN BUTTE ROAD
CORVALLIS, OREGON

July 15, 2024

Wallace Group Project No. 21129 (1)

Copyright 2024 Wallace Group, Inc.

ONLY CIVIL AND ENVIRONMENTAL CONSULTANTS, INC., AND ITS DESIGNATED REPRESENTATIVES MAY USE THIS DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS PREPARED.

A Report Prepared For:

Civil and Environmental Consultants, Inc.
c/o Mr. Jeff Shepherd, P.E.
4045 NW 64th Street
Oklahoma City, Oklahoma 73116

PHASE II GEOTECHNICAL EXPLORATION REPORT
COFFIN BUTTE LANDFILL SOUTH EXPANSION AREA
28972 COFFIN BUTTE ROAD
CORVALLIS, OREGON

Wallace Group Project Number 21129 (1)

Prepared By:

Lisa M. Splitter, P.E., G.E.
Senior Geotechnical Engineer

Adam Larson, P.E.
Project Geotechnical Engineer

The Wallace Group, Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

EXECUTIVE SUMMARY

The Wallace Group, Inc., (Wallace Group) completed geotechnical-engineering explorations for the proposed Coffin Butte Landfill South Expansion Area, located in Corvallis, Oregon (**Figure 1**, *Vicinity Map*). A figure with exploration locations is shown on **Figure 2**, *Exploration Location Map*. Wallace Group performed the geotechnical explorations in two phases, beginning in September 2021. Before a Phase I geotechnical exploration report was published, Wallace Group performed additional subsurface explorations, beginning in November 2022. Thus, this exploration report is considered the Phase II geotechnical exploration report.

Coffin Butte Landfill (CBLF) is an operating municipal solid waste disposal facility owned and operated by Valley Landfills, Inc. Draft development plans were provided by Civil and Environmental Consultants, Inc. (CEC), dated April 2022. Based on the draft development plans, a new landfill cell is planned south of the existing CBLF cells and Coffin Butte Road. Construction for the expansion area will include cuts of up to 155 feet into the northern flank of Tampico Ridge. To construct the planned access roads, up to 50 feet of structural fill will be placed within the valley in the south-central portion of the site and up to 10 feet of structural fill will be placed northeast of the new cell. Two new leachate ponds will be constructed east of the new cell and cuts for pond construction will be up to 50 feet deep. Additional improvements will include the construction of a new landfill administration office, asphalt-paved parking lot, and access roads.

Subsurface explorations generally encountered 6- to 25-feet of fine-grained alluvium (Willamette Silt) underlain by weathered basalt and basalt in the lower elevations. Competent basalt was encountered in the lower elevations at depths ranging between 22- and 65-feet below ground surface (bgs). The higher elevations of the site are underlain by fine-grained to coarse-grained colluvium and volcanic saprolites, which are generally coarser with increasing elevation. These soils are underlain by brecciated and altered basalt bedrock, with the depth to rock generally decreasing with increased elevation. On the western hillside of Tampico Ridge, basalt was encountered at depths ranging between 10- and 25-feet bgs. On the eastern hillslope, surface soil was generally weaker than the western hillslope and basalt was encountered at depths ranging between 19- and 45-feet bgs. In the valley formed between the two hillsides, the depth to basalt ranged from 21- to 23-feet bgs.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Based on this exploration, the sites appear suitable for the expected development from a geotechnical perspective, provided the recommendations contained in this report are incorporated into design and construction.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 GENERAL 1
1.2 PROJECT DESCRIPTION 1
1.3 PURPOSE AND SCOPE OF SERVICES 1

2.0 FIELD EXPLORATION 3

2.1 SUBSURFACE EXPLORATION 3

3.0 LABORATORY TESTING 4

4.0 EXISTING SITE CONDITIONS 5

4.1 SURFACE CONDITIONS 5
4.2 SUBSURFACE CONDITIONS 5
4.2.1 Willamette Silt 5
4.2.2 Low Elevation Alluvium 6
4.2.3 Volcanic Saprolite and Colluvium 6
4.2.4 Granular Weathered Basalt 7
4.2.5 Brecciated and Altered Basalt Bedrock 7
4.3 GROUNDWATER 8

5.0 SEISMIC CONSIDERATIONS 9

5.1 REGIONAL AND SITE GEOLOGY 9
5.2 REGIONAL SEISMICITY 9
5.2.1 Subduction Zone Sources 11
5.2.2 Crustal Sources 11
5.3 EARTHQUAKE GROUND MOTIONS 12
5.3.1 Ground Response Spectra 12
5.3.2 Peak Ground Acceleration 12
5.4 SEISMIC HAZARDS SUMMARY 13

6.0 CONCLUSIONS AND RECOMMENDATIONS 15

6.1 ROADWAY EMBANKMENT FILLS 15
6.1.1 Roadway Embankment Site Preparation 15
6.1.2 Roadway Embankment Structural Fill and Placement 16

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

6.2 LANDFILL CELL SITE PREPARATION 19
6.3 EXCAVATIONS 19
6.4.1 Slope Stability Model Soil and Rock Design Values 20
6.4.2 Eastern and Western Hillside Excavations 22
6.4.3 Leachate Pond Excavations 23
6.5 SETTLEMENT ESTIMATES 25
7.0 ADDITIONAL SERVICES 26
7.1 DESIGN AND CONSTRUCTION PERIOD ENGINEERING SERVICES 26
7.2 CONSTRUCTION INSPECTION AND TESTING 26
8.0 LIMITATIONS 27
9.0 REFERENCES 28
10.0 PROFESSIONAL AUTHENTICITY 29

TABLES

Table 6.1.2, Engineered Fill Specifications 18
Table 6.4.1-1, Assumed Engineering Properties West Slope 21
Table 6.4.1-2, Assumed Engineering Properties East Slope 21
Table 6.4.1-3, Assumed Engineering Properties South Central Embankment 21
Table 6.4.1-4, Assumed Short-Term Engineering Properties Leachate Pond 22
Table 6.4.1-5, Assumed Long-Term Engineering Properties Leachate Pond 22
Table 6.4.3-1, Modeling Factor of Safety Summary 24

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

FIGURES

1. Vicinity Map
2. Exploration Location Map
3. Surface Geology Map
4. Cross-Section Location Map
5. Cross-Section A-A’
6. Cross-Section B-B’
7. Cross-Section C-C’
8. Cross-Section D-D’
9. Cross-Section E-E’
10. Cross-Section F-F’
11. Cross-Section G-G’
12. Excavation Plan
13. Settlement Estimates

APPENDICES

A. Field Exploration Summary
B. Laboratory Test Results
C. Seismic Design
D. Exploration Photos
E. Landfill Cell Excavation Recommendations
F. Leachate Pond Slope Stability Analyses

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

1.0 INTRODUCTION

1.1 GENERAL

The Wallace Group performed geotechnical explorations in two phases, beginning in September 2021. Before a Phase I geotechnical exploration report was published, Wallace Group performed additional subsurface explorations, beginning in November 2022. Thus, this exploration report is considered the Phase II geotechnical exploration report.

The Wallace Group, Inc., (Wallace Group) completed a geotechnical-engineering exploration for the proposed Coffin Butte Landfill (CBLF) South Expansion Area, located at 28972 Coffin Butte Road, Corvallis, Oregon (**Figure 1**, *Vicinity Map*). CBLF is located approximately 11 miles north of downtown Corvallis. Figures with exploration locations are shown on **Figures 2a and 2b**, *Exploration Location Map*.

1.2 PROJECT DESCRIPTION

CBLF is an operating municipal solid waste disposal facility owned and operated by Valley Landfills, Inc. Development areas for the south expansion area include the following tax lots:

- Tax Lot 104180001101: 3.89-acres
- Tax Lot 104180001104: 3.80-acres
- Tax Lot 104180001107: 59.2-acres
- Tax Lot 104180001200: 82.7-acres

Draft development plans were provided by Civil and Environmental Consultants, Inc. (CEC), dated April 2022. Based on the draft development plans, a new landfill cell is proposed south of the existing CBLF cells and Coffin Butte Road. Construction for the expansion area will include cuts of up to 160-feet into the northern flank of Tampico Ridge. To facilitate the construction of new access roads, up to 50 feet of structural fill will be placed and compacted within the valley in the south-central portion of the site and up to 10 feet of structural fill will be placed northeast of the new cell. Two new leachate ponds will be constructed east of the proposed cell and cuts for pond construction will be up to 50-feet deep. Additional improvements will include the construction of a new landfill administration office, asphalt-paved parking lot, and access roads.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this exploration was to evaluate general subsurface conditions within the potential development areas and provide geotechnical design recommendations which will be

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

incorporated into project documents for Oregon DEQ-approval prior to the start of construction. The geotechnical exploration and site characterization work performed by Wallace Group was conducted in general accordance with applicable sections of Oregon DEQ's Solid Waste Landfill Guidance and included the following tasks:

- Reviewed and evaluated available geologic, hydrogeologic, and geotechnical data for the Coffin Butte Landfill site and surrounding Benton County area.
- Notified the One-Call Utility Notification Service to identify any public or private utilities near the proposed exploration locations.
- Drilled nineteen (19) borings within the proposed landfill expansion and proposed leachate pond areas using a track-mounted drilling rig equipped with mud-rotary drilling/rock coring equipment.
- Excavated fifteen (15) backhoe test pits within the proposed landfill expansion and leachate pond areas.
- Performed nine (9) cone penetration tests (CPTs) and advanced geoprobes adjacent to the CPT locations within the proposed landfill expansion and leachate pond areas.
- Converted two borings into temporary piezometers to measure depth to groundwater.
- Supervised, sampled, and logged test pits and borings. Soil samples were retrieved, sealed, and transported to the Wallace Group's A2LA-accredited geotechnical laboratory for further evaluation and testing or distribution to other geotechnical laboratories for specialized geotechnical testing.
- Performed geotechnical laboratory testing to measure and confirm the engineering and index properties of the soil and rock materials encountered.
- Performed geotechnical engineering analyses and provided recommendations and design criteria for excavating into soil and rock, maintaining cell and pond slope stability, designing foundations for the planned office building, and performing the planned earthwork, including recommendations for fill placement and compaction, and site drainage.
- Prepared this geotechnical exploration report summarizing our findings, conclusions, and recommendations.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

2.0 FIELD EXPLORATION

2.1 SUBSURFACE EXPLORATION

Subsurface conditions were explored by advancing nineteen (19) borings (designated BH-01 through BH-19), fifteen (15) test pits (designated TP-01 through TP-05, TP-08 through TP-13, and TP-15 through TP-18), and nine (9) cone penetration tests (CPTs) with geoprobe sampling (designated GP/CPT-01 through GP/CPT-09). TP-06, TP-07, and TP-14 were not excavated due to conflicts with utilities and access or equipment failure.

Borings BH-01 through BH-14 were drilled between September 7 and 28, 2021 by Western States Soil Conservation Inc. of Hubbard, Oregon, and BH-15 through BH-19 were drilled between November 8 through 23, 2022 by HazTech Drilling of Nampa, Idaho. Test pits were excavated between August 16 and September 28, 2021, using a CAT 310 excavator operated by RL Reimers Excavation of Albany, Oregon. CPTs and geoprobes were advanced by Oregon Geotechnical Explorations of Salem, Oregon between September 21 through November 8, 2022. A Wallace Group geotechnical professional logged the test pits and borings, supervised the CPTs and geoprobe work, performed dynamic-cone penetrometer (DCP) testing at selected test pit locations, and visually classified the soil and rock materials encountered at the exploration locations. The exploration logs, located in **Appendix A**, describe the materials encountered at each location explored. The soil and bedrock types between explorations are anticipated to be similar; however, variation should be expected. The stratigraphic contacts presented on the exploration logs represent the approximate boundaries between various soil and bedrock types. The approximate locations of the exploration locations are shown in **Figures 2a and 2b**.

A more complete description of the sampling techniques and soil-classification terminology is presented in **Appendix A**.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

3.0 LABORATORY TESTING

Soil samples were transported to the Wallace Group geotechnical laboratory in Bend, Oregon, where they were visually classified, and either prepared for in-house laboratory testing or transported to Northwest Testing, Inc. of Wilsonville, Oregon, or Cooper Testing Laboratory of Mountain View, California for specialized geotechnical laboratory testing. Laboratory tests were conducted in general accordance with standard procedures and included the following tests:

- Moisture Content, ASTM D2216;
- Gradation Analyses, ASTM C117 / C136 and D422;
- Classification of Soil for Engineering Purposes, ASTM D2487;
- Atterberg Limits, ASTM D4318;
- Consolidation, ASTM D2435;
- UU Triaxial, ASTM D2850;
- CD Triaxial, ASTM D4767;
- CD Direct Shear, ASTM D3080;
- Flexible Wall Permeability, ASTM D5084 Method C; and
- Unconfined Point Load Testing, ASTM D5731.

Laboratory test results are included in **Appendix B**.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

4.0 EXISTING SITE CONDITIONS

4.1 SURFACE CONDITIONS

The subject property includes the development of an approximate 42-acre area located south of the active CBLF. The CBLF south expansion area includes the northern flank of Tampico Ridge to the south extending to Coffin Butte Road on the north. Tampico Ridge includes hilltop peaks with elevations of 510 feet mean sea level (msl) on the west and 570 feet on the east. A valley is present between the two hilltop peaks in the south-central portion of the proposed landfill cell. The development area slopes down towards the south near Coffin Butte Road where elevations range from 260 feet msl on the east to 290 feet msl on the west. Groundcover consists of dense thickets of blackberry, poison oak, and coniferous trees in the steep upland areas. The lower topography areas of the site, near existing landfill infrastructure, are generally cleared and planted with agricultural vegetation and/or grasses.

4.2 SUBSURFACE CONDITIONS

Subsurface explorations generally encountered soil over weathered bedrock which becomes competent bedrock at deeper depths. More specifically, there are differences in the types of soil and depths to bedrock at upper and lower regions of the project area.

Subsurface conditions at lower elevations generally consist of fine-grained alluvium (Willamette Silt) and is primarily underlain by weathered basalt (bedrock) which becomes more competent at deeper depths. At higher elevations of the project area, the surficial soils primarily consist of fine-grained to coarse-grained colluvium and volcanic saprolites, which are generally coarser at higher elevations. These soils are primarily underlain by weathered basalt and more competent brecciated and altered basalt bedrock at deeper depths. The colluvium/saprolite soil cover generally becomes thinner at higher elevations. On the western hillside of Tampico Ridge, competent basalt was encountered at depths ranging between 10 and 25 feet bgs. On the eastern hillslope, surface soils were generally weaker and thicker than the western hillslope and competent basalt was encountered at depths ranging between 19 and 45 feet bgs. At lower elevations in the valley, the depth to competent basalt ranged from 22 and 65 feet bgs.

4.2.1 Willamette Silt

Willamette Silt was encountered in the northeast portion of the project area at BH-2, BH-14, GP/CPT-01, and GP/CPT-02 and extended from the surface to depths ranging between 17 to 25 feet below ground surface (bgs). Gradation and index tests indicate the native soil generally classifies as sandy -silt (ML) and sandy-fat-clay (CH), according to the Unified Soil Classification

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

System (USCS). The sandy silt and sandy clay were slightly moist to wet and brown, dark brown, tan, dark greenish gray, and gray with rounded to subrounded granular particles. Based on standard penetration testing, the Willamette Silt was generally medium stiff to stiff.

Where tested, the Willamette Silt samples contained 62 to 98 percent clay- and silt-sized particles and had moisture contents ranging between 30 to 36 percent. Atterberg limits testing indicates the soil is highly expansive with plasticity indices ranging from 31 to 39. Consolidated undrained (CU) triaxial testing indicates a total cohesion value of 1,000 pounds per square foot (psf) and total friction angle (phi) of 8.8 degrees at confining pressures ranging between about 2.9 and 3.7 kips per square foot (ksf). In the areas explored, the Willamette Silt was found to be underlain by weathered-in-place basalt.

4.2.2 Low Elevation Alluvium

Alluvial soil was encountered in GP/CPT-09 at the northwest portion of the development area, near the proposed new office building site. The alluvial soil layer extended from the surface to a depth of 6.5 feet bgs. Gradation and index tests indicate the native soil generally classifies as clay (CH), according to the USCS. The clay was moist and brown and dark gray in color. Based on CPT testing, the alluvial soil was generally stiff to very stiff.

Where tested, the clay contained 93 percent clay- and silt-sized particles and had a moisture content of 28 percent. Atterberg limits testing indicates the soil exhibited very high expansion potential and had plasticity index of 53. Consolidation testing on the alluvial fine-grained material indicates that it is slightly over-consolidated with over-consolidation ratios (OCRs) ranging between 2.3 and 8.4. In the areas explored, the alluvial soil was underlain by weathered-in-place basalt.

4.2.3 Volcanic Saprolite and Colluvium

Volcanic saprolite (in-place soil derived from the chemical weathering of rock) and colluvium (unconsolidated material derived from rain and gravity-driven soil movement) mantles the weathered basalt and competent basalt on the Tampico Ridge hillside. Volcanic saprolite and colluvium were encountered extending from the surface to depths ranging between 7 to 45 feet bgs. Colluvium was encountered in isolated areas and the soil mantle primarily consists of volcanic saprolite. Localized areas of thicker colluvial deposits may be encountered during construction.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Gradation and index tests indicate the soil generally classifies as silty-sand-with-gravel (SM), silty-sand (SM), clayey-sand (SC), sandy-silt-with-gravel (ML), sandy-silt (MH), and sandy-clay (CL), according to the field classifications and USCS. The silty-sand was moist to wet, tan, black, brown, orange, red, and gray, fine to coarse grained with subangular to subrounded particles. Based on SPT testing, the volcanic soil was generally found to be medium dense to very dense and very soft to hard. In general, the volcanic soil and colluvium are weaker and less dense on the eastern knob and northeastern portion of the site than the western knob and northwestern portion of the site.

Where tested, the clay contained 22.7 to 65.9 percent clay- and silt-sized particles and had moisture contents of 33.5 to 75.6 percent. Atterberg limits testing indicates the soil exhibits very high expansion potential with plasticity indices ranging from 19 to 41. In the areas explored, the alluvial soil was underlain by weathered-in-place basalt.

4.2.4 Granular Weathered Basalt

Willamette Silt, alluvial soil, volcanic saprolite, and colluvial soil were underlain by granular weathered basalt bedrock at depths ranging between 7 to 45 feet bgs. Gradation and field classifications indicate the weathered basalt generally classifies as silty -sand-with-gravel (SM), silty-sand (SM), silty-gravel-with-sand (GM), sandy-silt (ML), and sandy-clay (CL). The granular weathered basalt was moist to wet, gray, red, orange, and brown, fine to coarse grained, angular to subangular, and contains cobbles in some areas. Based on SPT testing, the weathered basalt is generally loose to very dense or medium stiff to hard.

Where tested, the weathered basalt contains 13.2 to 48.2 percent clay- and silt-sized particles with moisture contents ranging from 4.1 to 66.3 percent. Atterberg limits testing indicates the weathered rock exhibited moderate expansion potential with a plasticity index of 21. Where exploration locations were advanced through the granular weathered rock, it was underlain by basalt bedrock.

4.2.5 Brecciated and Altered Basalt Bedrock

Competent basalt bedrock was encountered at depths ranging between 10 to 65 feet bgs. The competent basalt encountered in borings was typically unweathered to moderately weathered, slightly to moderately fractured, with varying levels of brecciation, interbedding, and schistose/phyllitic alteration. Alterations generally occurred near high angle (55° to 90°) fractures and joints that were accompanied by chloritic siltstone interbeds, pyrite, calcite, and clay infilling. The bedrock ranged from very low strength to high strength with field strength

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

indices of R0 to R4. Basalt textures were waxy to smooth, and the bedrock varied from dark gray to greenish gray. Basalt bedrock was encountered in borings BH-03, BH-04, BH-05, BH-09, and BH-13. No bedrock was encountered within the depths explored in BH-01, BH-02, BH-06, BH-07, BH-08, BH-10, BH-11, BH-12, and BH-14. The test pits encountered refusal on basalt at the higher elevation areas of the site, such as at TP-01, TP-02, TP-03, TP-04, TP-05, TP-08, TP11, TP-12, and TP-13, which typically will require drilling and blasting, hydraulic hammers, or large equipment to remove competent bedrock.

4.3 GROUNDWATER

Groundwater was encountered during the exploration at depths ranging between 4.6 and 67 feet bgs with the groundwater level generally deeper towards the northeast. We expect groundwater will be present within fractures of the weathered and competent bedrock, perched above the interface between soil and bedrock, and within alluvial soils at the lower elevation areas. Fractures provide the primary transport mechanism of groundwater in the bedrock; therefore, the occurrence and amount of groundwater encountered during the excavation of the expansion cell and ponds will depend on the nature, distribution, and interconnection of the fractures.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

5.0 SEISMIC CONSIDERATIONS

5.1 REGIONAL AND SITE GEOLOGY

The Coffin Butte Landfill site is located approximately 11 miles north of downtown Corvallis, on the border of the Willamette Valley and Coast Range physiographic provinces. The Willamette Valley is a flat, riverine valley, formed by the cyclic damming and flooding of the Willamette River during the last ice age. This resulted in a broad flat valley with deep deposits of silt, clay, and organic soil, and a generally shallow water table (Orr, 1992).

The Coast Range is a volcanic complex and forearc basin which was accreted on the western edge of the North American plate between 66 and 30 million years ago (mya) (Snavely, et al, 1965). The Coast Range is locally composed of the Siletz River Volcanics, which are a Paleocene to middle Eocene aged sequence of pillow basalt flows, basalt breccias and conglomerates, and basaltic sedimentary interbeds (Walker and MacLeod, 1991). These rocks are generally altered and/or zeolitized and veined with calcite (Keith and Staples, 1985).

The site is generally divided into two zones: rocky upland areas underlain by the Siletz River Volcanics, and lowland areas composed of soft and or elastic fine-grained soils either derived from the Willamette Silt or volcanic saprolites. The Siletz River Volcanic uplands are generally composed of a thin mantle of granular soils overlying hard and competent basalt. These units have groundwater present in discontinuous layers and fracture zones of the basalt.

The lowland areas, present in the northeast and eastern portions of the site, are composed of fine-grained soils. These areas generally have shallow groundwater, and either consist of Willamette Silt, or highly weathered Siltez River volcanics that have been weathered in-place due to the influence of groundwater.

5.2 REGIONAL SEISMICITY

There are two primary earthquake source types that have been identified in the Pacific Northwest region: Cascadia Subduction Zone sources and shallow crustal sources. These sources result in three earthquake source classifications: (1) shallow crustal earthquakes, (2) deep earthquakes with a moment magnitude greater than 7.0 on the seismogenic part of the subducting plate of the Cascadia Subduction Zone, and (3) an earthquake with a possible moment magnitude of 9.0 (+/- 0.2) on the seismogenic part of the interface between the Juan de Fuca Plate and the North American Plate on the Cascadia Subduction Zone. Historic seismic

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

activity in the Corvallis area has been primarily from shallow crustal sources associated with the locally mapped Corvallis Fault Zone (Personius-USGS, 2002).

For evaluating the earthquake ground motions at this site, we relied on the work of Geomatrix (1995) for the Oregon Department of Transportation (ODOT Report) and information more recently published by the United States Geological Survey (USGS). The geotechnical seismic design recommendations contained herein are provided in accordance with the Oregon Structural Special Code (OSSC), based on ASCE 7-22. The approach used for evaluating seismic conditions is based on the following:

- Earthquake sources in Oregon are identified primarily from published geologic records rather than recorded seismic data. Of the three source mechanisms considered in OSSC Section 1803.3.2, recorded seismic data are available only for shallow crustal events. The potential for periodic, large-magnitude subduction zone events along the Oregon Coast is based primarily on geologic evidence, as large, subduction zone events are believed to occur at intervals of 300 to 500 years. The most recent significant subduction zone earthquake occurred in the year 1700, based on a tsunami recorded in Japan. As a result, there are significant uncertainties associated with evaluating many of the key parameters required to assess earthquake hazards.
- To prepare the ODOT Report, Geomatrix assessed the seismic hazard in Oregon using probabilistic seismic hazard analysis techniques. The analyses performed included quantitatively addressing the uncertainties associated with the required input parameters for each of the identified potential earthquake sources. Based on the results of the analyses conducted, earthquake ground motion maps were generated for the State of Oregon for 500-year, 1,000-year and 2,500-year return periods for peak ground acceleration and 5-percent-damped spectral accelerations at spectral periods of 0.3 and 1.0 seconds. Generalized elastic response spectra were also developed for various regions of Oregon based on the relative influence of subduction zone seismic sources and shallow crustal sources to the overall seismic hazard.
- We also reviewed the 2023 USGS fault maps for the State of Oregon. Information provided by the USGS is consistent with the Geomatrix report, for seismic events with return intervals of 2,500 years (approximately equivalent to the two percent probability of exceedance in 50 years), specified in the OSSC.

The following sections include more detailed descriptions of the potential seismic sources, the methods used to evaluate peak ground accelerations, the methods used to develop the site-specific response spectra, and a discussion of the specific seismic concerns.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

5.2.1 Subduction Zone Sources

An active subduction zone is located where the Juan de Fuca Plate is subducting beneath the North American Plate approximately 50 miles off the Oregon Coast. Earthquake types associated with the subduction zone include interface events at the boundary where two plates intersect and intra-slab events within the subducting Juan de Fuca Plate. Potential ground shaking and accelerations at the project site are expected to be significant. The northeastern portion of the site will be at risk of ground shaking amplification where soft, river plain sediments are present.

5.2.2 Crustal Sources

In the analyses associated with the Geomatrix ODOT Report, crustal sources incorporated into the analyses modeled both regional source zones and specific identified geologic faults.

Regional Zone: In this model, earthquakes are assumed to occur randomly within a general region. The advantage of this approach is that it allows provision for the possibility of unidentified or unknown fault sources. Maximum earthquake magnitudes are estimated for each source zone based on historic seismicity, maximum seismogenic depth and threshold of surface faulting. The project site is located in the southern Willamette Valley. Maximum earthquake magnitudes associated with crustal sources in the southern Willamette Valley and return interval of 2,500 years is Moment Magnitude (M_w) 5.75.

Specific Faults: The following discrete faults or fault zones are classified in the ODOT Report as "probable Quaternary Age" or later faults and are located within about 25 miles of the site. The ODOT Report and United States Geological Survey (USGS) identified two, isolated, northeast trending faults that displace late Quaternary deposits or geomorphic surfaces (less than 780,000 years old) in the southern Willamette Valley. These faults are located on the western and eastern borders of Corvallis. The Corvallis fault (west) and Owl Creek fault (east) are generally characterized as "inactive" and are up to approximately 40 km long.

The Corvallis fault, which forms the western boundary of the Willamette Valley near Corvallis, is mapped as close as four miles to the south of the site. The Corvallis fault is interpreted as northeast-trending, southwest-dipping Tertiary thrust fault, that thrusts the Eocene aged Siletz River Volcanics over the Eocene Tyee formation (Personius-USGS, 2002). The fault may also have been reactivated as a steeply dipping left lateral strike slip fault. Although there is no evidence that the fault is active due to late Pleistocene or Holocene displacement, USGS data suggests that the fault may be active with a long recurrence interval. Two alternative maximum

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

rupture lengths are possible; 23 km length with a probability of 0.4 or 35 km length with a probability of 0.4. The calculated movement of the fault is approximately 0.2 mm/year, and it is classified as Class B.

The Owl Creek fault, in southern Willamette Valley, is located six miles to the southeast of the site. The steeply east-dipping Owl Creek fault is a reverse fault associated with an anticline in the Eocene Spencer Formation mapped in the subsurface east of Corvallis on the floor of the southern Willamette Valley. The fault, which has no geomorphic expression, apparently offsets the middle to late Pleistocene Rowland Formation, but does not offset the latest Pleistocene Willamette Formation. The most recent movement on the Owl Creek fault is defined as middle and late Quaternary, less than 750,000 years old. The Owl Creek fault is interpreted as northeast striking and approximately 12 km long (USGS, 2022). The calculated movement of the fault is approximately 0.2 mm/year.

5.3 EARTHQUAKE GROUND MOTIONS

5.3.1 Ground Response Spectra

Local geologic deposits can significantly amplify the ground response and the response of structures (represented by a response spectrum) as earthquake motions are propagated from bedrock to the soil surface.

Based on the conditions encountered during our field exploration program and shear wave velocity measurements collected in CPT-08, 2022 ASCE 7 Site Class D (Stiff Soil) is recommended for use in design. Based on the site's latitude, longitude, and subsurface conditions, site-specific response spectra were developed. The spectra shown in Appendix C includes the criteria for Site Class D (Stiff Soil) from the 2022 OSSC, with a return interval of 2,500 years (approximately equivalent to a two percent probability of exceedance in 50 years). For Site Class D, the resulting short period spectral response acceleration (0.2 second) for the site (S_s) is 1.05g, and the 1.0 second (S_1) spectral response acceleration is 0.44g. The five percent damped design spectral response acceleration at short periods (S_{DS}) is 0.9g. The seismic curve is presented in **Appendix C**.

5.3.2 Peak Ground Acceleration

The peak ground accelerations developed in the ODOT report were estimated by combining the earthquake sources discussed above with published attenuation relationships (Sadigh et. al, 1993; Idriss, 1991; Boore et. al., 1993). Peak ground accelerations and spectral accelerations

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

incorporated into the 2022 OSSC have been periodically modified based on more recent USGS studies.

Based on the USGS Seismic Design Maps using the 2022 ASCE 7, the risk-based peak ground acceleration recommended for this site is 0.61g for Site Class D (Stiff Soil). Based on our understanding of previous geotechnical studies performed for landfill cells constructed on the north side of Coffin Butte Road, the site-specific PGA was 0.33g. Subsurface conditions in the southern expansion area include deeper soil over brecciated and altered basalt bedrock than encountered in the landfill cells to the north. We anticipate that a risk-based PGA of 0.61g is appropriate for the southern expansion area and will be more conservative than using a site-specific PGA.

5.4 SEISMIC HAZARDS SUMMARY

The OSSC specifically requires that certain geologic hazards be addressed in a site-specific seismic study. These are summarized in this section.

Ground Motion: Discussed in Section 5.3, Earthquake Ground Motions.

Liquefaction/Settlement: The potential for seismically induced liquefaction to develop within the profile was evaluated using the procedure outlined by Youd et. al. (2001). The procedure uses standard penetration test (SPT) blow counts and other soil data to estimate the cyclic resistance ratio (CRR) profile with depth (ratio of the cyclic shear stress required to cause liquefaction to the initial vertical effective stress). The cyclic stress ratio (CSR) profile with depth (ratio of cyclic shear stress to initial vertical effective stress) resulting from the design level earthquake is estimated from the total and effective stresses, the peak ground surface acceleration value, the magnitude of the design level earthquake, and a depth dependent stress reduction factor.

Based on the results of our geotechnical exploration, and lack of loose, saturated soils with a plasticity index of less than 12, the liquefaction potential at the site is low.

Landslide/Lateral Spreading: There is a risk from earthquake-induced landslides and the landslide potential analyses are presented in Section 6. The risk for lateral spreading is low due to the lack of significant potentially liquefiable zones.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Fault Rupture: The trace of the nearest mapped fault is associated with the Corvallis fault. This northeast trending fault is approximately four miles south of the project site (USGS, 2023). Based on our geologic research and local experience, the fault is reasonably mapped, and while in relatively close proximity to the project, it does not appear likely for fault rupture to occur at the proposed landfill site.

Tsunami or Seiche: There is no risk, based on the inland location of the site and lack of significant bodies of water in the immediate vicinity of the project.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of field exploration, laboratory testing, engineering analyses, and our local experience, it is our opinion that the site is suitable for the anticipated development from a geotechnical perspective. The primary geotechnical concerns are the highly expansive silts and clays in the lowland areas, potential settlement of new fills, and static and seismic slope stability of the new landfill cell and leachate pond excavations.

6.1 ROADWAY EMBANKMENT FILLS

Embankment fills for access roads will be constructed in the northeast portion of the site and in the south-central portion of the site. Fill placed for embankment roads in the northeast and south-central will be approximately 10 and 50 feet thick, respectively. Subsurface conditions vary from soft alluvial deposits in the northeast to dense volcanic soil in the south-central area. Based on the subsurface explorations, we expect that the 10-foot-tall roadway embankment constructed in the northeast will be underlain by approximately 13 to 28 feet of alluvial deposits, consisting of soft to very stiff silt and clay, underlain by very loose to very dense weathered basalt. The 50-foot-tall south-central embankment will be underlain by 10 to 25 feet of medium dense to very dense sand and gravel and hard clay, over basalt bedrock. In general, the upper five feet of soil in the south-central area is medium dense and the density increases with depth.

6.1.1 Roadway Embankment Site Preparation

We recommend that all development areas are stripped of organic soil to expose native soil. The development areas should be considered to extend five feet beyond the perimeter of the embankment fill areas. We anticipate deeper stripping depth will be required where mature trees are removed or were previously removed. All roots larger than 0.5-inch diameter should be removed. Once the organic soil and roots are removed, the subgrade should be scarified to a depth of at least eight (8) inches, moisture-conditioned at least three (3) percent above the optimum moisture content and compacted to at least 95 percent of the maximum Standard Proctor dry density as determined by ASTM D698 using suitable compaction equipment. The exposed soil subgrade should be kept moist until covered by new structural fill and/or pavement.

In the lowland area, soil exposed after stripping may be weak, saturated, and/or incapable of supporting the weight of construction equipment or achieving proper compaction; therefore, subgrade stabilization may be required prior to adding new fill. We first recommend that a

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Wallace Group representative evaluate the exposed subgrade and determine the most appropriate procedure for subgrade stabilization. Acceptable subgrade stabilization approaches include: 1) over-excavating and removing weak material to expose firm subgrade, and subsequently backfilling the excavation with compacted select fill, as described in a subsequent section of this report, and 2) over-excavating and removing weak material to a depth of at least two feet, and subsequently placing geogrid across the base of the excavation, placing a poorly graded, ¾-inch drain rock or crushed rock material over the geogrid in horizontal uncompacted lift of 12 inches or less, and compacting the granular material to the satisfaction of the Wallace Group representative; the process should be repeated until the over-excavated area has been fully backfilled.

In the south-central embankment area, the upper five (5) feet of medium dense sand should be removed to expose very dense sand and gravel or hard clay. The exposed subgrade should be scarified to a depth of at least eight (8) inches, moisture conditioned to above the optimum moisture content, and compacted to at least 95 percent of the maximum Standard Proctor dry density, as determined by ASTM D698 using suitable equipment. The exposed soil subgrade should be kept moist until covered by new structural fill and/or pavement. Embankment slopes should be no steeper than 2.5 to 1 (H to V).

6.1.2 Roadway Embankment Structural Fill and Placement

Where structural fill is needed to construct roadway embankments, we recommend it consist of appropriately graded sand and gravel having 100 percent passing a two-inch sieve, less than 30 percent retained on the ¾-inch sieve, and less than 20 percent passing a No. 200 sieve. On-site, non-organic, native soil, will not likely be suitable for reuse as structural fill due to the high content of silt and clay-sized particles and highly expansive properties. We recommend the structural fill have a maximum dry density (ASTM D698) of at least 90 pounds per cubic foot (pcf).

In addition, we recommend:

- Structural fill be placed in horizontal lifts not exceeding 8 inches in uncompacted thickness, moisture-conditioned to within a range of +/- 2 percent of optimum moisture content, and compacted as recommended in **Table 6.1.2**, *Engineered Fill Specifications Summary.*
- Structural fill should be placed in level lifts and benched into slopes. During the benching process, a Wallace Group representative should determine if subsurface

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

drainage should be installed to collect water that seeps from the existing hillslope and redirect the water to a suitable outlet.

- Structural fill should not be placed during freezing weather or on frozen subgrade to avoid potential thaw settlement.
- Compaction of fill should be performed to achieve the minimum relative compaction shown in **Table 6.1.2**. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by the ASTM D698 laboratory compaction procedure.
- A Wallace Group representative should periodically observe the fill placement and test the fill for grain-size, fines content, plasticity, and compaction.

The southern slope of the roadway embankment fill placed in the Tampico Ridge valley, in the south-central portion of the site, should be constructed with drainage elements to prevent potential erosion and piping of the embankment fill. Wallace Group recommends that the embankment is constructed with concrete lined v-ditches near the southern base of the embankment to direct surface water away from the embankment. The embankment should be graded such that the crest directs water away and reduces the potential for surface water flow over the crest. The potential for erosion should be reduced by constructing benches into the southern slope every 15 vertical feet. The benches should be wide enough to allow maintenance and should be sloped towards the embankment and constructed with concrete lined v-ditches which direct water away from the slope. In addition, the soil slope face should be hydroseeded to reduce surface erosion. Concrete lined v-ditches should be monitored and maintained.

As an alternative to the construction of benches and intermediate concrete lined v-ditches includes covering the soil slope surface with an erosion mat which is hydroseeded. The erosion control mat should be constructed with an anchor trench at the top of slope in accordance with the manufacturer's recommendations and be secured using high load anchors. The concrete lined v-ditch at the base of the southern slope should also be included to direct surface water away from the embankment.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Table 6.1.2, below, summarizes the placement and compaction specifications for anticipated uses of structural fill for this project.

Table 6.1.2
Engineered Fill Specifications Summary
Coffin Butte Landfill Southern Expansion Area
28972 Coffin Butte Road
Corvallis, Oregon

Material Type & Specifications	Placement Location	Placement Specifications
Base Course – Crushed Aggregate, ¾-inch minus, <8% passing #200 sieve.	Base Course Beneath Slabs on Grade, Pavement, and Footings	Maximum 6" lifts; compacted to minimum 95% of Standard Proctor density (ASTM D698) for floor slabs, footings, 92% for pavement, exterior slabs and sidewalks.
Structural Fill - Granular, Inorganic soil, 2-inch minus, <30% retained on ¾-inch sieve, <20% passing #200 sieve. Non-plastic. Maximum dry density of at least 90 pcf.	Beneath Slabs on Grade, Exterior Slabs, Pavement, Sidewalks, Utility Trench Backfill, and Footings	Maximum 8" lifts; compacted to minimum 95% of Standard Proctor density (ASTM D698) for floor slabs, footings, all fill exceeding 5 feet vertical, 92% for pavement, exterior slabs and sidewalks.
Granular Landscape Fill – Inorganic soil, 3-inch minus.	Landscaped Areas	Fill depth less than 4 feet, compaction not required. Fill depths greater than 4 feet, compact to a minimum of 90% of Standard Proctor (ASTM D698).

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

6.2 LANDFILL CELL SITE PREPARATION

We recommend that all development areas are stripped of organic soil to expose native soil. Based on the depths of proposed excavation, softer volcanic soil, alluvial deposits, and Willamette Silt will be removed. However, there is potential for some softer soil to remain along the northern and eastern perimeter and in the valley between the east and west knob. If subgrade stabilization measures are needed, the process described in Section 6.1.1 should be utilized.

6.3 EXCAVATIONS

To construct the CBLF southern expansion area, cuts will be up to 155-feet at the western knob of Tampico Ridge, up to 110-feet at the eastern knob, and up to 50-feet for the construction of the leachate ponds (**Figure 2b**, *Exploration Location Map*). Cuts to remove the native silt, clay, and gravel soil can generally be excavated with conventional earth-moving equipment such as excavators and small dozers.

Competent basalt bedrock will likely require rock hammers or drilling and blasting to excavate. The western hillside may be excavatable mechanically; however, it will result in a ragged final slope which may be problematic over time. The eastern hillside is more competent and mechanical excavation methods will not be appropriate. We recommend that drilling and blasting is used during rock excavation. The rock excavation method should be performed in a manner that limits as much as practical blasting disturbance beyond the rock cut. We recommend the project documents incorporate the latest Oregon Department of Transportation (ODOT) Standard Specifications, Section 00335, for blasting and that a qualified blasting consultant is used. Groundwater will be encountered during the expected earthwork operations and dewatering operations are recommended during the construction of the leachate ponds.

The excavation areas have been divided into three areas based on the subsurface conditions: the western hillside slope, eastern hillside slope, and leachate ponds. In general, the western hillslope was underlain by volcanic soil consisting of medium dense to very dense sand and gravel and hard clay which was up to approximately 35-feet thick and underlain by weathered basalt and fresh basalt. The basalt in the western hillslope was intensely brecciated with infilling of siltstone.

The volcanic soil overlying bedrock in the eastern slope and within the valley was generally weaker than encountered in the west. The eastern slope was generally underlain by up to 27-

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

feet of very soft to hard silt and clay underlain by weathered basalt and basalt. The bedrock encountered in the eastern hillslope was generally intact basalt with only isolated intervals of brecciation and was primarily composed of basalt with minor siltstone matrix. The subsurface conditions near the leachate ponds consisted of up to 28-feet of soft to very stiff fine-grained alluvial deposits underlain by weathered basalt and basalt bedrock.

Based on current plans, excavations in the landfill cell below the access road will be sloped at 2 to 1 horizontal to vertical (H to V) to accommodate the landfill liner. The access road loops around the cell to the south and the slope above the road is sloped at 1.5 to 1 (H to V). The two leachate ponds will be constructed with bottom of pond elevations of 257 feet and 272 feet msl on the north and south, respectively. The slope from the ponds will continue to the south at 2.5 to 1 (H to V) where it meets Tampico Ridge near elevation 400 feet msl.

6.4.1 Slope Stability Model Soil and Rock Design Values

The proposed excavations were evaluated using the SLIDE2 program, developed by Rocscience. Wallace Group teamed with Delve Underground to complete the excavation recommendations for the southern expansion. Subsurface conditions and engineering properties were selected based upon applicable Wallace Group borings, CPTs, and test pits and laboratory test results. Strength of the alluvial and volcanic soil was represented using the Mohr-Coulomb criteria for both short-term (after construction) and long-term conditions. Acceptable factors of safety were considered to be greater than or equal to 1.3 for short and long-term conditions and 1.0 for seismic analysis.

Strength of the volcanic breccia of the west slope and the basalt of the east slope were modeled using the Generalized Hoek-Brown relationships. The following tables summarize the soil and rock strengths used in the slope stability models.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Table 6.4.1-1
Assumed Engineering Properties
West Slope

Geologic Unit	Unit Weight (pcf)	Strength Model	Friction Angle (degrees)	Cohesion (psf)	UCS (psf)	GSI
Soil (Colluvium)	125	Mohr-Coulomb	34	100	-	-
Weathered Rock	165	Generalized Hoek-Brown	-	-	30,000	30
Volcanic Breccia	170	Generalized Hoek-Brown	-	-	200,000	45

Table 6.4.1-2
Assumed Engineering Properties
East Slope

Geologic Unit	Unit Weight (pcf)	Strength Model	Friction Angle (degrees)	Cohesion (psf)	UCS (psf)	GSI
Soil (Colluvium)	125	Mohr-Coulomb	30	150	-	-
Weathered Rock	165	Generalized Hoek-Brown	-	-	30,000	30
Basalt	175	Generalized Hoek-Brown	-	-	480,000	55

Table 6.4.1-3
Assumed Engineering Properties
South Central Embankment

Geologic Unit	Unit Weight (pcf)	Strength Model	Friction Angle (degrees)	Cohesion (psf)	UCS (psf)	GSI
Embankment Fill	120	Mohr-Coulomb	38	0	-	-
Hard Clay	95	Mohr-Coulomb	0	2,000	-	-
Shale	120	Generalized Hoek-Brown	-	-	500,000	10
Basalt	175	Generalized Hoek-Brown	-	-	480,000	55

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Table 6.4.1-4
Assumed Short-Term Engineering Properties
Leachate Ponds

Geologic Unit	Unit Weight (pcf)	Strength Model	Friction Angle (degrees)	Cohesion (psf)	UCS (psf)	GSI
Willamette Silt	95	Mohr-Coulomb	9	1000	-	-
Soil (Volcanic/ Colluvium)	95	Mohr-Coulomb	0	1039	-	-
Weak Weathered Rock	120	Mohr-Coulomb	14	750	-	-
Dense Weathered Rock	165	Generalized Hoek-Brown	-	-	30,000	30
Basalt	175	Generalized Hoek-Brown	-	-	480,000	55

Table 6.4.1-5
Assumed Long-Term Engineering Properties
Leachate Ponds

Geologic Unit	Unit Weight (pcf)	Strength Model	Friction Angle (degrees)	Cohesion (psf)	UCS (psf)	GSI
Willamette Silt	95	Mohr-Coulomb	9	1000	-	-
Soil (Volcanic/ Colluvium)	95	Mohr-Coulomb	33	0	-	-
Weak Weathered Rock	120	Mohr-Coulomb	22	400	-	-
Dense Weathered Rock	165	Generalized Hoek-Brown	-	-	30,000	30
Basalt	175	Generalized Hoek-Brown	-	-	480,000	55

6.4.2 Eastern and Western Hillside Excavations

Delve utilized the Markland Analysis technique with mapped joint orientations and an estimated rock mass peak friction angle to study the kinematic stability of the overall rock mass with respect to the proposed cut slope orientation. Delve concluded that the rock slope should not be cut an at angle steeper than 53 degrees (approximately 0.75 to 1, H to V). Limited rock reinforcement, scaling, and rockfall mitigation (ditch or mesh) may still be required for a 53-degree cut slope). Rockfall mitigation techniques are discussed in detail in **Appendix E**.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

Global stability of the eastern and western hillside cut was evaluated using a 2D limit equilibrium analysis. The analysis was performed using the Rocscience SLIDE2 computer program and the material strength properties presented in **Section 6.3.1**. The selected subsurface conditions were based on cross-sections B-B' at the western slope and Section D-D' at the eastern slope. Configuration of the models assumed the following cut inclinations:

- Slope of 2H:1V below the access road
- Slope of 0.75H:1V in rock and weathered rock above the access road
- Slope of 1.5H:1V at the brow of the slope where colluvium is encountered on the west slope.
- Slope of 2.5H:1V at the brow of the slope where colluvium is encountered on the east slope.

As discussed in **Appendix E**, the limit equilibrium analysis suggests stable conditions provided the west and east slopes are cut at the following inclinations or shallower:

- Volcanic Breccia and Basalt: 0.75H:1V
- Weathered Rock: 0.75H:1V
- Colluvium soil: 1.5H:1V at the west slope
- Colluvium soil: 2H:1V at the east slope below the access road and 2.5H:1V above the access road

The interpreted boundary between soil and weathered rock will dictate where the cut-slope transitions from 0.75H:1V to 1.5H:1V or 2H:1V to 2.5H:1V. Because of the assumptions made and variation in subsurface conditions, representation of subsurface geometry along the height of the cut should be considered approximate. Transition in the cut slope angle from colluvium to rock should be confirmed and modified as necessary during construction. See **Appendix E** for further discussion on the rock cut analysis and conclusions. Acceptable excavation slopes are presented on **Figure 12**.

6.4.3 Leachate Pond Excavations

Wallace Group evaluated the global stability of the leachate pond cut using a 2D limit equilibrium analysis for short-term (during construction), long-term, and seismic conditions. The analysis was performed using the Rocscience SLIDE2 computer program and the material strength properties are presented in **Section 6.3.1**. The selected subsurface conditions were based on cross-section E-E.' Configuration of the model assumed the cut slope is 2.5H:1V from the base of the leachate pond cut to the intersection with the slope to the south at an approximate elevation of 400 feet msl. Based on the available groundwater data, the models

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

were evaluated assuming that the groundwater is approximately 17-feet bgs at the south and 5-feet bgs at the north. Seismic loading conditions were assumed to be 40 percent of the PGA, a seismic load of approximately 0.25g.

Based on the results of the slope stability modeling, the following table summarizes the minimum factors of safety for the three conditions:

Table 6.4.3-1
Modeling Factor of Safety Summary
Leachate Ponds

Slope Stability Condition	Estimated Factor of Safety
Short-Term	1.3
Long-Term	1.3
Seismic	1.0

The global factors of safety for the planned 2.5H:1V cut slope will be acceptable for the short-term, long-term, and seismic conditions. Some localized slope failures of the leachate pond edges are possible; therefore, Wallace Group recommends that the leachate pond slopes are constructed using compacted structural fill which extends from the bottom of pond to a lateral distance of at least 25-feet. Structural fill should be placed in level lifts and bear on dense soil or hard weathered basalt. Cuts into native soil for the construction of the ponds should not be steeper than 2.5H:1V. We recommend the slope is cut, then benches are constructed during fill placement. Benches in the native soil should be approximately 5 feet deep and 5 feet high. A keyway should be constructed at the base of the fill that is at least 8-feet wide and 6-feet deep. If a long-term slope stability factor of 1.5 is preferred, horizontal drains should be constructed upslope of the leachate pond to lower the groundwater elevation to below the very dense weathered basalt. Output slope models are presented in **Appendix F**.

The safety of the workers and equipment in or near excavations is the responsibility of the contractor. During construction, Wallace Group should observe cut slopes to confirm the inclinations are appropriate for the conditions encountered. It is the responsibility of the contractor to maintain safe and stable slopes during construction. The slope stability analyses did not include surcharge loading from construction equipment or stockpiled material.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

6.5 SETTLEMENT ESTIMATES

The laboratory consolidation test results indicate that the Willamette Silt and volcanic/colluvial soil is overconsolidated with overconsolidation ratios (OCRs) ranging from 2.3 to 8.4. Dependent on the landfill cell thickness, new loads added to the base of the landfill could result in recompression and a new cycle of primary consolidation. Considering the variable thickness of new fill and the amount of Willamette Silt and volcanic/colluvial soil which will remain after excavation, the amount of settlement will differ across the site. Based on an assumed landfill material unit weight of 80 pounds per square foot, we estimate up to 24 inches of consolidation settlement will occur within 50-years. Settlement estimates were computed using the computer modeling program Settle3 by Rocscience and the settlement contours are illustrated on **Figure 13**.

Roadway embankment fill placed in the lowland area will be underlain by weak fine-grained silt and clay. Where new fill is placed, total settlement is expected to be up to 8- to 10-inches within 50 years. It should be expected that some repairs to the embankment fill will be needed over time.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

7.0 ADDITIONAL SERVICES

7.1 DESIGN AND CONSTRUCTION PERIOD ENGINEERING SERVICES

Wallace Group will review the geotechnical and civil aspects of the project design plans and specifications, when completed, to confirm that our recommendations are incorporated into the project documents, and to make appropriate modifications, if necessary. We currently anticipate performing design review of foundation, grading, and drainage plans to document that our recommendations are incorporated into design. This review will reduce misinterpretation of our recommendations and reduce the potential for costly design changes and construction delays.

7.2 CONSTRUCTION INSPECTION AND TESTING

To maintain our role as the geotechnical engineer of record, Wallace Group will also observe and monitor earthwork construction including site preparation, placement, and compaction of engineered fill in building pad areas, utility trench backfill, foundation, and slab preparation. The purpose of these services will be to help document that site grading and development-area-subgrade preparation complies with the recommendations of this geotechnical report and the approved project plans and specifications. If subsurface conditions are encountered during construction that differ from the conditions described herein, we will review our recommendations considering these different conditions and recommend changes in design or construction procedures.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

8.0 LIMITATIONS

Exploratory test pits, borings, CPTs, and geoprobes performed for this study were placed to obtain an understanding of underground conditions for evaluation and design purposes. The exploration was performed using a mutually-agreed-upon scope of services. Variations from these conditions, not indicated by the test pits, are possible. These variations are sometimes enough to necessitate design modifications. CEC (Client) must recognize that it is impossible to predict every physical condition that will be encountered. If unexpected conditions are observed during construction, or if the size, type, elevation, or location of the proposed structures should differ significantly from the preliminary plans, we should be notified to review the recommendations contained in this report. The professional judgments expressed in this report meet the standard of care of our profession; however, no warranty is expressed or implied.

This report may be used only by the Client and only for the intended site and for the purposes stated within a reasonable time from its issuance, but in no event, later than five (5) years from the date of the report. Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Any party other than the Client or their design team who wishes to use this report shall notify the Wallace Group of such intended use. Based on the intended use of the report, the Wallace Group may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Wallace Group from any liability resulting from the use of this report by any unauthorized party.

The contractor selected for this project is responsible for supervision and direction of the actual work performed by his employees, subcontractors, and agents. Wallace Group will use accepted geotechnical engineering and testing procedures; however, our testing and observations will not relieve the contractor of his primary responsibility to produce a completed project conforming to the project plans and specifications.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor’s operations, and we cannot be responsible for the safety of personnel other than our own on the site. The safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein unsafe.

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

9.0 REFERENCES

Geomatrix Consultants, 1995, Seismic Design Mapping State of Oregon: Final Report, prepared for Oregon Department of Transportation under personal services contract 11688.

Keith, Terry E.C. and Staples, Lloyd W, The Clay Minerals Society, 1985, *Zeolites in Eocene Basaltic Pillow Lavas of the Siletz River Volcanics, Central Coast Range, Oregon.* Vol. 33, No. 2, 135-144.

Oregon Department of Transportation, Standard Specifications for Construction, 2021.

Oregon Structural Specialty Code 2022, Based on 2018 International Building Code, with Oregon amendments.

Personius, S.F., compiler, U.S. Geological Survey Website, 2002, *Fault number 869, Corvallis fault zone, in Quaternary fault and fold database of the United States*, https://earthquakes.usgs.gov/hazards/qfaults

Snavely, Park D. Jr., Wagner, Holly C, and Macleod, Norman S., June 1965, *Preliminary Data on Compositional Variations of Tertiary Volcanic Rocks in the Central Part of the Oregon Coast Range,* The Ore Bin, Volume 27, No. 6.

Orr, William N., and Elizabeth L. Orr, 1992, Oregon Geology.

United States Geological Survey, 2023, Seismic Hazards website data base.

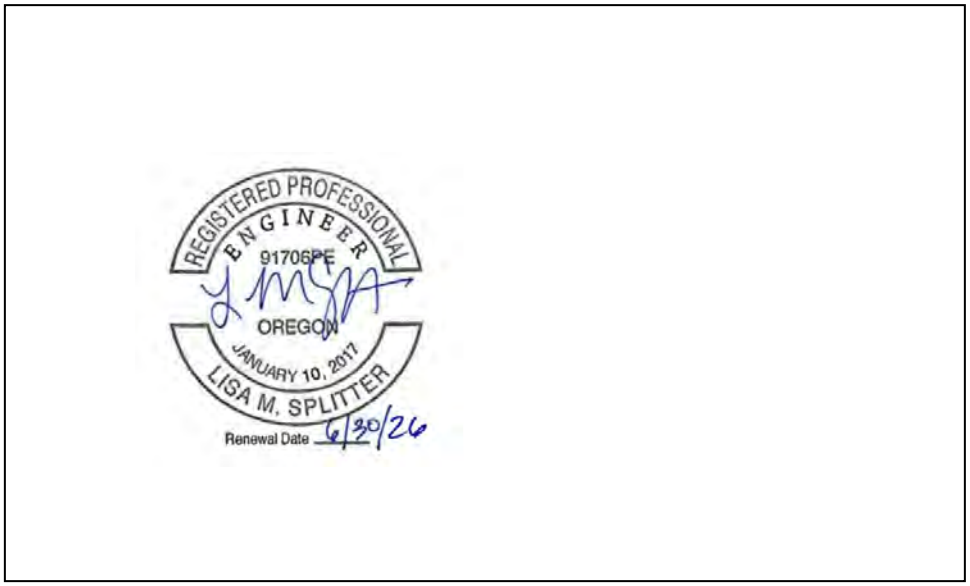
United States Geological Survey, 2020, *Lewisburg Quadrangle, Benton County, Oregon* (7.5-minute series-topographic).

Walker, G.W. and MacLeod, M.S., 1991, U.S. Geological Survey, *Geologic Map of Oregon.*

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

10.0 PROFESSIONAL AUTHENTICITY

This report has been authored and reviewed by the undersigned, respectively. This report is void if the original seal(s) and signature(s) are not included.



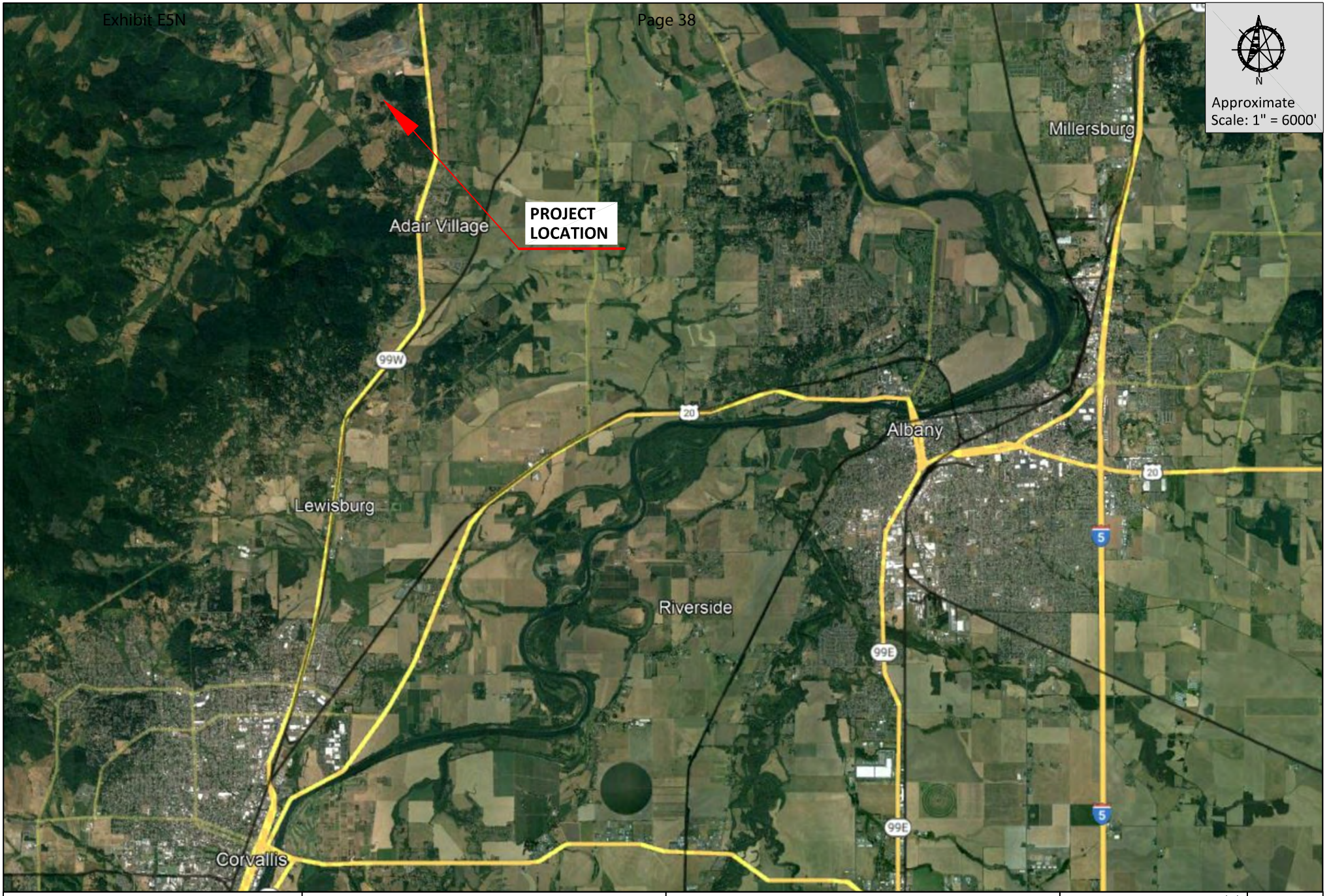
Lisa M. Splitter, P.E., G.E.
Senior Geotechnical Engineer

Adam Larson, P.E.
Project Geotechnical Engineer

62915 NE 18th St, Ste 1, Bend, OR 97701 **p |** 541.382.4707 **f |** 541.383.8118 wallacegroup-inc.com

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

FIGURES



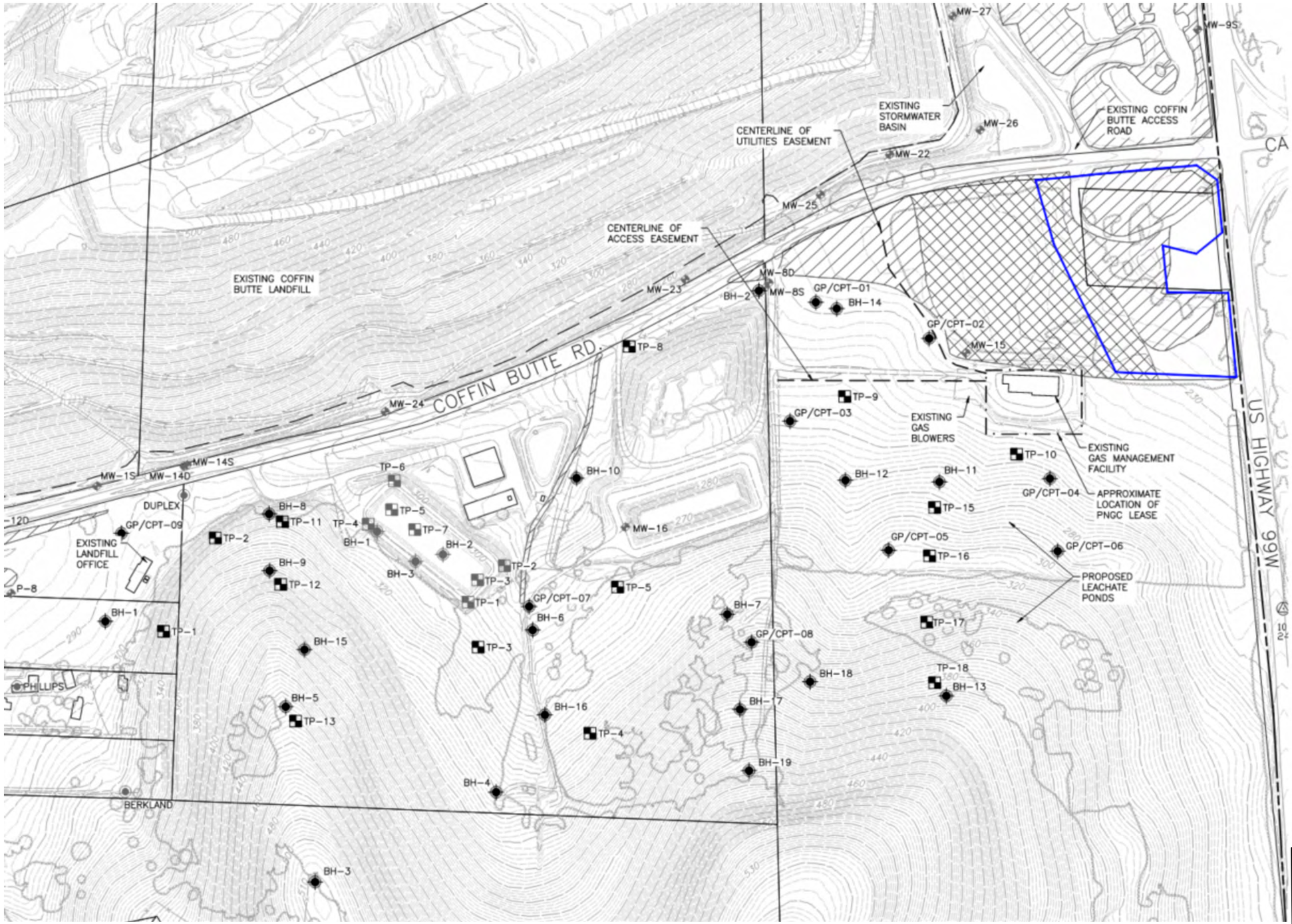
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

VICINITY MAP
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	January 31, 2022
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 1

FIGURE
1



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- EXISTING GROUNDWATER MONITORING WELLS/PIEZOMETER
- DECOMMISSIONED MONITORING WELLS
- EXISTING WATER SUPPLY WELLS
- EXISTING BORE HOLE
- PROPOSED BORE HOLE
- EXISTING TEST PIT
- PROPOSED TEST PIT

PROPOSED BOREHOLE/TEST PIT TABLE

POINT #	DESCRIPTION	EXISTING GROUND ELEVATION	DESIGN GROUND ELEVATION	ELEVATION DIFFERENCE (FT)	NORTHING	EASTING
1	BH	291.73	314.31	+22.58	386993.30	7491228.00
2	BH	240.75	247.73	+6.98	388028.01	7493274.15
3	BH	510.00	500.01	−9.99	386177.39	7491884.63
4	BH	343.89	362.49	+18.60	386458.65	7492451.61
5	BH	443.43	313.86	−129.57	386726.13	7491792.60
6	BH	291.19	293.82	+2.63	386966.17	7492565.95
7	BH	338.92	321.62	−17.30	387015.13	7493175.46
8	BH	309.25	292.60	−16.65	387329.59	7491740.75
9	BH	359.05	295.02	−64.03	387151.79	7491742.28
10	BH	263.11	271.53	+8.42	387441.49	7492703.58
11	BH	274.77	265.00	−9.77	387429.86	7493839.53
12	BH	270.70	278.46	+7.76	387429.86	7493839.53
13	BH	390.17	376.93	−13.24	386760.08	7493861.25
14	BH	239.03	253.00	+13.97	387972.34	7493517.97
1	TP	323.66	331.61	+7.95	386961.84	7491410.53
2	TP	301.95	293.05	−8.90	387254.49	7491572.23
3	TP	308.29	297.30	−10.99	386912.70	7492395.46
4	TP	334.16	345.53	+11.37	386643.02	7492745.75
5	TP	297.77	286.17	−11.60	387100.73	7492831.97
8	TP	251.57	252.52	+0.95	387853.25	7492868.49
9	TP	253.18	265.38	+12.20	387697.22	7493543.05

N

APPROXIMATE SCALE
1" = 350'

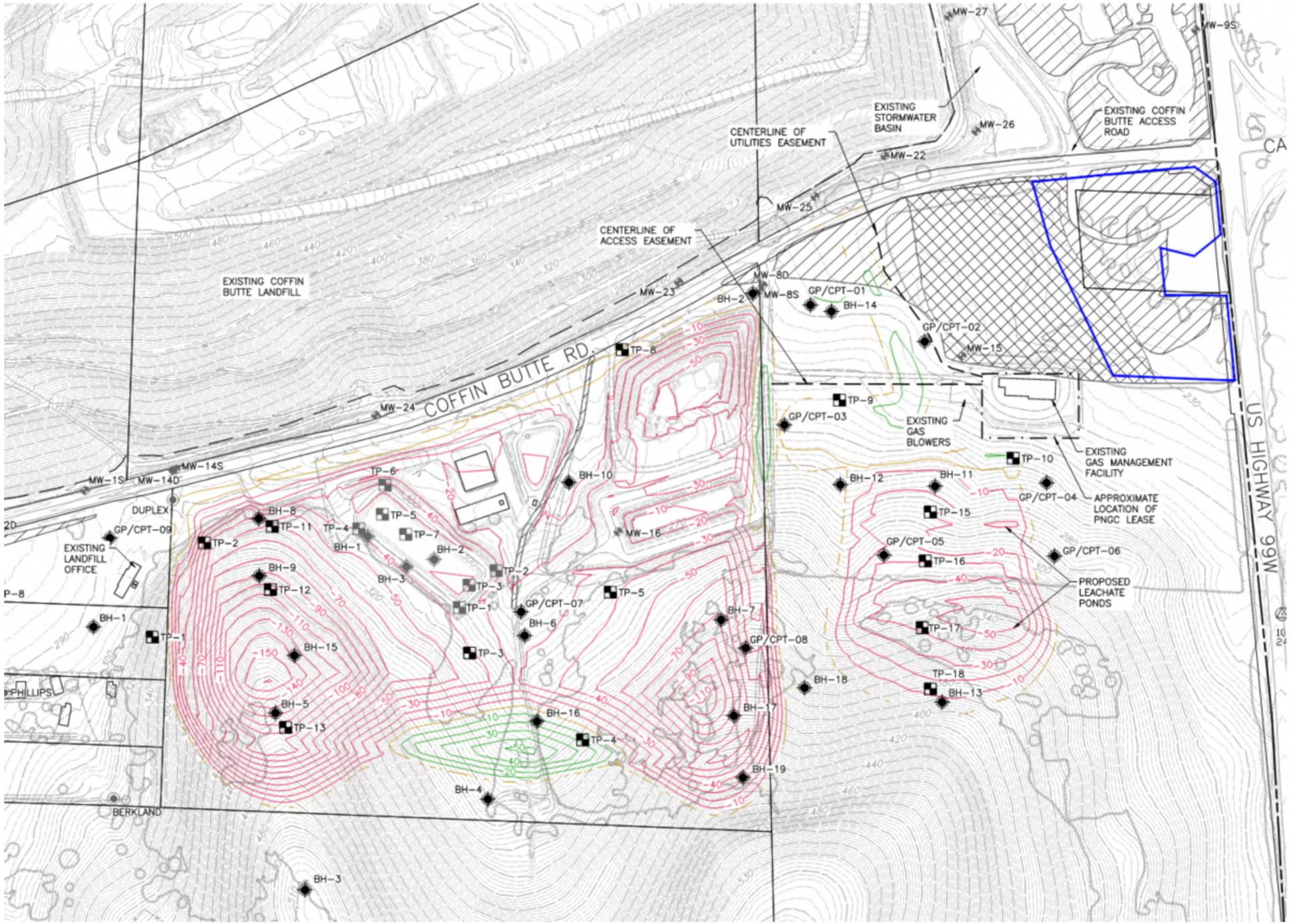
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

EXPLORATION LOCATION MAP
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	January 31, 2022
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 2a

FIGURE: 2a



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- EXISTING GROUNDWATER MONITORING WELLS/PIEZOMETER
- DECOMMISSIONED MONITORING WELLS
- EXISTING WATER SUPPLY WELLS
- EXISTING BORE HOLE
- PROPOSED BORE HOLE
- EXISTING TEST PIT
- PROPOSED TEST PIT

PROPOSED BOREHOLE/TEST PIT TABLE

POINT #	DESCRIPTION	EXISTING GROUND ELEVATION	DESIGN GROUND ELEVATION	ELEVATION DIFFERENCE (FT)	NORTHING	EASTI
1	GP/CPT	238.82	247.90	-9.08	387992.07	749345
2	GP/CPT	237.06	237.06	0.00	387878.79	749380
3	GP/CPT	258.82	263.12	-4.30	387619.91	749337
4	GP/CPT	263.42	263.42	0.00	387440.30	749418
5	GP/CPT	302.68	280.00	22.68	387216.21	749368
6	GP/CPT	290.84	290.84	0.00	387213.16	749420
7	GP/CPT	287.77	264.57	23.20	387040.06	749255
8	GP/CPT	360.17	315.26	44.91	386928.09	749325
9	GP/CPT	288.85	288.85	0.00	387269.13	749127

N

APPROXIMATE SCALE
1" = 350'

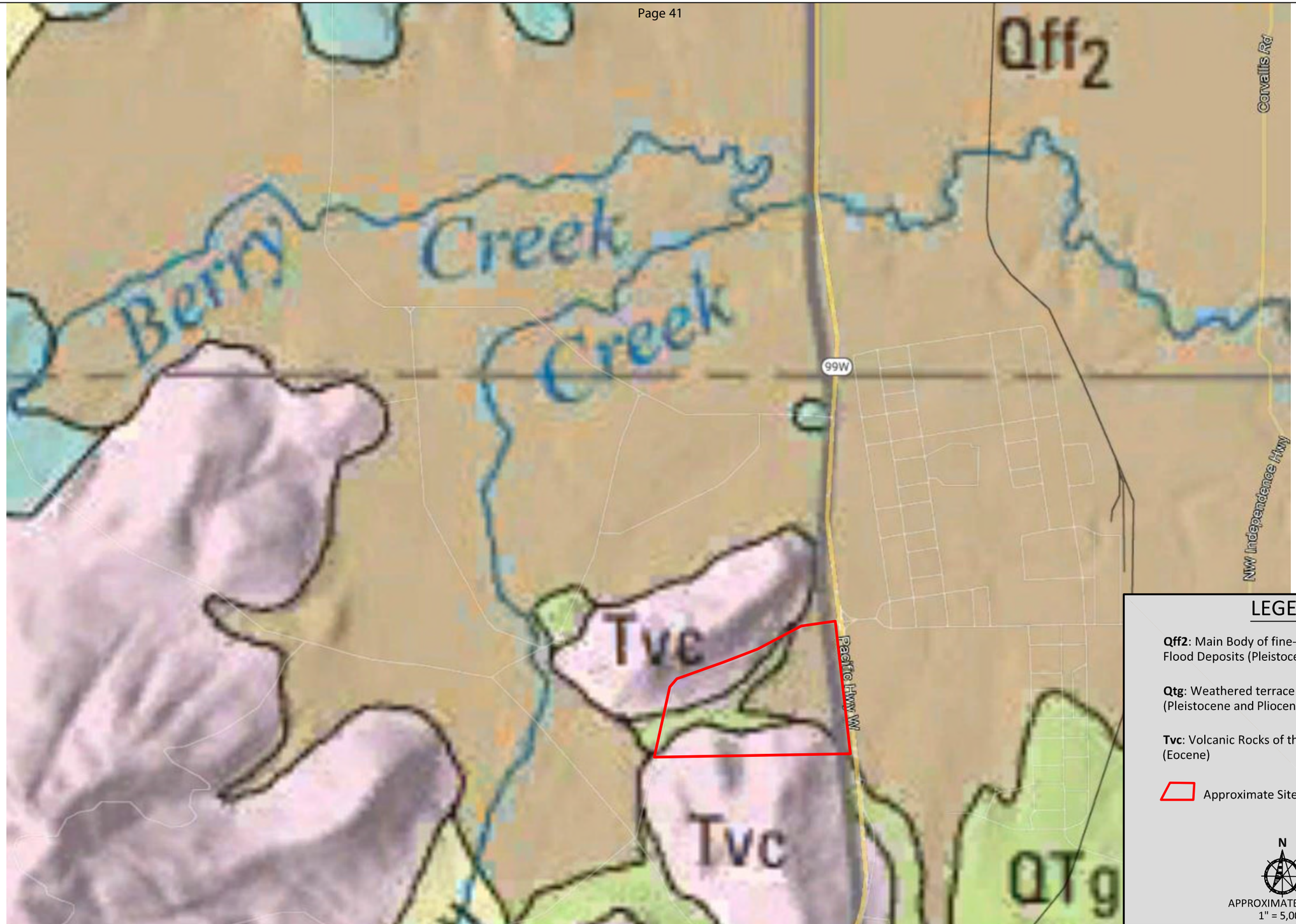
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

EXPLORATION LOCATION MAP
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	January 31, 2022
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 2b

FIGURE: 2b



LEGEND

Qff2: Main Body of fine-grained Missoula Flood Deposits (Pleistocene)

Qtg: Weathered terrace deposits (Pleistocene and Pliocene?)

Tvc: Volcanic Rocks of the Coastal Range (Eocene)

Approximate Site Border

N

APPROXIMATE SCALE
1" = 5,000'

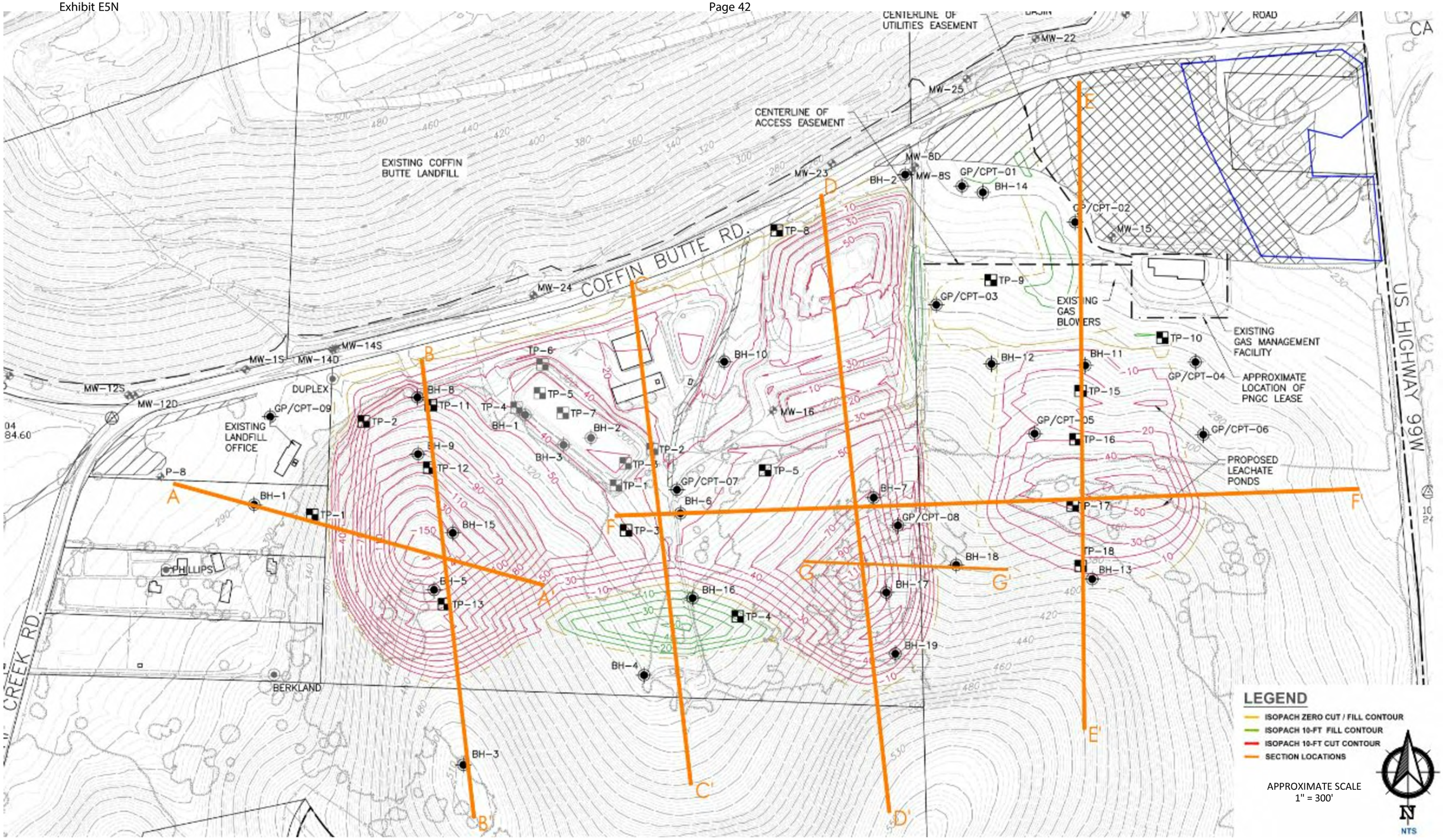
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

SURFACE GEOLOGY MAP
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	January 31, 2022
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 3

FIGURE: 3



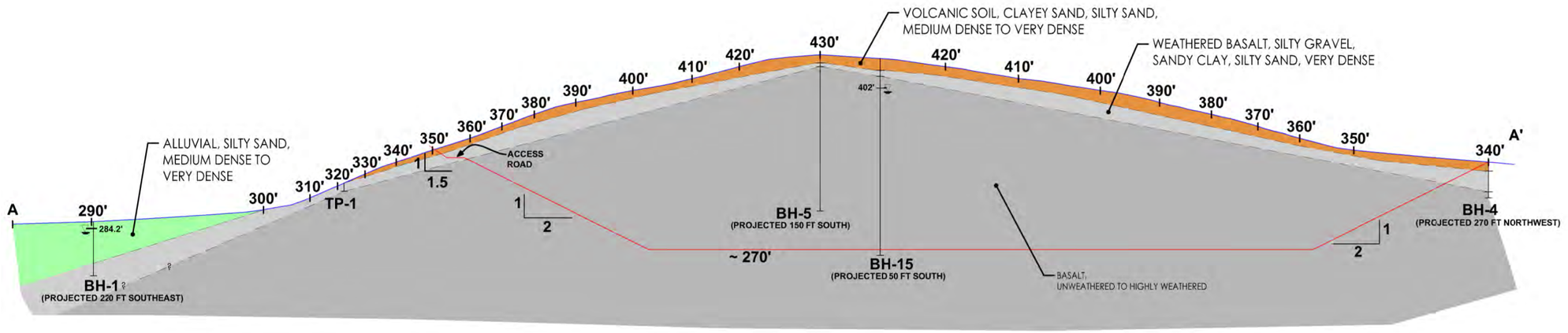
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS SECTION LOCATION MAP
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	January 31, 2022
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 4

FIGURE: 4



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- GROUNDWATER
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT
- ALLUVIAL

GRAPHIC SCALE

0 25 42.5 100 200

(IN FEET)

1 inch = 100 ft.

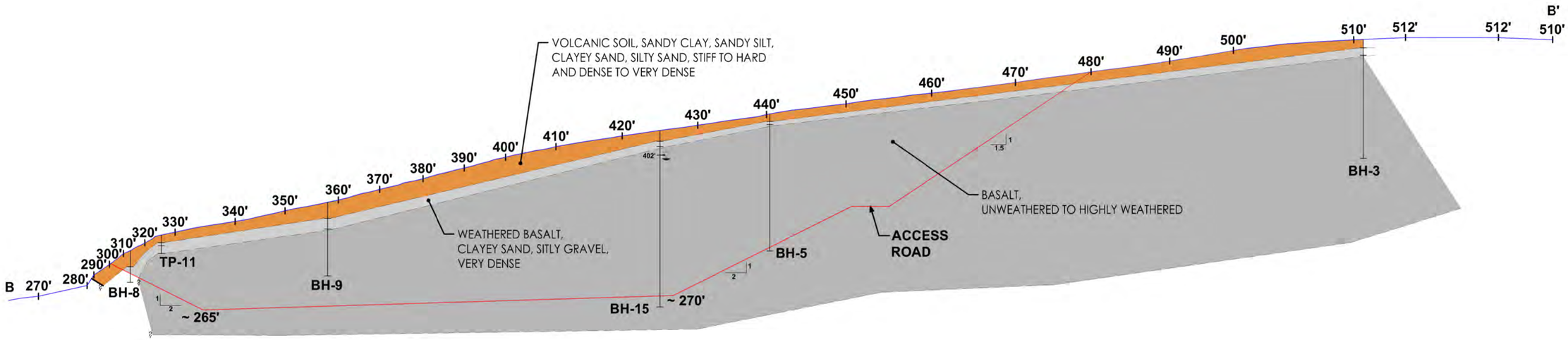
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION A-A'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_5.DWG

FIGURE 5



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- GROUNDWATER
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT

GRAPHIC SCALE

0 25 50 100 200

(IN FEET)

1 inch = 100 ft.

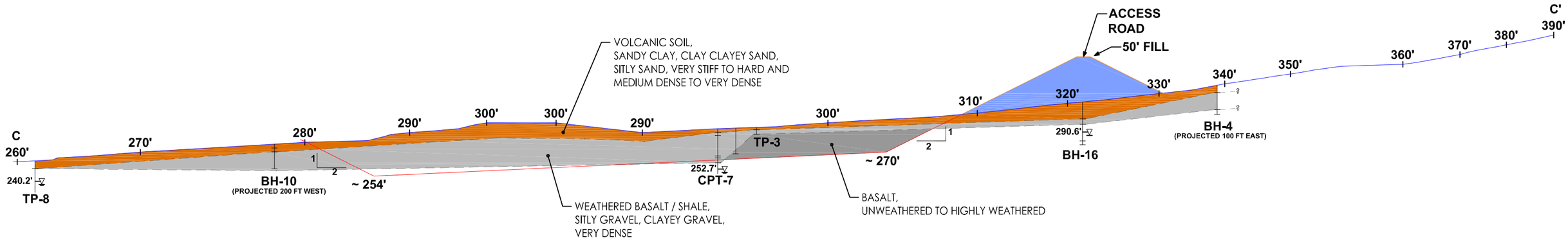
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION B-B'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_6.DWG

FIGURE 6



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- ISOPACH ZERO CUT/ FILL LINE
- GROUNDWATER
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT
- FILL

GRAPHIC SCALE

0 25 50 100 200

(IN FEET)

1 inch = 100 ft.

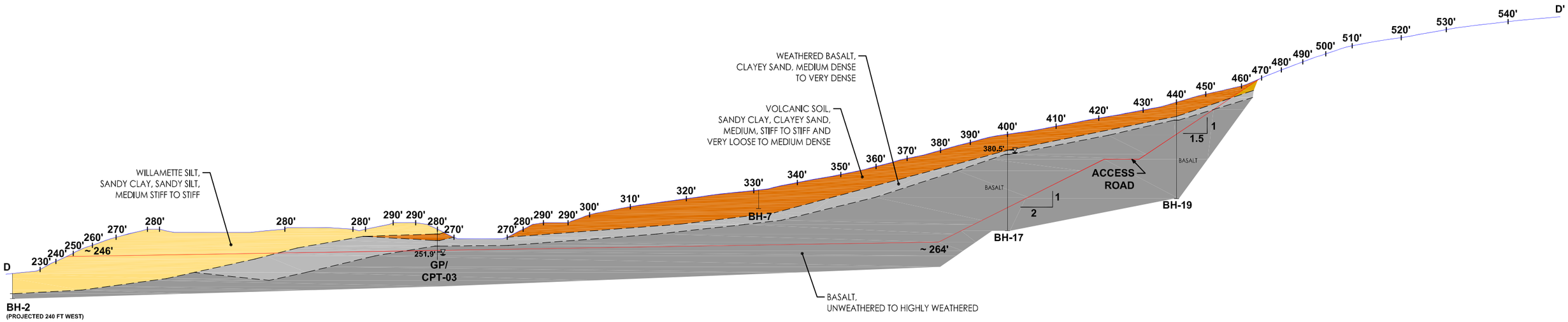
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION C-C'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_7.DWG

FIGURE 7



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- GROUNDWATER
- WILLAMETTE SILT
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT

GRAPHIC SCALE

0 30 60 120 240

(IN FEET)

1 inch = 120 ft.

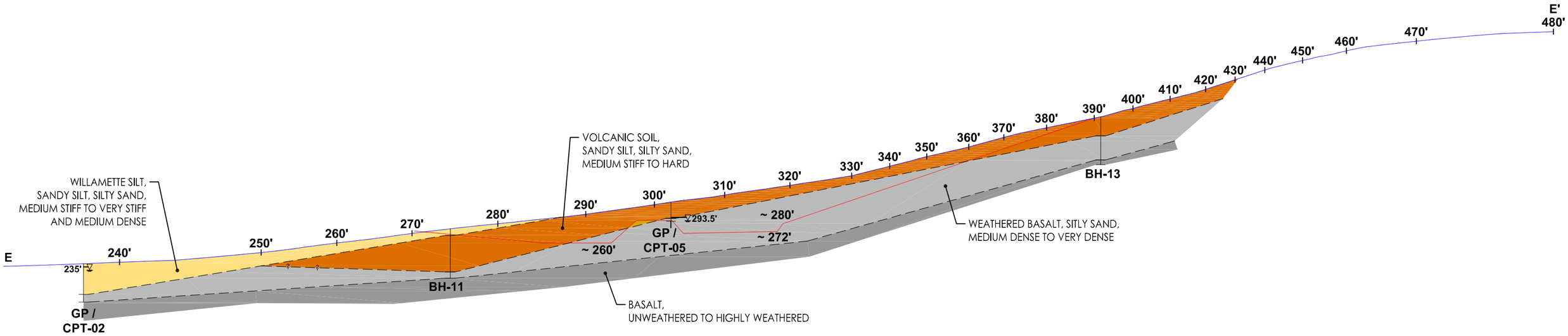
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION D-D'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_8.DWG

FIGURE 8



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- GROUNDWATER
- WILLAMETTE SILT
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT

GRAPHIC SCALE

0 25 50 100 200

(IN FEET)

1 inch = 100 ft.

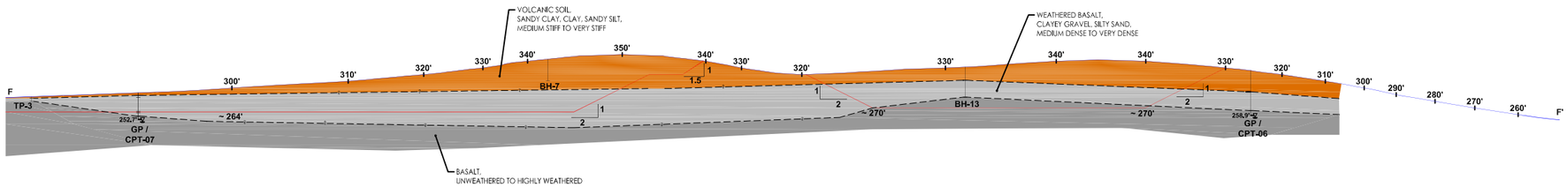
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION E-E'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_9.DWG

FIGURE 9



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- GROUNDWATER
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT

GRAPHIC SCALE

0 50 100 200 400

(IN FEET)

1 inch = 200ft.

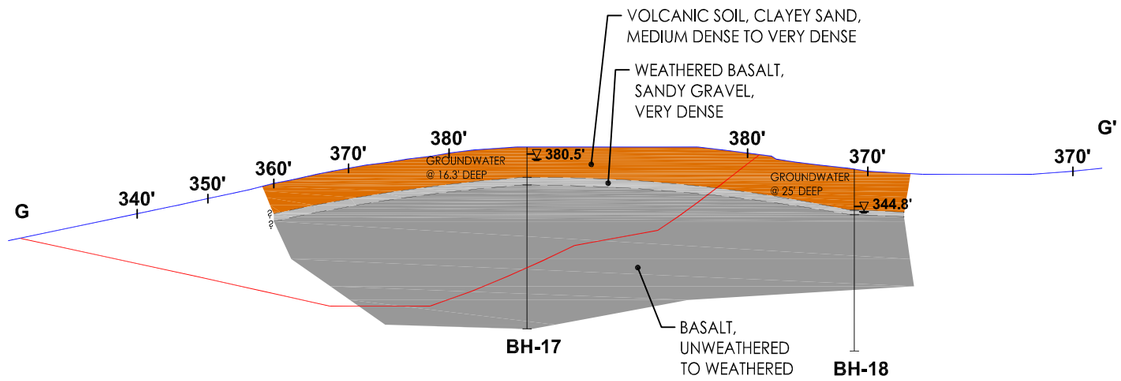
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION F-F'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_10.DWG

FIGURE 10



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- GROUNDWATER
- VOLCANIC SOIL
- WEATHERED BASALT
- BASALT

GRAPHIC SCALE

0 25 50 100 200

(IN FEET)

1 inch = 100 ft.

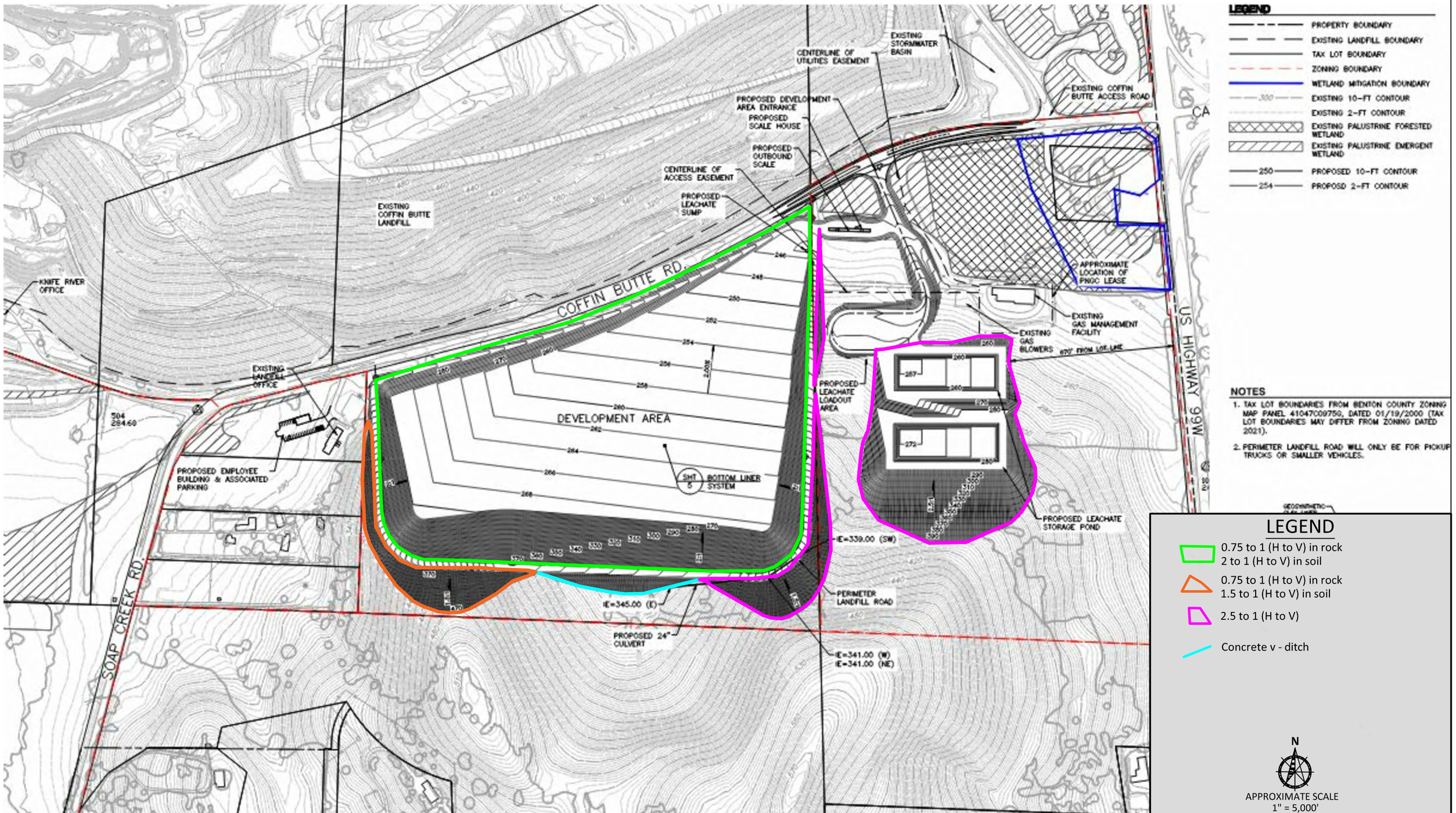
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION G-G'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	October 24, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_11.DWG

FIGURE 11



THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

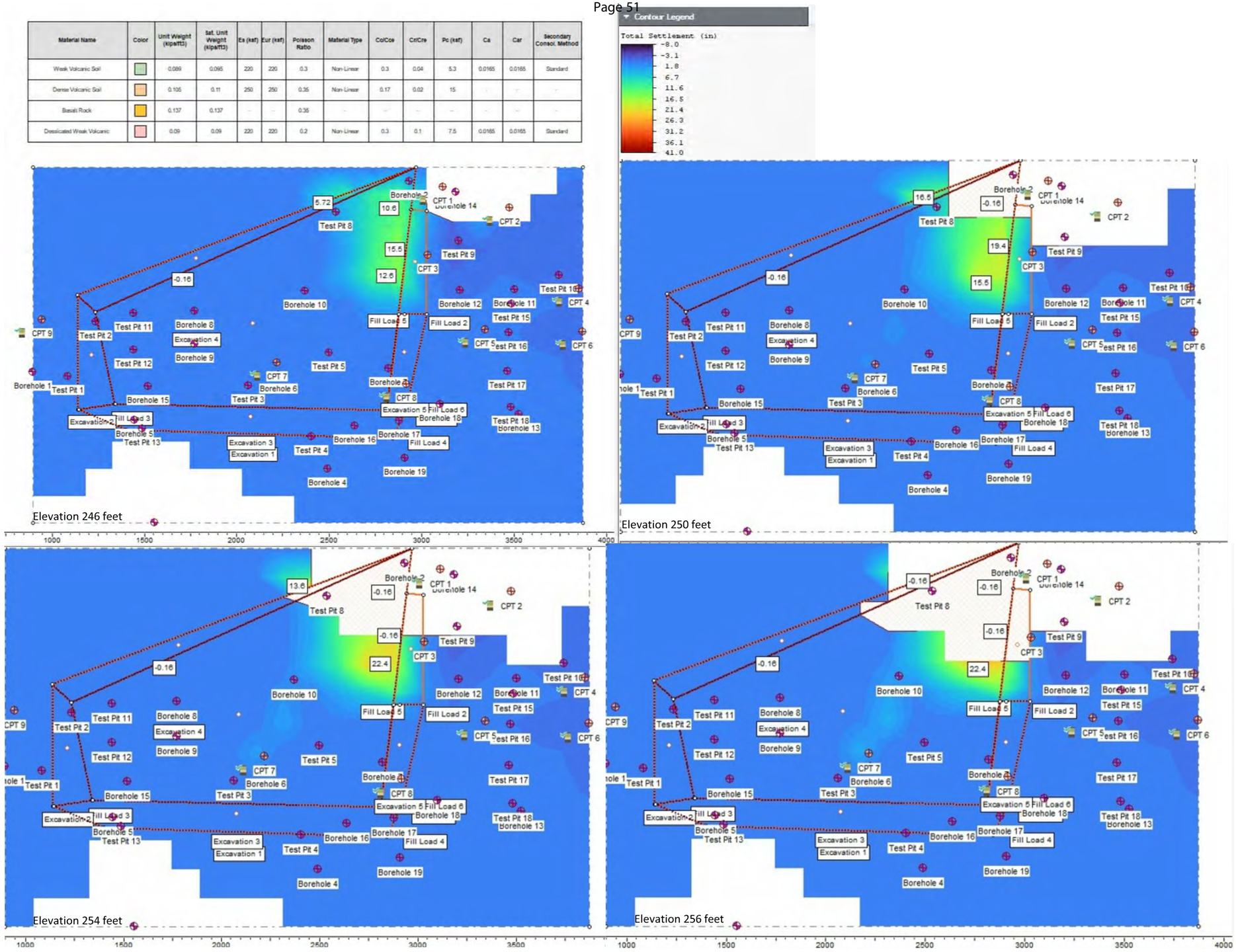
WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

EXCAVATION PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	June 4, 2024
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 12

FIGURE: 12

Material Name	Color	Unit Weight (kips/ft3)	Sat. Unit Weight (kips/ft3)	Es (ksf)	Eur (ksf)	Poisson Ratio	Material Type	Cc/Cce	Cr/Cre	Pc (ksf)	Ca	Car	Secondary Consol. Method
Weak Volcanic Soil		0.089	0.095	220	220	0.3	Non-Linear	0.3	0.04	5.3	0.0165	0.0165	Standard
Dense Volcanic Soil		0.105	0.11	250	250	0.35	Non-Linear	0.17	0.02	15	--	--	--
Basalt Rock		0.137	0.137	--	--	0.35	--	--	--	--	--	--	--
Desiccated Weak Volcanic		0.09	0.09	220	220	0.2	Non-Linear	0.3	0.1	7.5	0.0165	0.0165	Standard



THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUG NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

SETTLEMENT ESTIMATES VS. GROUND SURFACE ELEVATION
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No:	21129 (1)
DRAWN:	June 7, 2024
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	21129 (1) Figure 13

FIGURE: 13

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

APPENDIX A

APPENDIX A
FIELD EXPLORATION SUMMARY

GENERAL

Subsurface conditions for the proposed Coffin Butte Landfill South Expansion Area, located in Corvallis, Oregon, were explored by advancing nineteen (19) borings (designated BH-01 through BH-19), fifteen (15) test pits (designated TP-01 through TP-05, TP-08 through TP-13, and TP-15 through TP-18), and nine (9) cone penetration tests with geoprobe sampling (designated GP/CPT-01 through GP/CPT-09) at the approximate locations shown on **Figures 2a and 2b**, *Exploration Location Map*. TP-06, TP-07, and TP-14 were not excavated due to conflicts with utilities, access restrictions, and a mechanical breakdown. Boring, test pit, CPT, and geoprobe logs are included in this appendix. The procedures used to advance the borings and test pits, collect soil samples, and other field techniques are described in detail in this appendix. Unless otherwise noted, all soil sampling and classification procedures followed local engineering practices which are in general conformance with relevant ASTM procedures and the Unified Soil Classification System (USCS). "General conformance" means that certain local and common excavation and descriptive practices and methodologies have been followed.

TEST PITS

Fifteen (15) test pits were advanced with a CAT 310 trackhoe, operated by RL Reimers Excavation of Albany, Oregon between August 16 and September 23, 2021. The test pits were observed by a Wallace Group geotechnical professional who maintained a detailed log of subsurface conditions and materials encountered, collected soil samples, and documented backfilling. The test pits were advanced to depths ranging from 7- to 12-feet below ground surface (bgs). Grab samples were retrieved for laboratory testing. Test pits were backfilled using spoils from the excavations.

Dynamic Cone Penetration (DCP) testing was conducted to evaluate the relative density of the soil. DCP procedures are generally described in ASTM Special Technical Publication 399, which have been modified by Wallace Group to provide better representation of soil relative density or stiffness. During the DCP test, a 1.5-inch diameter steel cone is driven up to 18 inches into the soil using a 15-pound hammer dropped from a height of 18 inches. The number of blows is recorded and can be roughly correlated to the Standard Penetration Test. The number of blows required to drive the cone 12 inches into the soil provides a measure of the relative density of granular soils such as sand and gravel, and the strength of fine-grained soils such as silt and clay.

BORINGS

Nineteen (19) borings, advanced with a combination of hollow-stem augers (HSA), mud rotary, and HQ rock coring techniques. Borings BH-01 through BH-14 were drilled by using a track-mounted CME drilling rig, operated by Western States Drilling of Hubbard, Oregon on September 7 through 28, 2021. Borings BH-15 through BH-19 were drilled using a track-mounted CME drilling rig, operated by HazTech Drilling of Nampa, Idaho on November 8 through 16, 2022. The borings were observed by a Wallace Group geotechnical professional who maintained a detailed log of subsurface conditions and materials encountered, collected soil samples, and documented backfilling. The borings were advanced to depths ranging from 25.1- to 165-feet below ground surface (bgs). Disturbed (SPT), relatively undisturbed (Shelby tube), and rock core (HQ wireline) samples were retrieved for laboratory testing. Borings were abandoned using bentonite backfill.

BH-16 and BH-17 were converted into temporary piezometers (designated MW-16 and MW-17, respectively) by Oregon Geotechnical Explorations on November 21 and 22, 2022. Piezometers were installed to depths of 20-feet bgs in MW-16 and 100-feet bgs in MW-17.

CONE PENETRATION TESTING

Nine (9) CPTs were advanced by Oregon Geotechnical Explorations of Salem, Oregon between September 21 through November 8, 2022. The CPTs were performed by hydraulically-pushing a 1.4-inch-diameter, cone-tipped probe, with a projected area of 10 square centimeters, into the ground. The cone tip measures tip resistance, and a friction sleeve behind the cone tip measures frictional resistance. Electrical strain gauges or load cells within the cone continuously measured cone tip resistance and frictional resistance during the entire depth of each probing. Accumulated data was processed to provide engineering information, such as the types and approximate strength characteristics of the soil encountered. CPT's were advanced to depths between 10- to 65-feet bgs. Pore pressure dissipation testing was performed at all CPT locations to evaluate the depth to groundwater. Shear wave velocity measurements were collected in CPT-08.

Nine geoprobes (GP) were advanced adjacent to CPT locations to collect soil samples for laboratory testing. Geoprobes were advanced adjacent to CPT-01 through CPT-09 and were designated GP-01 through GP-09, as shown on Figure 2. Geoprobes were advanced by vibrating a 1.25-inch-diameter casing to depths ranging between 10- and 30-feet bgs. CPT and GP holes were abandoned with bentonite.

MATERIAL DESCRIPTIONS

Soil samples were visually classified in the field as they were collected. Consistency, color, and other distinguishing characteristics of the samples were noted. Afterwards, the soil samples were re-examined in the laboratory and the field descriptions were modified where necessary. The terminology used in the rock descriptions are defined in the following sections.

SAMPLING AND LABORATORY TESTING

Disturbed and relatively undisturbed soil samples were retrieved from the borings. The samples were classified and capped, sealed in plastic bags, or placed into core boxes for further examination and physical testing in our laboratory for gradation, moisture content, rock specimen point load testing, Atterberg limits, triaxial, and permeability.

BORING, TEST PIT, AND GP/CPT LOGS

Figure A is a Legend explaining the information and symbols presented on the test pit and boring logs. The logs are presented on Figures A-1 through A-15 (Test Pits), A-16 through A-36 (Borings and Piezometers), A-37 through A-45 (Geoprobes), and A-46 through A-54 (CPTs). The logs describe the materials encountered and the depths where materials and/or characteristics of these materials changed, although the changes may be gradual. Where material types and descriptions changed between samples, the contacts were interpreted. On each boring log, the types of samples collected (including their identification number) are reported, including laboratory test results and blow counts. Corrected N-values, as presented on the boring logs, represent sampler blow counts that have been corrected for sampler type and hammer energy.

GROUNDWATER

Groundwater was encountered during subsurface exploration for this project and groundwater elevations during drilling are presented on the logs in Appendix A.

TERMINOLOGY USED TO DESCRIBE SOIL AND ROCK

Soils exist in mixtures with varying proportions of components. The predominant soil, i.e., greater than 50 percent based upon total dry weight, is the primary soil type and is capitalized in our log descriptions, e.g., SAND, GRAVEL, SILT or CLAY. "General Accordance" means that certain local and common descriptive practices have been followed. In accordance with ASTM D2488, group symbols (such as GP or CH) are applied on that portion of the soil passing the 3-inch (75mm) sieve based upon visual examination. The following describes the use of soil names and modifying terms used to describe fine- and coarse-grained soils.

Fine - Grained SOILS (More than 50% fines passing 0.074 mm, #200 sieve)

The primary soil type i.e. SILT or CLAY is designated through visual – manual procedures to evaluate soil toughness, dilatancy, dry strength, and plasticity. The following describes the terminology used to describe fine - grained soils and varies from ASTM 2488 terminology in the use of some common terms.

Primary Soil Name and Symbols		
SILT (ML & MH)	CLAY (CL & CH)	ORGANIC SILT & CLAY (OL & OH)

Descriptions of plasticity are described based on the plasticity index results of Atterberg limits testing, as follows:

Plasticity Description	**Plasticity Index (PI)**
Non-Plastic	0 - 3
Low Plasticity	4 - 10
Medium Plasticity	>10 – 20
High Plasticity	>20 – 40
Very High Plasticity	>40

Modifying terms describing secondary constituents, estimated to 5 percent increments, are applied as follows:

Description	% Composition
Trace sand, trace gravel	5% - 10%
With sand; with gravel	15% - 25%
Sandy, or gravelly	30% - 45%

Borderline Symbols, for example CH/MH, are used where soils are not distinctly in one category or where variable soil units contain more than one soil type. Dual Symbols, for example CL-ML, are used where two symbols are required in accordance with ASTM D2488.

Soil Consistency. Consistency terms are applied to fine-grained soils (fines content > 50 percent). Descriptive terms are based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84, as follows.

Consistency Term	SPT N-value	Unconfined Compressive Strength	
		Tons/sq.ft.	kPa
Very soft	Less than 2	Less than 0.25	Less than 24
Soft	2 - 4	0.25 - 0.5	24 - 48
Medium stiff	5 - 8	0.5 - 1.0	48 – 96
Stiff	9 - 15	1.0 - 2.0	96 – 192
Very stiff	16 - 30	2.0 - 4.0	192 – 383
Hard	Over 30	Over 4.0	Over 383

Coarse-Grained Soils (less than 50% fines)

Coarse-grained soil descriptions, i.e., SAND or GRAVEL, are based on that portion of materials passing a 3-inch (75mm) sieve. Coarse-grained soil group symbols are applied in accordance with ASTM D2488 based upon the degree of grading, or distribution of grain sizes of the soil. For example, well graded sand containing a wide range of grain sizes is designated SW; poorly graded gravel, GP, contains high percentages of only certain grain sizes. Terms applied to grain sizes follow.

	Particle Diameter	
	Inches	**Millimeters**
Sand	0.003 - 0.19	0.075 - 4.8
Gravel	0.19 - 3.0	4.8 - 75
	Additional Constituents	
Cobble	3.0 - 12	75 - 300
Boulder	12 - 120	300 - 3050
Rock Block	>120	>3050

The amount of 'fines' in the soil are described as indicated by the following examples. Other soil mixtures will provide similar descriptive names.

Example: Coarse-Grained Soil Descriptions with Fines

Less than 5% fines	5 to 12% fines (Dual Symbols)	Greater than 12% to Less than 50% fines
GRAVEL: GW or GP	GRAVEL WITH SILT, GW-GM	SILTY GRAVEL: GM
SAND: SW or SP	SAND WITH CLAY, SP-SC	SILTY SAND: SM

Cohesionless Soil Structure terms are applied to granular, non-plastic soils based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586.

Cohesionless Soil Structure Term	***SPT N-value***
Very loose	0 - 4
Loose	4 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	> 50

Terminology Used to Describe Rock

The descriptions of rock strength, joint space or bedding, vesicularity, and quality are as follows:

Scale of Rock Strength

Description	Designation	Unconfined Compressive Strength, psi	Unconfined Compressive Strength, MP	Field Identification
Very low strength	R1	100 – 1000	0.7 – 7	Crumbles under firm blows with point of geology pick; can be peeled by a pocketknife.
Low strength	R2	1,000 – 4,000	7 – 28	Can be peeled by a pocketknife with difficulty; shallow indentation made by firm blows of geology pick.
Moderate strength	R3	4,000 – 8,000	28 – 55	Cannot by scraped or peeled with a pocketknife; specimen can be fractured with a single firm blow of geology hammer.
Medium high strength	R4	8,000 – 16,000	55 – 110	Specimen requires more than one blow with a geology hammer to fracture it.
High strength	R5	16,000 – 32,000	110 – 120	Specimen requires many blows of geology hammer to fracture it.
Very high strength	R6	> 32,000	> 220	Specimen can only be chipped with geology pick.

Descriptive Terminology for Joint Spacing or Bedding

Descriptive Term	*Spacing of Joints*	
Very close	Less than 2 inches	< 50 mm
Close	2 inches - 1 foot	50 mm – 300 mm
Moderately close	1 foot - 3 feet	300 mm – 1 m
Wide	3 feet -10 feet	1 m – 3 m
Very wide	Greater than 10 feet	> 3 m

Descriptive Terminology for Vesicularity

Descriptive Term	*Percent voids by volume*
Dense	< 1%
Slightly vesicular	1 – 10%
Moderately vesicular	10 – 30%
Highly vesicular	30 – 50%
Scoriaceous	> 50%

Correlation of RQD and Rock Quality

Rock Quality Descriptor	RQD Value
Very poor	0 – 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90

Scale of Rock Weathering

Stage	*Description*	*Quality Distinction*
Fresh	Rock is fresh, crystals are bright, a few joints may show slight staining because of ground water.	Discoloration
Very Slight	Rock is generally fresh, joints are stained, some joints may have thin clay coatings, crystals in broken faces show bright.	Discoloration only on major discontinuity surfaces [i]
Slight	Rock is generally fresh, joints are stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some feldspar crystals are dull and discolored. Rocks ring under hammer if crystalline.	Discoloration on all discontinuity surfaces and on rock
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some are clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.	Decomposition and/or disintegration < 50% of rock [ii]
Moderately Severe	All rock, except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick. Rock goes "clunk" when struck.	Decomposition and/or disintegration > 50%, but not complete
Severe	All rock, except quartz, discolored or stained. Rock "fabric" is clear and evident but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of harder rock usually left, such as corestones in basalt.	Decomposition and/or disintegration > 75%, nearly complete
Very Severe	All rock, except quartz, discolored or stained. Rock "fabric" is discernible, but mass effectively reduced to "soil" with only fragments of harder rock remaining.	Decomposition and/or disintegration 100% with structure/fabric intact
Complete	Rock is reduced to "soil". Rock "fabric" is not discernible, or only in small scattered locations. Quartz may be present as dikes or stringers.	Decomposition and/or disintegration 100% with structure/fabric destroyed

NOTES: [i] Discontinuities consist of any natural break (joint, fracture or fault) or plane of weakness (shear or gouge zone, bedding plane) in a rock mass

[ii] Decomposition refers to chemical alteration of mineral grains; disintegration refers to mechanical breakdown

[iii] Stage and description from ASCE Manual No. 56 (1976), quality distinction from Murray (1981)

KEY TO SYMBOLS

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- BASALT: Basalt
- CH: USCS High Plasticity Clay
- CL: USCS Low Plasticity Clay
- CL-ML: USCS Low Plasticity Silty Clay
- FILL: Fill (artificial fill)
- GC: USCS Clayey Gravel
- GM: USCS Silty Gravel
- MH: USCS Elastic Silt
- ML: USCS Silt
- SANDSTONE: Sandstone
- SC: USCS Clayey Sand
- SC-SM: USCS Clayey Sand
- SHALE: Shale
- SM: USCS Silty Sand

SAMPLER SYMBOLS

- Grab Sample
- Rock Core (RC)
- Standard Penetration Test
- Shelby Tube

WELL CONSTRUCTION SYMBOLS

- Bentonite Seal
- Filter Pack
- Slotted Pipe
- Top Cap: 1 pipe group, 1st pipe

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
MC - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
FINES - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)
OC - ORGANIC CONTENT (%)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UCCS - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION
Water Level at Time of Drilling, or as Shown
Water Level at End of Drilling, or as Shown
Water Level After 24 Hours, or as Shown

KEY TO SYMBOLS - WALLACE GROUP DATA TEMPLATE.GDT - 10/10/23 09:21 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-01

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/17/21 **COMPLETED** 8/17/21
GROUND ELEVATION 323.7 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0				SANDY LEAN CLAY WITH GRAVEL, moist, reddish brown, fine to coarse grained, angular to subangular, organics to 1', more gravel with depth	
2.5	GB S-1	CL			
5.0					
7.0					316.7

Refusal at 7.0 feet on basalt.
Bottom of test pit at 7.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-02

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/17/21 **COMPLETED** 8/17/21
GROUND ELEVATION 302 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0		19 18 35	CL		SANDY LEAN CLAY WITH GRAVEL, stiff, moist, dark brown, fine to coarse grained, subangular, organic soil	
					2.0	300.0
2.5			CL		LEAN CLAY WITH SAND, stiff, moist, reddish brown, fine grained, subangular	
5.0					5.0	297.0
			GC		CLAYEY GRAVEL WITH SAND, stiff, moist, red with gray, fine to coarse grained, angular, friable	
7.5	GB S-1					
10.0					10.0	292.0
					Refusal at 10.0 feet on basalt. Bottom of test pit at 10.0 feet.	

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-03

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 308.3 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0		CL		SANDY LEAN CLAY, stiff, moist, dark brown to black, fine grained, organic	
2.5				2.5	305.8
	GB S-1	GC		CLAYEY GRAVEL WITH SAND, moist, tan with reddish brown, fine to coarse grained, subangular, with cobbles and weathered in-place pillow basalt	
5.0					
				7.0	301.3

Refusal at 7.0 feet on basalt.
Bottom of test pit at 7.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-04

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 334.2 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0					SANDY LEAN CLAY, stiff, moist, reddish brown, fine grained	
2.5	GB S-1	54 68 75	CL			
5.0						
6.0						328.2
					SANDY LEAN CLAY WITH GRAVEL, stiff, moist, dark reddish brown	
7.5			CL			
10.0						324.2
10.0					Refusal at 10.0 feet on basalt. Bottom of test pit at 10.0 feet.	

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-05

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 297.8 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0	GB S-1	45 67 78	CL		SANDY LEAN CLAY, stiff, moist, reddish brown, fine grained	
5.0	GB S-2		CL		SANDY LEAN CLAY WITH GRAVEL, stiff, moist, dark reddish brown	292.8
9.0			GM		SILTY GRAVEL WITH SAND, moist, dark gray, fine to coarse grained, angular, weathered in-place basalt	288.8
10.0					Refusal at 10.0 feet on basalt. Bottom of test pit at 10.0 feet.	287.8

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-08

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/28/21 **COMPLETED** 9/28/21
GROUND ELEVATION 247.7 ft
EXCAVATION CONTRACTOR Sure Flow INC
GROUND WATER LEVELS:
EXCAVATION METHOD Hydro Excavation
AT TIME OF EXCAVATION 7.50 ft / Elev 240.20 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0				SANDY LEAN CLAY, moist, dark brown, fine grained	
2.5	GB S-1	CL			
5.0					
7.5					
8.0					239.7

Refusal at 8.0 feet on basalt.
Bottom of test pit at 8.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 6

TEST PIT NUMBER TP-09

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 253.2 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0		29 35 41			SILT WITH SAND, stiff, moist, gray to reddish brown, fine grained	
2.5	GB S-1		ML			
5.0						
7.5						
10.0	GB S-2					
12.0					Refusal at 12.0 feet on limit of excavator. Bottom of test pit at 12.0 feet.	241.2

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-10

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 256.3 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0				LEAN CLAY WITH SAND, stiff, moist, gray, fine grained	
2.5		CL			
				4.0	252.3
				SANDY LEAN CLAY, stiff, moist, red with gray	
5.0	GB S-1				
7.5		CL			
10.0					
				11.0	245.3

Refusal at 11.0 feet on limit of excavator.
Bottom of test pit at 11.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-11

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/17/21 **COMPLETED** 8/17/21
GROUND ELEVATION 310 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0					SANDY LEAN CLAY, stiff, moist, dark brown, fine grained, with organics	
			CL			
2.5						
		61				
	GB S-1	68				
		74				
5.0			SC			
7.5					CLAYEY GRAVEL WITH SAND, moist, dark red, fine to coarse grained, angular to subangular, weathered basalt	
			GC			
10.0						

3.0 — 307.0
7.0 — 303.0
10.0 — 300.0

Refusal at 10.0 feet on basalt.
Bottom of test pit at 10.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-12

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/17/21 **COMPLETED** 8/17/21
GROUND ELEVATION 360 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0		35 19 24	CL		SANDY LEAN CLAY WITH GRAVEL, stiff, moist, reddish brown, fine to coarse grained, organic to 1'	
2.5						
					4.0	356.0
5.0	GB S-1		GC		CLAYEY GRAVEL, moist, dark reddish brown, fine to coarse grained, angular, gravel increases with depth	
7.5						
					9.0	351.0

Refusal at 9.0 feet on basalt.
Bottom of test pit at 9.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-13

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/17/21 **COMPLETED** 8/17/21
GROUND ELEVATION 445 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0		ML		SANDY SILT, stiff, moist, dark brown, fine grained, low plasticity, roots and organics	
2.0					443.0
2.5	GB S-1	GC		CLAYEY GRAVEL WITH SAND, stiff, moist, dark reddish tan, fine to coarse grained, angular to subangular, increasing gravel with depth	
5.0					
7.0					438.0

Refusal at 7.0 feet on basalt.
Bottom of test pit at 7.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-15

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 288 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0				SANDY LEAN CLAY, stiff, moist, red with gray, fine grained, medium plasticity	
5.0	GB S-1	CL			
11.0					277.0

Refusal at 11.0 feet on limit of excavator.
Bottom of test pit at 11.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-16

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 309 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0				SANDY LEAN CLAY, stiff, moist, red with gray, fine grained	
2.5	GB S-1				
5.0		CL			
7.5					
10.0	GB S-2				
12.0					297.0

Refusal at 12.0 feet on limit of excavator.
Bottom of test pit at 12.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-17

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0				SANDY LEAN CLAY, stiff, moist, red with gray, fine grained
2.5	GB S-1			
5.0		CL		
7.5				
10.0				
11.0				Refusal at 11.0 feet on limit of excavator. Bottom of test pit at 11.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

TEST PIT NUMBER TP-18

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 8/16/21 **COMPLETED** 8/16/21
GROUND ELEVATION 390 ft
EXCAVATION CONTRACTOR RL Reimers
GROUND WATER LEVELS:
EXCAVATION METHOD CAT 310 Excavator
AT TIME OF EXCAVATION ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER EXCAVATION ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	DCP BLOW COUNTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0.0					SANDY LEAN CLAY, stiff, moist, red with gray, fine grained	
2.5		50 64 78				
5.0			CL			
7.5						
10.0	GB S-1				10.0	380.0

Refusal at 10.0 feet on limit of excavator.
Bottom of test pit at 10.0 feet.

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:48 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-01

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/9/21 **COMPLETED** 9/24/21
GROUND ELEVATION 291.7 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 7.50 ft / Elev 284.20 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SILTY SAND WITH GRAVEL, medium dense, moist, brown with grayish white, fine to coarse grained, subangular to subrounded, medium plasticity	
	SPT S-1	93	8 8 8	19	-				
5									
	SPT S-2	87	10 11 13	29	-				
	SPT S-3	93	9 10 8	22	LL: 52 PI: 19 Fines: 33.3% MC: 33.7%				
10									
	SPT S-4	93	10 20 25	54	very dense wet	SM			
15									
	SPT S-5	87	13 17 21	46	dense				
20								20.0	271.7
	SPT S-6	100	11 23 43	55				SILTY SAND, clayey sand, very dense, wet, tan with black, fine to coarse grained, subangular to subrounded, low plasticity	
25									
	SPT S-7	100	29 47 50	116		SC-SM			
30									
	SPT S-8	100	16 23 30	64	MC: 39.1% Fines: 36.0%				
35								35.0	256.7

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 16.1

BORING NUMBER BH-01

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35	SPT S-9	100	50/4"	60/4"		SM		SILTY SAND WITH GRAVEL, very dense, wet, dark gray, fine to coarse grained, angular to subangular, weathered basalt	
40	SPT S-10	100	42 50/3"	50/5"					
45	SPT S-11	100	50/5"	60/5"				45.4 Bottom of borehole at 45.4 feet.	246.3

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-02

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/28/21 **COMPLETED** 9/28/21
GROUND ELEVATION 244 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 4.90 ft / Elev 239.10 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY LEAN CLAY, moist, dark brown, fine grained, medium plasticity	
5						CL			
10								10.0	234.0
	SPT S-1	100	1 2 2	5	-	CL		LEAN CLAY, medium stiff, wet, olive brown, fine grained, subrounded to rounded, medium plasticity	
15	ST ST-1	100			MC: 36.1% DD: 83 / 85 / 86 pcf c: 1000 psf phi: 8.8 degrees			15.0	229.0
	SPT S-2	100	3 3 5	10		CL		SANDY LEAN CLAY, stiff, wet, dark greenish gray, fine grained, subrounded to rounded, high plasticity	
20	SPT S-3	100	2 2 3	6	medium stiff				
25								25.0	219.0
	SPT S-4	100	4 6 7	16		ML		SANDY SILT, very stiff, wet, tan with gray, fine to coarse grained, angular to subangular, weathered in-place basalt, trace gravel	
30	SPT S-5	100	6 19 22	49	hard				
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 17.1

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-02

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35	SPT S-6	100	17 25 24	59		ML		SANDY SILT, very stiff, wet, tan with gray, fine to coarse grained, angular to subangular, weathered in-place basalt, trace gravel *(continued)*	
40	SPT S-7	100	7 10 18	34					
45	SPT S-8	100	8 12 14	31					
50	SPT S-9	100	50	60/6"				50.5 Bottom of borehole at 50.5 feet.	193.5

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-03

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/10/21 **COMPLETED** 9/16/21
GROUND ELEVATION 510 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY SILT WITH GRAVEL, hard, moist, reddish brown with gray, fine to coarse grained, angular to subangular, medium plasticity, with cobbles	
	SPT S-1	87	10 13 14	32	-	ML			
5	SPT S-2	86	14 33 50/5"	106/11"					
									502.0
8.0								SILTY GRAVEL WITH SAND, very dense, moist, grayish red with brown, fine to coarse grained, angular to subangular, low plasticity, with cobbles, weathered basalt	
10	SPT S-3	67	43 50/1"	60/1"	MC: 20.0% Fines: 13.2%	GM			
15									495.0
15.0	SPT S-4	100	50/1"	60/1"				BASALT, unweathered to highly weathered, greenish gray, low strength to medium high strength, R1 - R3/R4, fractures are filled with siltstone, chlorite alteration in places, basalt is brecciated	
	RC C-1	58 (0)							
	RC C-2	97 (68)							
20									
	RC C-3	85 (52)			21.5': UCS: 624 psi				
25									
	RC C-4	67 (45)			28.5': UCS: 5377 psi				
30									
	RC C-5	97 (75)			32.5': UCS: 2297 psi				
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 18.1

BORING NUMBER BH-03

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35								BASALT, unweathered to highly weathered, greenish gray, low strength to medium high strength, R1 - R3/R4, fractures are filled with siltstone, chlorite alteration in places, basalt is brecciated *(continued)*	
40	RC C-6	100 (70)			36.5': UCS: 264 psi				
45	RC C-7	100 (58)							
50	RC C-8	80 (48)			47.5': UCS: 439 psi				
55	RC C-9	97 (57)							
60	RC C-10	78 (43)			60': UCS: 248 psi				
65	RC C-11	73 (18)							
70	RC C-12	100 (62)			67': UCS: 2460 psi				
75	RC C-13	90 (33)			73': UCS: 473 psi				

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-03

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
75								BASALT, unweathered to highly weathered, greenish gray, low strength to medium high strength, R1 - R3/R4, fractures are filled with siltstone, chlorite alteration in places, basalt is brecciated *(continued)*	
80	RC C-14	93 (68)			79': UCS: 473 psi				
85	RC C-15	100 (53)			85': UCS: 677 psi				
90	RC C-16	100 (27)			87': UCS: 979 psi				
95	RC C-17	85 (40)							
100	RC C-18	48 (0)							
105	RC C-19	100 (65)			103': UCS: 223 psi 105': UCS: 3242 psi				
110	RC C-20	65 (18)			108': UCS: 640 psi				
								111.0	399.0

Bottom of borehole at 111.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 18.3

BORING NUMBER BH-04

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/27/21 **COMPLETED** 9/27/21
GROUND ELEVATION 343.9 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SILTY SAND, clayey sand, stiff, moist, brownish gray, fine to coarse grained, angular to subangular, medium plasticity	
	SPT S-1	100	3 6 10	19	MC: 36.9% Fines: 41.2%	SC-SM			
5	SPT S-2	100	10 50/5"	60/5"	medium dense				
7.5									336.4
	SPT S-3	100	50/3"	60/3"				SILTY GRAVEL WITH SAND, very dense, moist, gray, fine to coarse grained, angular to subangular, low plasticity, highly weathered and fractured in-place basalt	
10	SPT S-4	100	50/3"	60/3"					
15	SPT S-5	100	50/2"	60/2"		GM			
20	SPT S-6	100	50/2"	60/2"					
25									
25.0									318.9
	SPT S-7	100	50/2"	60/2"				BASALT, slightly weathered, slightly fractured, greenish gray, low strength to medium high strength, brecciated, palagonite/chlorite infilling, R3/R1	
	RC C-1	97 (60)							
30									
30.0									313.9

Bottom of borehole at 30.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 19

BORING NUMBER BH-05

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/17/21 **COMPLETED** 9/20/21
GROUND ELEVATION 443.4 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SILTY SAND WITH GRAVEL, dense, moist, reddish brown with gray, fine to coarse grained, angular to subangular, medium plasticity, with cobbles	
	SPT S-1	20	12 17 21	46	LL: 67 PI: 30 MC: 37.2% Fines: 22.7%	SM			
5	SPT S-2	60	10 14 18	38					
7.0									436.4
	SPT S-3	96	47 50/4"	60/4"		GM		SILTY GRAVEL WITH SAND, very dense, moist, gray with reddish brown, fine to coarse grained, angular to subangular, low plasticity, with cobbles	
10									
10.0									433.4
	SPT S-4	0	50/3"	60/3"				BASALT, slightly weathered to moderately weathered, moderately fractured, greenish gray, very low strength to high strength, R0 - R3/R4, fractures are filled with siltstone, chlorite alteration in places, basalt is brecciated	
	RC C-1	89 (0)							
	RC C-2	40 (0)			11': UCS: 929 psi				
15									
	RC C-3	65 (10)							
20									
	RC C-4	40 (0)							
25									
25.0									418.4
								BASALT, highly weathered to weathered, intensely fractured, greenish gray, very low strength to medium high strength, R0 - R3, basalt is brecciated with a siltstone matrix	
	RC C-5	80 (15)			30': UCS: 1022 psi				
30									
	RC C-6	40 (7)							
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 20.1

BORING NUMBER BH-05

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35								BASALT, highly weathered to weathered, intensely fractured, greenish gray, very low strength to medium high strength, R0 - R3, basalt is brecciated with a siltstone matrix *(continued)*	
40	RC C-7	38 (0)							
45	RC C-8	50 (0)							
50	RC C-9	40 (0)			47': UCS: 5332 psi				
55	RC C-10	43 (0)							
60	RC C-11	33 (0)							
65	RC C-12	55 (0)			61': UCS: 324 psi				
70	RC C-13	32 (0)							
75	RC C-14	33 (0)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-05

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
75								BASALT, highly weathered to weathered, intensely fractured, greenish gray, very low strength to medium high strength, R0 - R3, basalt is brecciated with a siltstone matrix *(continued)*	
80	RC C-15	47 (0)							
85	RC C-16	60 (0)							
90	RC C-17	33 (0)			90': UCS: 18061 psi				
95	RC C-18	37 (0)							
100	RC C-19	40 (0)							
105	RC C-20	93 (45)			105': UCS: 374 psi				
110	RC C-21	40 (0)							
115	RC C-22	60 (25)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-05

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
115								BASALT, highly weathered to weathered, intensely fractured, greenish gray, very low strength to medium high strength, R0 - R3, basalt is brecciated with a siltstone matrix *(continued)*	
120	RC C-23	72 (45)			119.5': UCS: 1059 psi				
125	RC C-24	67 (0)			125': UCS: 1529 psi				
130	RC C-25	80 (50)			127': UCS: 1204 psi				
								131.0	312.4

Bottom of borehole at 131.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-06

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/27/21 **COMPLETED** 9/27/21
GROUND ELEVATION 291.2 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0						CL		SANDY LEAN CLAY, medium stiff to very stiff, moist, brown with gray, fine grained, high plasticity	
	SPT S-1	67	4 5 5	12	-				
5	SPT S-2 ST ST-1	100 100	0 2 5	8	200 - 250 psi				
	SPT S-3	100	2 2 3	6	medium stiff				
10	SPT S-4	100	3 3 6	11	stiff				
15	SPT S-5	100	6 7 12	23	very stiff				
20	SPT S-6	93	3 5 5	12	stiff				
25	SPT S-7	100	5 4 6	12					
								26.5	264.7

Bottom of borehole at 26.5 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-07

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/28/21 **COMPLETED** 9/28/21
GROUND ELEVATION 338.9 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY LEAN CLAY, stiff, moist, reddish brown with black, fine to coarse grained, angular to subangular, high plasticity, weathered and decomposed basalt	
	SPT S-1	100	5 4 5	11	-				
5	SPT S-2	100	2 3 5	10					
	SPT S-3	100	1 3 4	8					
10	SPT S-4 ST ST-1	100 100	1 1 3	5	medium stiff MC: 65.0% DD: 54 pcf c: 350 psf phi: 37 degrees consol test - see App B				
15	SPT S-5	100	2 3 4	8	stiff	CL			
20	SPT S-6	100	2 3 5	10					
25	SPT S-7	100	1 1 4	6	medium stiff				
30	SPT S-8	100	2 3 6	11	stiff			31.5	307.4

Bottom of borehole at 31.5 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-08

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/24/21 **COMPLETED** 9/24/21
GROUND ELEVATION 309.3 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY LEAN CLAY, very stiff, moist, orangeish brown with gray, fine to coarse grained, medium plasticity, weathered in-place basalt	
	SPT S-1	93	6 7 6	16	-				
5	SPT S-2	80	14 17 17	41	hard				
	SPT S-3	93	12 19 14	40		CL			
10	SPT S-4	100	10 10 13	28	very stiff				
15								15.0	294.3
	SPT S-5	100	18 22 37	71				CLAYEY SAND WITH GRAVEL, very dense, moist, orangeish brown with gray, fine to coarse grained, angular to subangular, medium plasticity, basalt texture, weathered basalt	
20	SPT S-6	100	30 23 46	83	MC: 23.2% Fines: 21.3%	SC			
25	SPT S-7	100	17 39 50/4"	107/10"				26.3	283.0
								Bottom of borehole at 26.3 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-09

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/22/21 **COMPLETED** 9/23/21
GROUND ELEVATION 359.1 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY SILT WITH GRAVEL, stiff, moist, reddish brown with gray, fine to coarse grained, angular to subangular, medium plasticity	
	SPT S-1	93	4 5 6	13	-				
5	SPT S-2	87	3 7 10	20	very stiff				
	SPT S-3	80	9 13 23	43	hard	ML			
10	SPT S-4	93	29 37 21	70					
15									344.1
	SPT S-5	100	50/2"	60/2"				SILTY GRAVEL WITH SAND, very dense, moist, gray with reddish brown, fine to coarse grained, angular to subangular, weathered in-place basalt, with cobbles	
20	SPT S-6	25	50/4"	60/4"		GM			
25									334.1
	SPT S-7	100	50/2"	60/2"				BASALT, highly weathered to weathered, intensely fractured, greenish gray, very low strength to medium high strength, R0 - R3, fractures are filled with siltstone, chlorite/palagonite alteration in places, basalt is brecciated	
	RC C-1	0 (0)							
	RC C-2	33 (10)			26': UCS: 350 psi				
30									
	RC C-3	87 (15)			35': UCS: 481 psi				
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 24.1

BORING NUMBER BH-09

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35								BASALT, highly weathered to weathered, intensely fractured, greenish gray, very low strength to medium high strength, R0 - R3, fractures are filled with siltstone, chlorite/palagonite alteration in places, basalt is brecciated *(continued)*	
40	RC C-4	40 (0)							
45	RC C-5	97 (60)			43.5': UCS: 631 psi 45.5': UCS: 1410 psi				
50	RC C-6	48 (0)							
55	RC C-7	55 (0)							
60	RC C-8	68 (17)			57': UCS: 14194 psi 57': UCS: 7636 psi				
65	RC C-9	32 (0)							
70	RC C-10	85 (54)			69': UCS: 1059 psi			70.0	289.1

Bottom of borehole at 70.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-10

PAGE 1 OF 1

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/28/21 **COMPLETED** 9/28/21
GROUND ELEVATION 263.1 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0	SPT S-1	100	5 4 4	10	-	CL		SANDY LEAN CLAY, stiff, moist, dark brown, fine to coarse grained, subangular to subrounded, medium plasticity, [FILL]	
								4.0	259.1
5	SPT S-2	100	3 6 9	18	LL: 60 PI: 35 MC: 32.0% Fines: 74.6%	CH		SANDY FAT CLAY WITH GRAVEL, very stiff, moist, reddish brown, fine to coarse grained, angular to subangular, high plasticity	
								8.0	255.1
	SPT S-3	100	18 33 34	80		GM		SILTY GRAVEL WITH SAND, very dense, moist, gray, fine to coarse grained, angular to subangular, low plasticity	
10	SPT S-4	100	50	60/6"					
15	SPT S-5	67	50/3"	60/3"					
20	SPT S-6	100	50/2"	60/2"	MC: 20.5% Fines: 27.0%				
25	SPT S-7	100	50/2"	60/2"					
								25.2	237.9
								Bottom of borehole at 25.2 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-11

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill
PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR
DATE STARTED 9/8/21 **COMPLETED** 9/9/21 **GROUND ELEVATION** 274.8 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc. **GROUND WATER LEVELS:**
DRILLING METHOD CME Track Rig **AT TIME OF DRILLING** ---
LOGGED BY SMW **CHECKED BY** LMS **24HRS AFTER DRILLING** ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SILTY SAND, medium dense, moist, dark reddish brown with gray, fine grained, high plasticity	
5	SPT S-1	87	3 4 5	11	-	SM			
	SPT S-2	93	3 4 5	11	MC: 49.7% Fines: 33.5%				
								7.0	267.8
10	SPT S-3	100	1 2 3	6				SANDY SILT, medium stiff, moist, dark reddish brown with gray, fine grained, high plasticity	
	SPT S-4	100	1 2 3	6					
15	ST ST-1	100			MC: 69.8% DD: 52 / 57pcf Su: 1039 psf k: 0.00000411 cm/s consol test - see App B				
	SPT S-5	93	1 2 2	5	LL: 85 PI: 41 MC: 80.7% Fines: 65.9%				
20	SPT S-6	93	2 3 5	10	stiff	MH			
25	SPT S-7	100	1 2 3	6	medium stiff				
30	SPT S-8	100	1 2 3	6	MC: 72.2% Fines: 54.9%				
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 26.1

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-11

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35								SANDY SILT, medium stiff, moist, dark reddish brown with gray, fine grained, high plasticity *(continued)*	
40	SPT S-9	100	4 8 10	22	very stiff	MH			
45								45.0	229.8
								SILTY SAND, very dense, moist, greenish gray, fine grained, angular to subangular, low plasticity, weathered basalt	
50	SPT S-10	100	14 21 30	61		SM			
								51.5	223.3

Bottom of borehole at 51.5 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-12

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/7/21 **COMPLETED** 9/7/21
GROUND ELEVATION 270.7 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY ELASTIC SILT, stiff, moist, orangeish brown, fine grained, high plasticity, saprolitic basalt	
5	SPT S-1	93	2 6 6	14	-				
	SPT S-2	100	2 2 4	7	medium stiff				
10	SPT S-3	100	1 1 3	5	LL: 78 PI: 36 MC: 61.1% Fines: 50.7%				
	SPT S-4 ST ST-2	93 100	0 1 1	2	MC: 63.9% DD: 58 pcf Su: 1159 psf consol test - see App B				
15	SPT S-5	100	1 1 1	2	soft	MH			
	SPT S-6	100	0 2 1	4	medium stiff				
20									
	SPT S-7 ST ST-3	100 100	1 2 4	7	MC: 64.9% c: 200 psf phi: 41 degrees consol test - see App B				
25	SPT S-8	100	1 2 5	8					
								28.0	242.7
30								SILTY SAND, loose, moist, orangeish brown, fine grained, angular to subangular, saprolitic basalt, weathered basalt	
	SPT S-9	100	1 1 2	4	LL: 67 PI: 21 MC: 66.3% Fines: 48.2%	SM			
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 27.1

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-12

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35	SPT S-10	100	2 2 3	6		SM		SILTY SAND, loose, moist, orangeish brown, fine grained, angular to subangular, saprolitic basalt, weathered basalt *(continued)*	
40	ST ST-1	80							
45	SPT S-11	100	5 10 18	34	MC: 44.2% Fines: 38.0% dense			46.5	224.2

Bottom of borehole at 46.5 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-13

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/9/21 **COMPLETED** 9/9/21
GROUND ELEVATION 390.2 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY SILT, very stiff, moist, dark red with gray, fine grained, medium plasticity, weathered saprolitic basalt	
	SPT S-1	67	5 10 12	26	-				
5	SPT S-2	73	5 7 6	16					
	SPT S-3	80	2 3 5	6	medium stiff				
10	SPT S-4	73	2 4 4	10	stiff	ML			
15	SPT S-5	80	1 1 2	4	medium stiff				
20								20.0	370.2
	SPT S-6	93	5 11 21	38				SILTY SAND WITH GRAVEL, dense, moist, dark red with gray, fine to coarse grained, angular to subangular, weathered basalt	
25	SPT S-7	93	3 6 10	19	MC: 47.7% Fines: 27.1% medium dense	SM			
30								30.0	360.2
	SPT S-8	87	18 13 34	56	MC: 25.2% Fines: 18.8%	SM		SILTY SAND WITH GRAVEL, very dense, moist, greenish gray, fine to coarse grained, angular to subangular, weathered basalt	
35									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 28.1

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-13

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35	SPT S-9	100	50/3"	60/3"				SILTY SAND WITH GRAVEL, very dense, moist, greenish gray, fine to coarse grained, angular to subangular, weathered basalt *(continued)*	
40	SPT S-10	0	50/1"	60/1"		SM			
45	SPT S-11	100	50/1"	60/1"				45.0	345.2
	RC C-1	52 (26)						BASALT, highly weathered to slightly weathered, moderately fractured, greenish gray, low strength to medium high strength, R1 - R3	
50								50.0	340.2

Bottom of borehole at 50.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-14

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/7/21 **COMPLETED** 9/7/21
GROUND ELEVATION 239 ft
DRILLING CONTRACTOR Western States Soil Conservation Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS	Corrected N-Value	TESTS AND REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY FAT CLAY, stiff, moist, brown to gray, high plasticity	
	SPT S-1	80	3 3 7	12	-				
5									
	SPT S-2	100	2 3 3	7	LL: 56 PI: 31 MC: 32.6% Fines: 77.8% medium stiff	CH			
	SPT S-3	100	1 3 3	5					
10									
	ST ST-1	0							
	ST ST-2	0							
12.0									227.0
15								SANDY FAT CLAY WITH GRAVEL, stiff, moist, greenish gray, fine grained, rounded, high plasticity	
	SPT S-4	100	2 3 6	11	LL: 62 PI: 39 MC: 32.4% Fines: 62.2%	CH			
17.0									222.0
	SPT S-5	100	17 37 42	95				SILTY SAND WITH GRAVEL, very dense, moist, greenish gray with brown, fine to coarse grained, angular to subangular, medium plasticity, weathered-in-place basalt	
20									
	SPT S-6	100	10 27 50/5"	92/11"	MC: 15.0% Fines: 21.0%	SM			
25									
25.1									213.9
	SPT S-7	100	50/1"	60/1"	MC: 4.1% Fines: 18.1%			Bottom of borehole at 25.1 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-15

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 11/8/22 **COMPLETED** 11/12/22
GROUND ELEVATION 408 ft
DRILLING CONTRACTOR Haz-Tech Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 6.00 ft / Elev 402.00 ft
LOGGED BY KAK **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								CLAYEY SAND, very dense, moist, red and gray, fine to coarse grained	
5	SPT S-1		17 20 25	54		SC			
10	SPT S-2		37 50/5"	60/5"				10.0	398.0
15						GM		SILTY GRAVEL WITH SAND, wet, gray, fine to coarse grained, angular, weathered basalt at 10.5'	
20	RC C-1	87 (0)						15.0 BASALT, slightly weathered, highly fractured, interbedded, gray to greenish gray, very low strength to moderate strength, clay infilling, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R2	393.0
25	RC C-2	67 (0)							
30	RC C-3	75 (0)							
35	RC C-4	77 (10)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 30.1

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-15

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35	RC C-5	50 (17)						BASALT, slightly weathered, highly fractured, interbedded, gray to greenish gray, very low strength to moderate strength, clay infilling, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R2 *(continued)*	
40	RC C-6	100 (0)							
45	RC C-7	83 (19)							
50	RC C-8	92 (60)							
55	RC C-9	73 (20)							
	RC C-10	97 (13)							
60	RC C-11	75 (0)							
	RC C-12	92 (28)							
65	RC C-13	100 (65)							
	RC C-14	73 (0)							
70	RC C-15	60 (0)			69' - 70' clayey soft highly weathered				
	RC C-16	83 (17)							
75									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-15

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
75	RC C-17	120 (37)			75' - 77.5' clayey soft			BASALT, slightly weathered, highly fractured, interbedded, gray to greenish gray, very low strength to moderate strength, clay infilling, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R2 *(continued)*	
80	RC C-18	97 (88)							
85	RC C-19	97 (77)							
90	RC C-20	95 (14)							
95	RC C-21	70 (0)							
	RC C-22	86 (0)							
100	RC C-23	90 (20)							
	RC C-24	100 (0)							
	RC C-25	100 (58)							
105	RC C-26	20 (7)			106' - 110' highly weathered topsoil no returns washed out				
110	RC C-27	100 (57)							
115									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 30.3

BORING NUMBER BH-15

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
115	RC C-28	100 (73)						BASALT, slightly weathered, highly fractured, interbedded, gray to greenish gray, very low strength to moderate strength, clay infilling, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R2 *(continued)*	
120	RC C-29	100 (80)							
125	RC C-30	100 (60)							
130	RC C-31	100 (35)							
135	RC C-32	100 (50)			132' - 133' fast advance softer				
140	RC C-33	100 (87)							
145	RC C-34	100 (40)							
150	RC C-35	100 (32)							
155	RC C-36	63 (0)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 30.4

BORING NUMBER BH-15

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
155	RC C-37	100 (0)						BASALT, slightly weathered, highly fractured, interbedded, gray to greenish gray, very low strength to moderate strength, clay infilling, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R2 *(continued)*	
	RC C-38	100 (64)							
160	RC C-39	43 (0)							
	RC C-40	100 (37)							
165								165.0	243.0

Bottom of borehole at 165.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-16

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 11/16/22 **COMPLETED** 11/16/22
GROUND ELEVATION 310 ft
DRILLING CONTRACTOR Haz-Tech Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 19.40 ft / Elev 290.60 ft
LOGGED BY KAK **CHECKED BY** LMS
24HRS AFTER DRILLING 4.60 ft / Elev 305.40 ft
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								FAT CLAY, hard, moist, brown to light brown, fine grained	
5	SPT S-1		3 10 18	34	wet				
10	SPT S-2		18 25 35	72		CH			
15	SPT S-3		22 29 29	70					
								17.5	292.5
20	SPT S-4	0 (0)	50/5"	60/5"				SHALE, slightly weathered, blueish green, fine, very low strength to low strength, basaltic rip-up clasts at contact, R0 - R1	
	RC C-1	100 (0)							
	RC C-2	75 (13)							
25	RC C-3								
	RC C-4	100 (63)							
30	RC C-5	100 (67)							
	RC C-6	100 (63)							
35								23.0	287.0
								BASALT, unweathered to slightly weathered, slightly fractured, interbedded, gray to greenish gray, moderate strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R2	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 31.1

BORING NUMBER BH-16

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35									
40	RC C-7	100 (63)						BASALT, unweathered to slightly weathered, slightly fractured, interbedded, gray to greenish gray, moderate strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R2 *(continued)*	270.0
								40.0 Bottom of borehole at 40.0 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-17

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 11/13/22 **COMPLETED** 11/14/22
GROUND ELEVATION 400 ft
DRILLING CONTRACTOR Haz-Tech Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 20.50 ft / Elev 379.50 ft
LOGGED BY KAK **CHECKED BY** LMS
24HRS AFTER DRILLING 19.50 ft / Elev 380.50 ft
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY LEAN CLAY, stiff, moist, yellowish red to blackish gray, fine to medium grained, subangular to subrounded, medium plasticity, gravelly weak cementation, iron oxide staining	
5	SPT S-1		3 4 5	11					
10	SPT S-2		7 10 14	29	very stiff				
15	SPT S-3		2 5 7	14	organic/peat lenses at 15-16.5' stiff 17' - 19' weakly cemented sand organic stringers	CL			
20	SPT S-4		14 50/5"	60/5"	20' - 25' weathered top of rock augered to core point at 25'				
25								25.0	375.0
	RC C-1	86 (29)			26.5' - 27.5' soil-filled fracture (clay)			BASALT, unweathered to slightly weathered, moderately fractured, interbedded, blackish gray to greenish gray, very low strength to high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R4	
30	RC C-2	80 (0)							
	RC C-3	100 (6)							
35	RC	100							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 32.1

BORING NUMBER BH-17

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35	C-4	(33)						BASALT, unweathered to slightly weathered, moderately fractured, interbedded, blackish gray to greenish gray, very low strength to high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R4 *(continued)*	
	RC C-5	100 (23)			38' - 38.5 soil-filled fracture (clay/organics)				
40									
	RC C-6	100 (78)							
45									
	RC C-7	100 (63)							
50									
	RC C-8	100 (23)							
	RC C-9	100 (30)							
55									
	RC C-10	67 (0)							
	RC C-11	100 (23)							
60									
	RC C-12	100 (27)							
	RC C-13	100 (88)							
65									
	RC C-14	80 (50)							
70									
	RC C-15	100 (67)							
	RC C-16	100 (60)							
75									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-17

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
75	RC C-17	100 (24)						BASALT, unweathered to slightly weathered, moderately fractured, interbedded, blackish gray to greenish gray, very low strength to high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R4 *(continued)*	
80	RC C-18	100 (50)							
	RC C-19	100 (60)							
85	RC C-20	100 (63)							
90	RC C-21	100 (27)							
	RC C-22	100 (73)							
95	RC C-23	100 (54)							
100	RC C-24	100 (62)							
	RC C-25	100 (50)							
105	RC C-26	100 (23)							
	RC C-27	100 (0)							
110	RC C-28	100 (17)							
	RC C-29	100 (17)							
115									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 32.3

BORING NUMBER BH-17

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
115	RC C-30	100 (90)						BASALT, unweathered to slightly weathered, moderately fractured, interbedded, blackish gray to greenish gray, very low strength to high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R4 *(continued)*	
120	RC C-31	100 (73)						120.0	280.0

Bottom of borehole at 120.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-18

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 11/12/22 **COMPLETED** 11/13/22
GROUND ELEVATION 370 ft
DRILLING CONTRACTOR Haz-Tech Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 25.20 ft / Elev 344.80 ft Conclusion of HSA , cor
LOGGED BY KAK **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0								SANDY LEAN CLAY, very stiff, moist, reddish brown with blackish gray, fine grained, subangular to subrounded, medium plasticity, laminated, weak cementation, iron oxide staining	
5	SPT S-1		5 7 8	18					
10	SPT S-2		24 14 13	32	10' - 10.5' weakly cemented sand stringer hard				
15	SPT S-3		50/5"	60/5"		CL			
20	SPT S-4		8 4 5	11	stiff				
25	SPT S-5		3 12 48	72	25' - 26' wet elastic/plastic tan clay interbed atop rock weathered rock 27' - 30' weathered top of bedrock augered to core point at 30'			27.0	343.0
30	RC C-1	100 (53)						BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clastic infilling, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3	
35	RC C-2	100 (62)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 33.1

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-18

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35								BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clastic infilling, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3 *(continued)*	
40	RC C-3	100 (63)							
45	RC C-4	100 (67)							
50	RC C-5	100 (55)							
55	RC C-6	100 (58)			57' - 58.5' greenish gray drilling fluids changed to brown then back to gray				
60	RC C-7	100 (65)							
65	RC C-8	100 (77)							
70	RC C-9	100 (80)							
75	RC C-10	100 (67)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER BH-18

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
75								BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clastic infilling, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3 *(continued)*	
80	RC C-11	100 (55)			80' - 81.5' volcaniclastic poorly-graded sand interbed (S-6)				
	GB S-6								
	RC C-12	100 (62)							
85	RC C-13	100 (67)			C-13 and C-14 contained sloughing sand atop core from wash out at 80'				
	RC C-14	100 (67)							
	RC C-15	100 (50)							
90	RC C-16	100 (71)							
95	RC C-17	100 (90)							
	RC C-18	100 (50)							
100	RC C-19	88 (29)							
	RC C-20	100 (71)							
105	RC C-21	100 (33)							
110	RC C-22	100 (58)							
115									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 33.3

BORING NUMBER BH-18

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
115									
	RC C-23	100 (30)						BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clastic infilling, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3 *(continued)*	
120	RC C-24	100 (30)							250.0
								120.0 Bottom of borehole at 120.0 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-19

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 11/15/22 **COMPLETED** 11/16/22
GROUND ELEVATION 438 ft
DRILLING CONTRACTOR Haz-Tech Drilling, Inc.
GROUND WATER LEVELS:
DRILLING METHOD CME Track Rig
AT TIME OF DRILLING 17.83 ft / Elev 420.17 ft
LOGGED BY KAK **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0						GM		0.5 SILTY GRAVEL WITH SAND, slightly moist, blackish gray, fine to coarse grained, angular to subangular, road base, [FILL]	437.5
								FAT CLAY, stiff, moist, yellowish red to orangeish black, fine grained	
5	SPT S-1		3 4 4	10					
10	SPT S-2		0 0 0	0	very soft	CH			
15	SPT S-3		1 1 3	5	medium stiff				
20	SPT S-4		8 7 7	17	very stiff wet				
25	RC C-1	100 (28)			22.5' - 25' top of rock augered to core point at 25'			22.5 BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3	415.5
30	RC C-2	100 (58)							
35	RC C-3	100 (73)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 34.1

BORING NUMBER BH-19

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
35								BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3 *(continued)*	
	RC C-4	100 (33)							
40	RC C-5	100 (0)							
	RC C-6	100 (86)							
45	RC C-7	100 (20)							
	RC C-8	67 (0)							
50	RC C-9	100 (70)							
	RC C-10	100 (33)							
55	RC C-11	100 (0)							
	RC C-12	61 (19)							
60	RC C-13	80 (0)							
	RC C-14	100 (8)			63.5' - 64' highly weathered rock with clay infilling				
65	RC C-15	76 (12)							
	RC C-16	100 (33)							
70	RC C-17	100 (13)							
	RC C-18	100 (47)							
75									

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-19

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
75	RC C-19	100 (13)						BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3 *(continued)*	
80	RC C-20	100 (33)							
85	RC C-21	100 (35)			86' - 87' greenish gray drilling fluids changed to brown gray again at 87'				
90	RC C-22	100 (8)							
95	RC C-23	80 (30)							
100	RC C-24	87 (13)							
	RC C-25	100 (0)							
	RC C-26	100 (50)							
	RC C-27	100 (20)			100' - 100.5' bit jammed trip out of hole to inspect				
	RC C-28	100 (0)							
105	RC C-29	100 (50)							
110	RC C-30	100 (50)							
115	RC C-31	100 (63)							

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER BH-19

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc. **PROJECT NAME** Coffin Butte Landfill

PROJECT NUMBER 21129-1 **PROJECT LOCATION** Corvallis, OR

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS	Corrected N-Value	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
115									
120	RC C-32	100 (33)						BASALT, slightly weathered to unweathered, moderately fractured, interbedded, greenish gray to blackish gray, very low strength to medium high strength, clay infilling, moderately weathered zones, highly fractured zones, discontinuites are high angle (55 - 90 degrees) with chloritic siltstone, pyrite, and calcite infilling, joints and discontinuities are wavey to smooth with schistose/phyllitic faces, R0 - R3 *(continued)*	
								120.0	318.0

Bottom of borehole at 120.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 15:02 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-01

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/21/22 **COMPLETED** 9/22/22
GROUND ELEVATION 238.82 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 1.97 ft / Elev 236.85 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					SANDY FAT CLAY, stiff to very stiff, wet, brown to gray	
5	GB S-1	MC: 29.9% Fines: 98.1% LL: 58 PI: 32	CH			
	ST ST-1					
10	GB S-2	MC: 35.6% Fines: 97.4% LL: 54 PI: 31				
	ST ST-2					
15					15.0	223.8
	ST ST-3		CH		SANDY FAT CLAY WITH GRAVEL, stiff to very stiff, wet, greenish gray	
20					20.0	218.8
			CL		SANDY LEAN CLAY WITH GRAVEL, stiff to very stiff, wet, greenish gray with brown, weathered in-place basalt	
					22.5	216.3

Bottom of borehole at 22.5 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-02

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/22/22 **COMPLETED** 9/22/22
GROUND ELEVATION 237.06 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 2.02 ft / Elev 235.04 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0				SANDY LEAN CLAY, stiff to very stiff, wet, brown to gray	
	GB S-1				
5		CL			
	GB S-2				
10	ST ST-1			12.0	225.1
	GB S-3			SANDY LEAN CLAY WITH GRAVEL, stiff to very stiff, wet, reddish brown to reddish black, weathered in-place basalt	
15		CL			
	ST ST-2			17.0	220.1
				Bottom of borehole at 17.0 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-03

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/22/22 **COMPLETED** 9/22/22
GROUND ELEVATION 258.82 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 12.00 ft / Elev 246.82 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING 19.00 ft / Elev 239.82 ft
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					SANDY LEAN CLAY, stiff, moist, brown to gray	
	GB S-1		CL			
5					6.0	252.8
	GB S-2		ML		SANDY SILT, stiff, moist, red with gray, fine grained, weathered in-place basalt	
10	ST ST-1					
	GB S-3	wet			14.0	244.8
15			SM		SILTY SAND WITH GRAVEL, dense to very dense, wet, greenish gray with red, fine to coarse grained, angular to subangular, weathered in-place basalt	
	GB S-4				19.0	239.8

Bottom of borehole at 19.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-04

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/22/22 **COMPLETED** 9/22/22
GROUND ELEVATION 263.42 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 20.82 ft / Elev 242.60 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					SANDY FAT CLAY, very stiff to hard, moist, red with gray, fine grained, weathered in-place basalt	
5	GB S-1	MC: 22.6% LL: 63 PI: 38	CH			
10	GB S-2	MC: 37.3%				
	ST ST-1					
15	GB S-3	MC: 40.1% LL: 75 PI: 38				
					17.0	246.4
20	ST ST-2	MC: 70.0% C': 0 psf phi: 33.3°	MH		ELASTIC SILT WITH SAND, medium stiff to very stiff, wet, red with gray, weathered in-place basalt	
					22.0	241.4
25	GB S-4	MC: 75.6%	MH		ELASTIC SILT WITH SAND, medium stiff to very stiff, wet, red with gray, weathered in-place basalt	
	GB S-5	MC: 69.7% LL: 78 PI: 30				
	GB S-6	MC: 70.3%				
30	ST ST-3	MC: 65.4 / 62.9 / 69.6% DD: 61 / 63 / 59 pcf C': 0 psf phi: 35.5°				
					30.5	232.9
					Bottom of borehole at 30.5 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-05

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/22/22 **COMPLETED** 9/22/22
GROUND ELEVATION 302.68 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 15.70 ft / Elev 286.98 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					ELASTIC SILT, stiff to very stiff, moist, dark brown, fine grained, weathered in-place basalt, with sand	
5	GB S-1	-	MH			
	GB S-2	MC: 42.6% LL: 73 PI: 34				
					9.0	293.7
10	ST ST-1	MC: 41.2 / 48.2 / 41.2% DD: 79 / 71 / 79 pcf C': 150 psf phi: 39°	SC		CLAYEY SAND, medium dense, moist, red with gray, weathered in-place basalt	
					14.0	288.7
15	GB S-3	MC: 45.1% Fines: 28.9%	SC-SM		SILTY SAND, clayey sand, wet, dark gray brown, fine to coarse grained, angular to subangular, weathered in-place basalt	
					17.5	285.2
					Bottom of borehole at 17.5 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-06

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/22/22 **COMPLETED** 9/22/22
GROUND ELEVATION 290.84 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 31.90 ft / Elev 258.94 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					ELASTIC SILT, stiff to hard, moist, red with gray, fine grained, weathered in-place volcanics	
5	GB S-1	-	MH			
10	GB S-2	MC: 39.0% LL: 80 PI: 36				
	ST ST-1					
					14.0	276.8
15	GB S-3		ML		SILT, stiff, moist, dark brown and yellow, with fine grained sand	
20	GB S-4	MC: 71.9%				
					20.0	270.8
	ST ST-2		MH		ELASTIC SILT, stiff, moist, light tan with reddish gray	
25	GB S-5	MC: 75.0% LL: 84 PI: 30				
					26.0	264.8
	GB S-6	MC: 80.6%	ML		SILT, stiff to very stiff, brownish yellow and yellowish brown	
30	ST ST-3					
					31.0	259.8
					Bottom of borehole at 31.0 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-07

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/23/22 **COMPLETED** 9/23/22
GROUND ELEVATION 287.77 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING 4.50 ft / Elev 283.27 ft
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					SANDY LEAN CLAY, moist, brown to gray, fine to coarse grained, angular to subangular, [FILL]	
	GB S-1	MC: 26.9% Fines: 53.1%	CL			
4.0						283.8
5			CL		SANDY LEAN CLAY, medium stiff, wet, dark gray to greenish gray, fine grained, organics	
	ST ST-1					
7.0						280.8
	ST ST-2		ML		SILT, medium dense, wet, brown and very light brown, fine to coarse grained, angular, trace sand and weathered in-place basalt	
10						
	GB S-2	MC: 38.3%				
15						
15.0						272.8
	GB S-3	MC: 25.5% Fines: 45.9%	SC		CLAYEY SAND, medium dense to dense, tannish brown, fine to coarse grained, angular, weathered in-place basalt	
20						
	GB S-4					
25						
25.0						262.8
					Bottom of borehole at 25.0 feet.	

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

BORING NUMBER GP-08

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 11/8/22 **COMPLETED** 11/8/22
GROUND ELEVATION 360.17 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING ---
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0				SANDY LEAN CLAY WITH GRAVEL, stiff to hard, moist, reddish brown with dark gray, fine to coarse grained, subangular to subrounded, with cobbles, weathered in-place basalt	
	GB S-1				
5					
	GB S-2				
10		CL			
	GB S-3				
15					
	GB S-4				
				19.0	341.2
20				BASALT, dark gray	
				21.0	339.2

Bottom of borehole at 21.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Wallace Group Inc.
62915 NE 18th Street, Suite 1
Bend, OR 97701

BORING NUMBER GP-09

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED 9/23/22 **COMPLETED** 9/23/22
GROUND ELEVATION 288.85 ft
DRILLING CONTRACTOR Oregon Geotechnical Explorations
GROUND WATER LEVELS:
DRILLING METHOD geoprobe 6622
AT TIME OF DRILLING 7.28 ft / Elev 281.57 ft
LOGGED BY SMW **CHECKED BY** LMS
24HRS AFTER DRILLING ---
NOTES

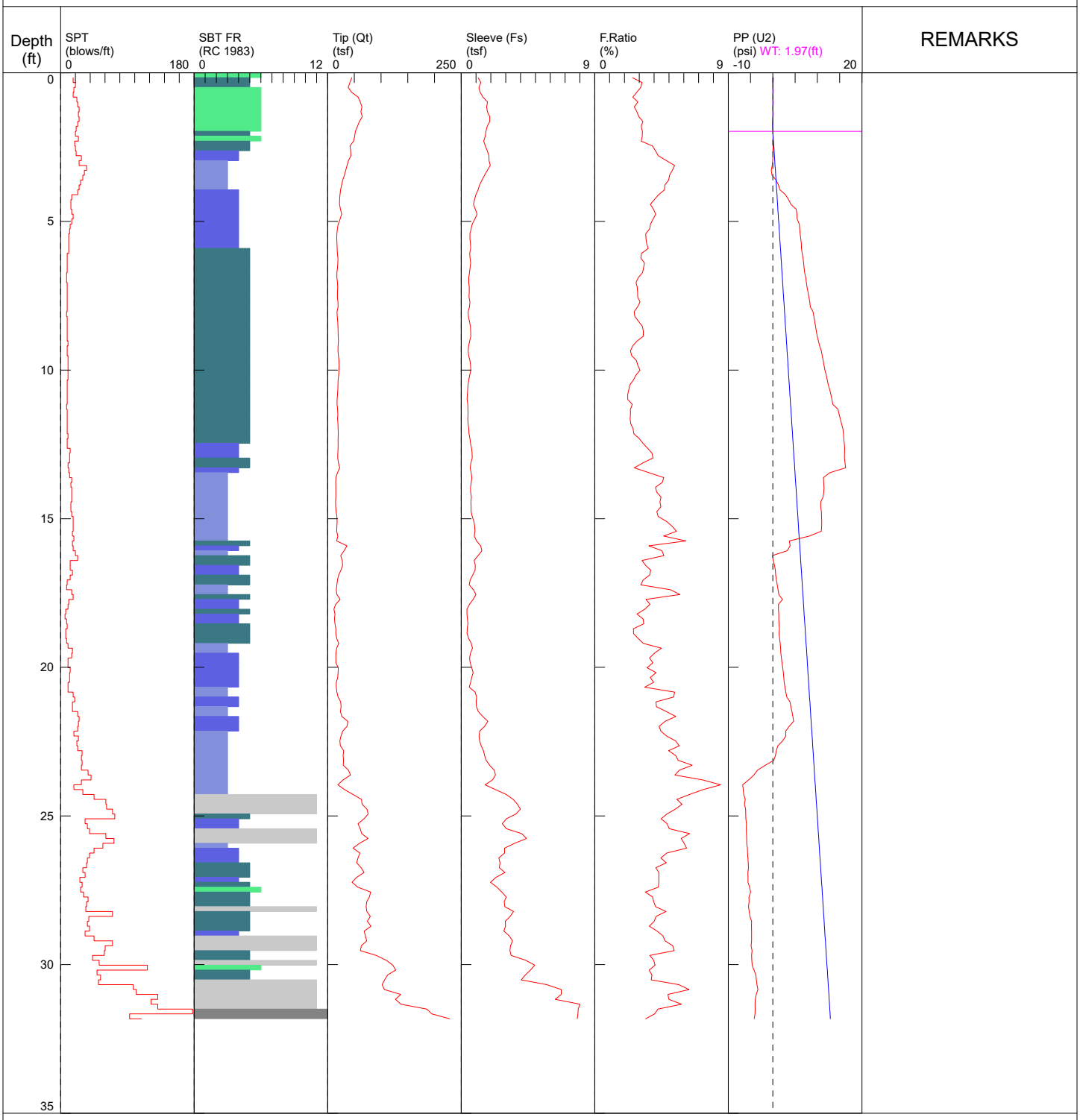
DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	Approximate Elevation
0					FAT CLAY, stiff to very stiff, moist, dark gray, fine grained, roots and organics	
	GB S-1	MC: 28.3% Fines: 92.9% LL: 73 PI: 53	CH			
5	ST ST-1					
					6.5	282.4
	GB S-2		SM		SILTY SAND WITH GRAVEL, very dense, wet, tan with blackish brown, fine to coarse grained, angular to subangular, weathered basalt	
10					10.0	278.9

Bottom of borehole at 10.0 feet.

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 12/15/23 12:47 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

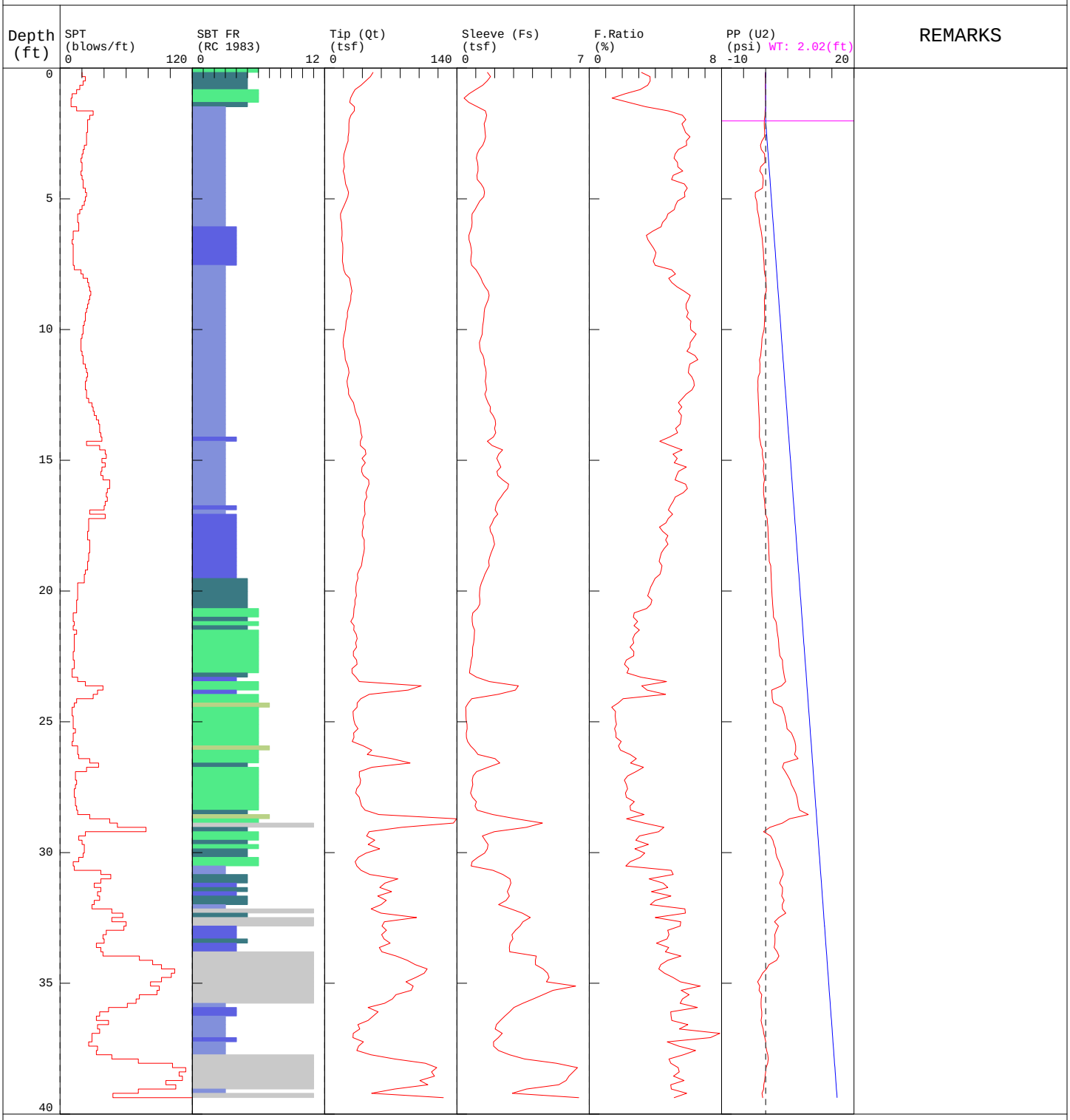
The Wallace Group / CPT-1 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/21/2022 4:21:43 PM
TOTAL DEPTH: 31.824 ft



The Wallace Group / CPT-2 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/21/2022 3:15:49 PM
TOTAL DEPTH: 39.370 ft

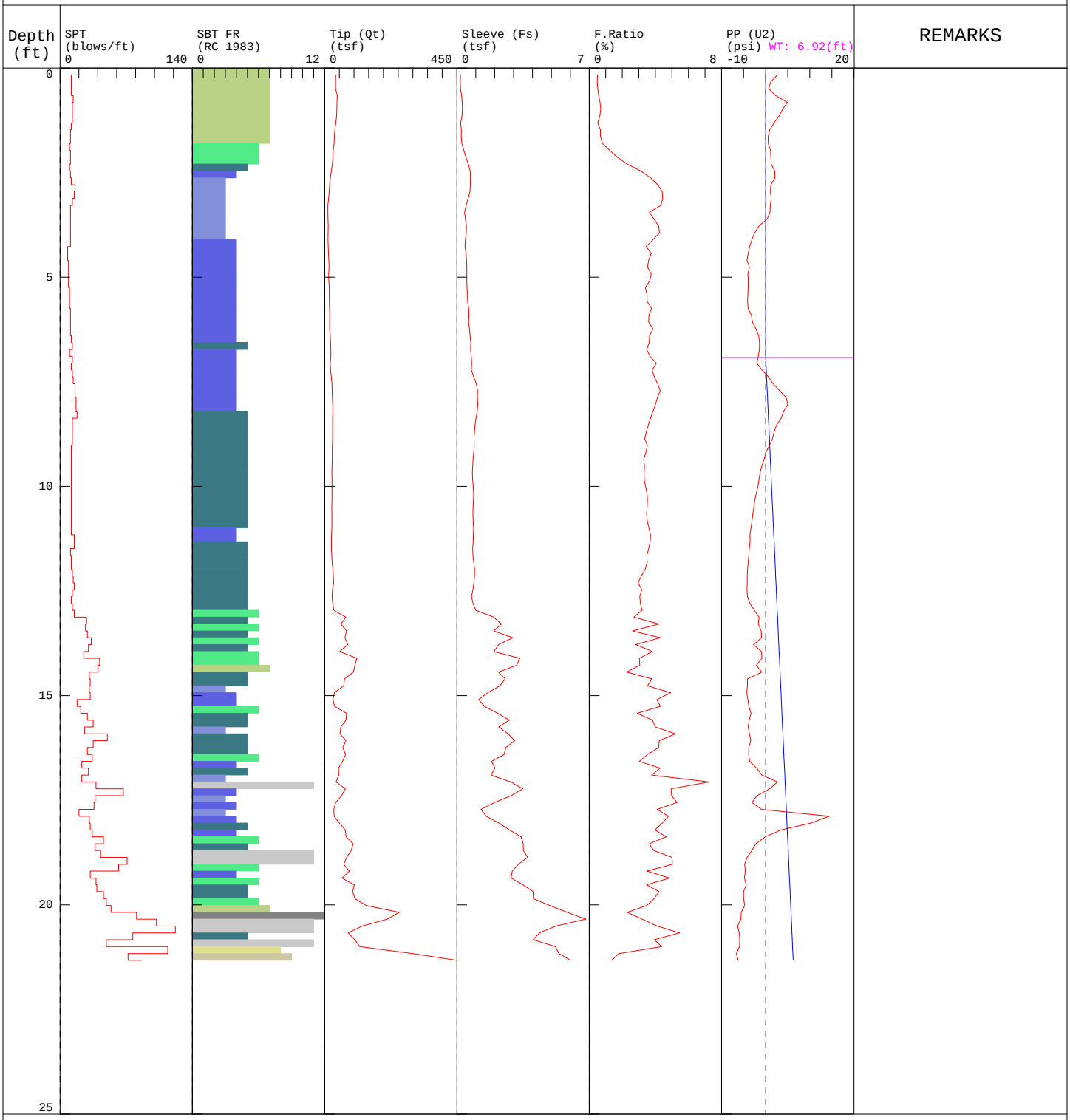


1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty cl
6 sandy silt to clayey si
7 silty sand to sandy si
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

The Wallace Group / CPT-3 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/21/2022 10:38:43 AM
TOTAL DEPTH: 21.325 ft

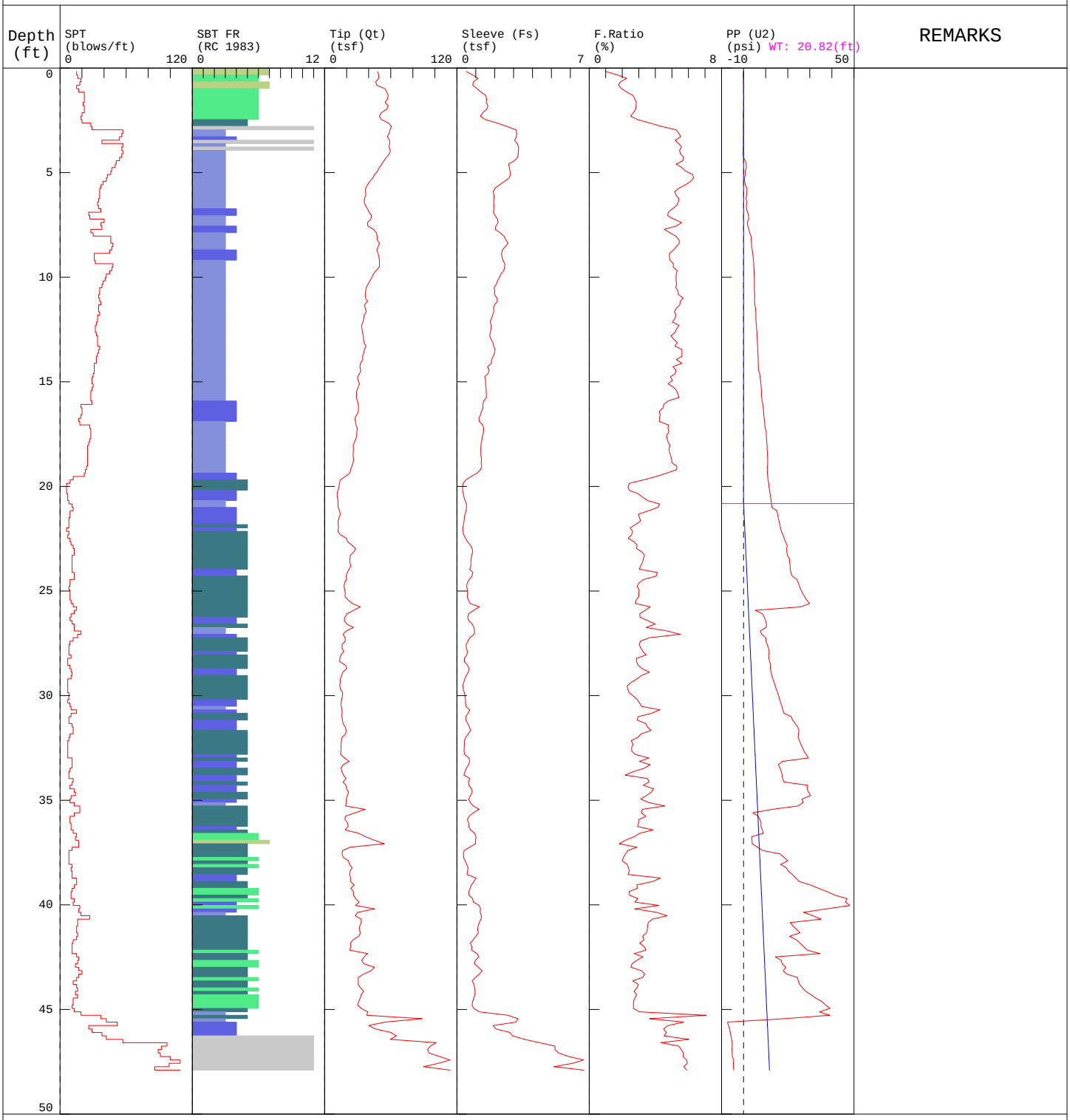


1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty cl
6 sandy silt to clayey si
7 silty sand to sandy si
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

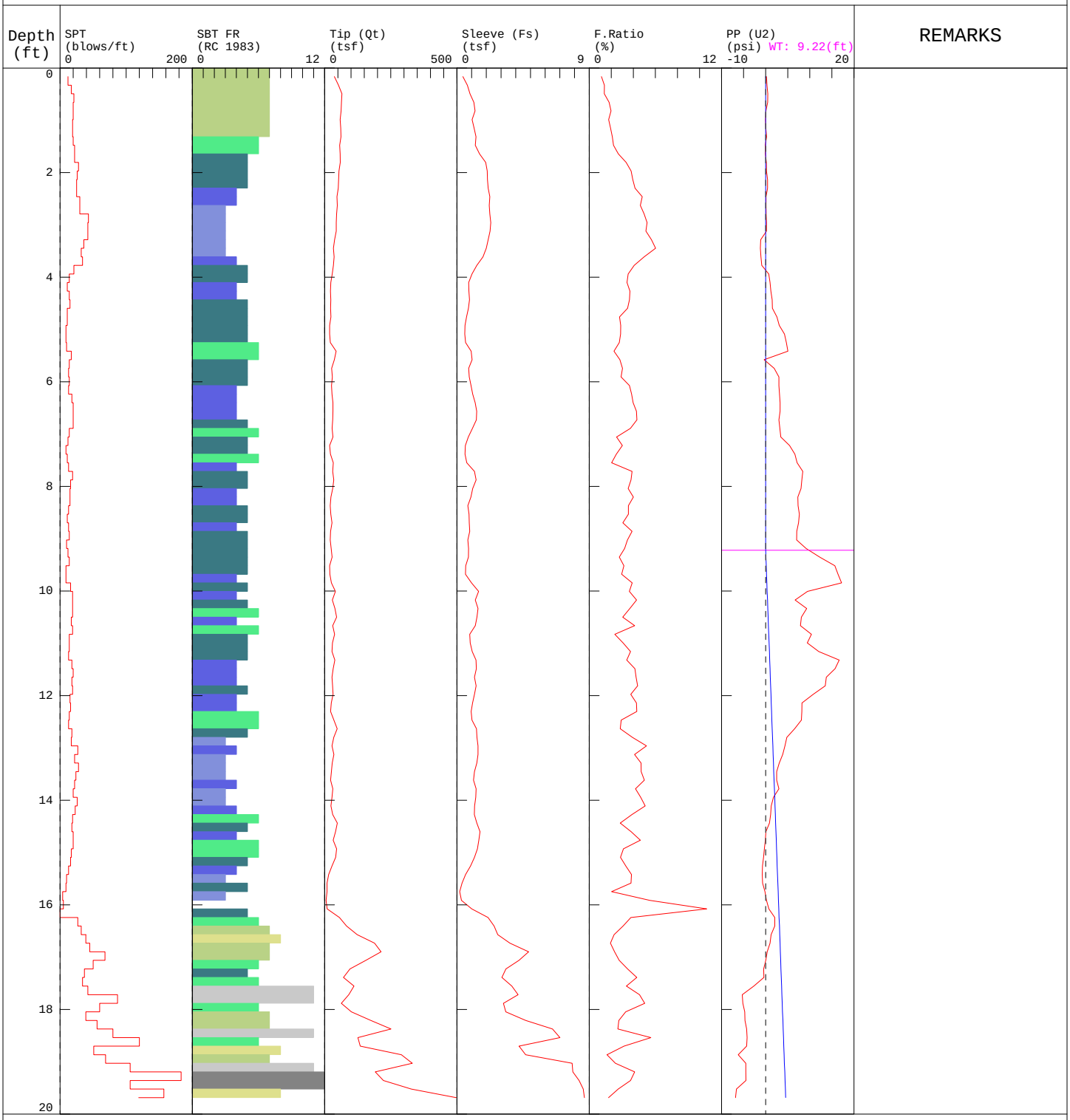
The Wallace Group / CPT-4 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/21/2022 2:02:24 PM
TOTAL DEPTH: 47.900 ft



The Wallace Group / CPT-5 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/21/2022 11:37:33 AM
TOTAL DEPTH: 19.685 ft

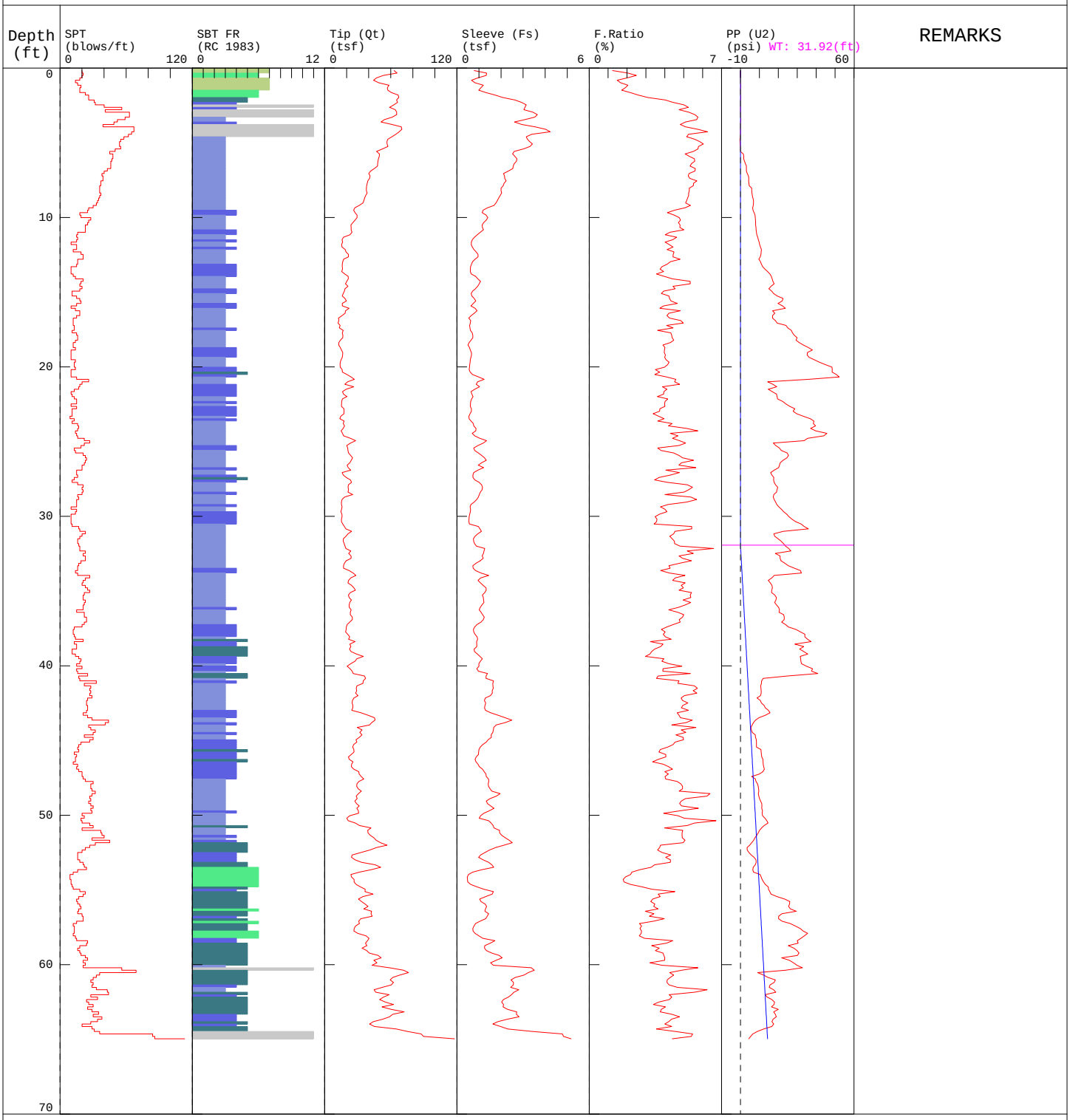


1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty cl
6 sandy silt to clayey si
7 silty sand to sandy si
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

The Wallace Group / CPT-6 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/21/2022 12:36:51 PM
TOTAL DEPTH: 64.961 ft

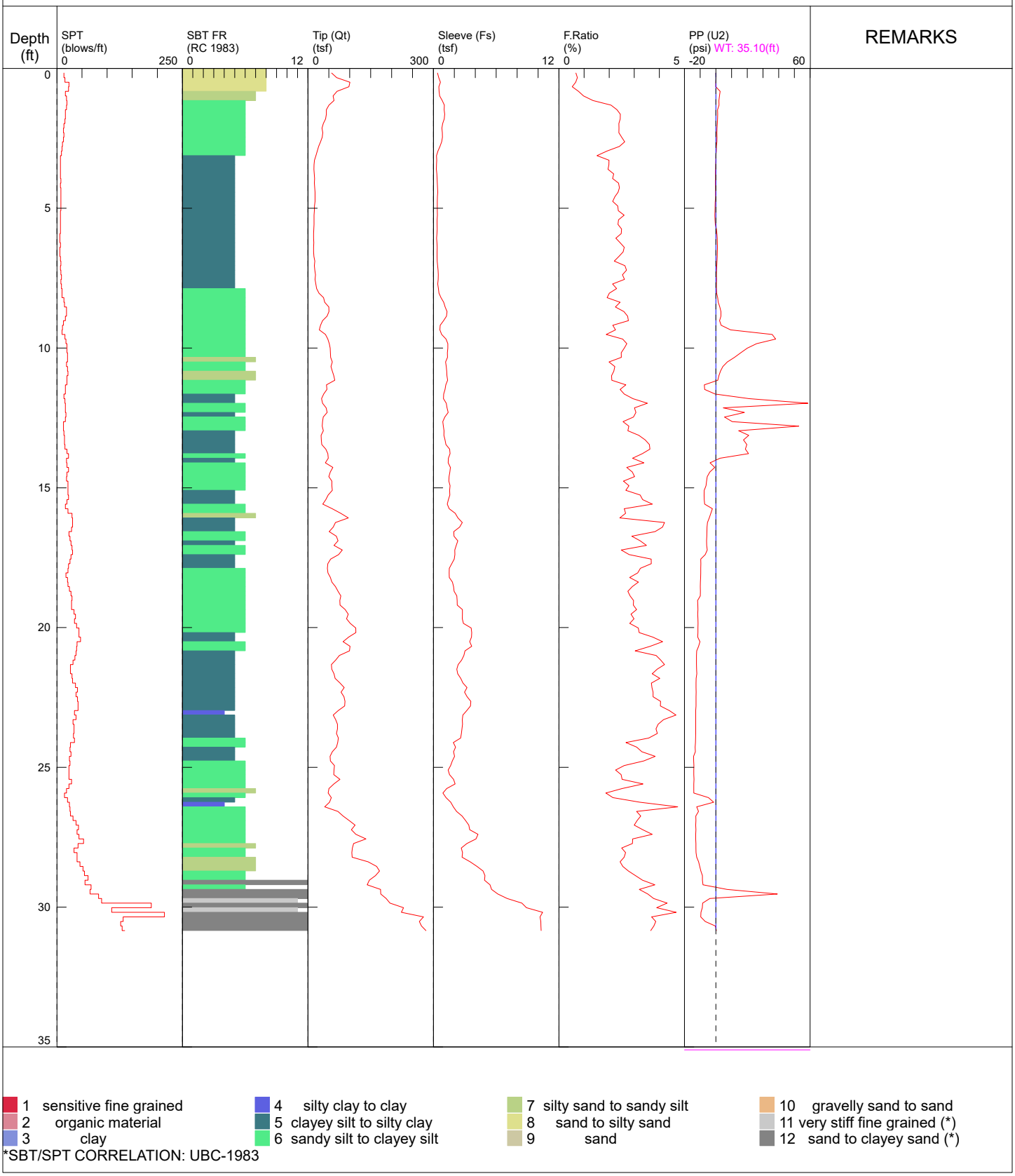


1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty cl
6 sandy silt to clayey si
7 silty sand to sandy si
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

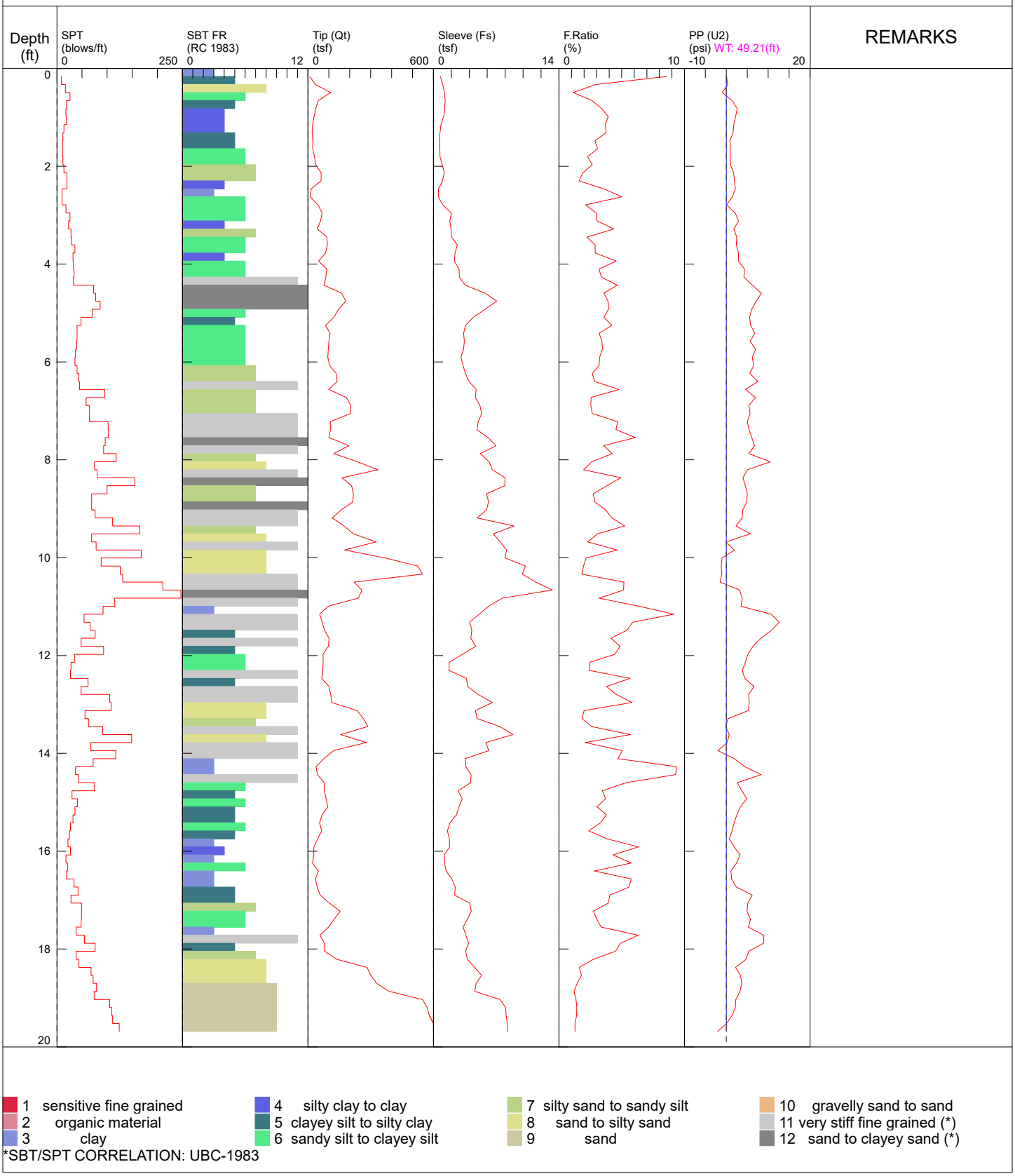
The Wallace Group / CPT-7 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/23/2022 8:28:45 AM
TOTAL DEPTH: 30.840 ft



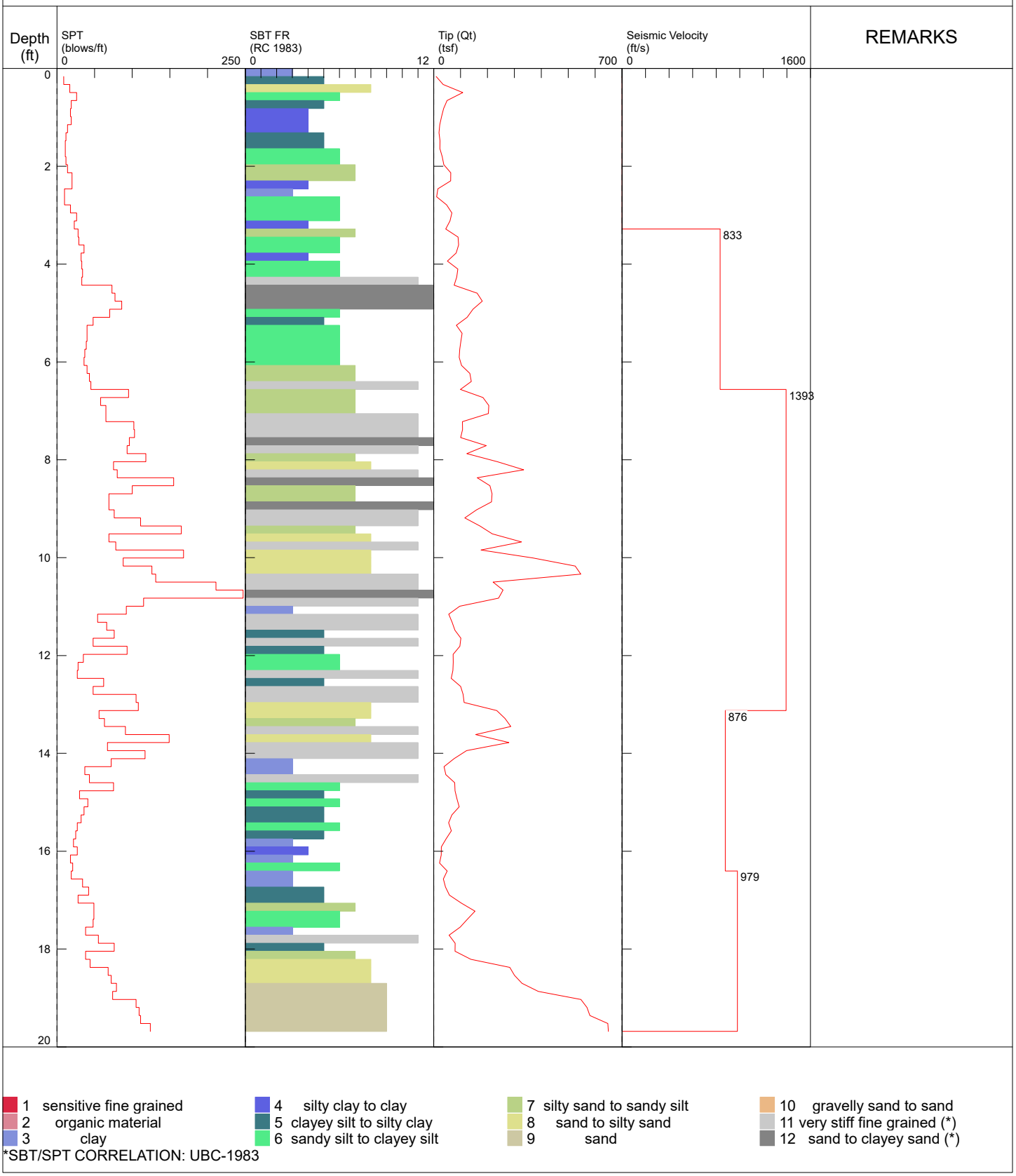
The Wallace Group / CPT-8 / 29160 Coffin Butte Rd Corvallis

OPERATOR: OGE BAK
CONE ID: DDG1296
TEST DATE: 11/8/2022 12:20:14 PM
TOTAL DEPTH: 19.685 ft



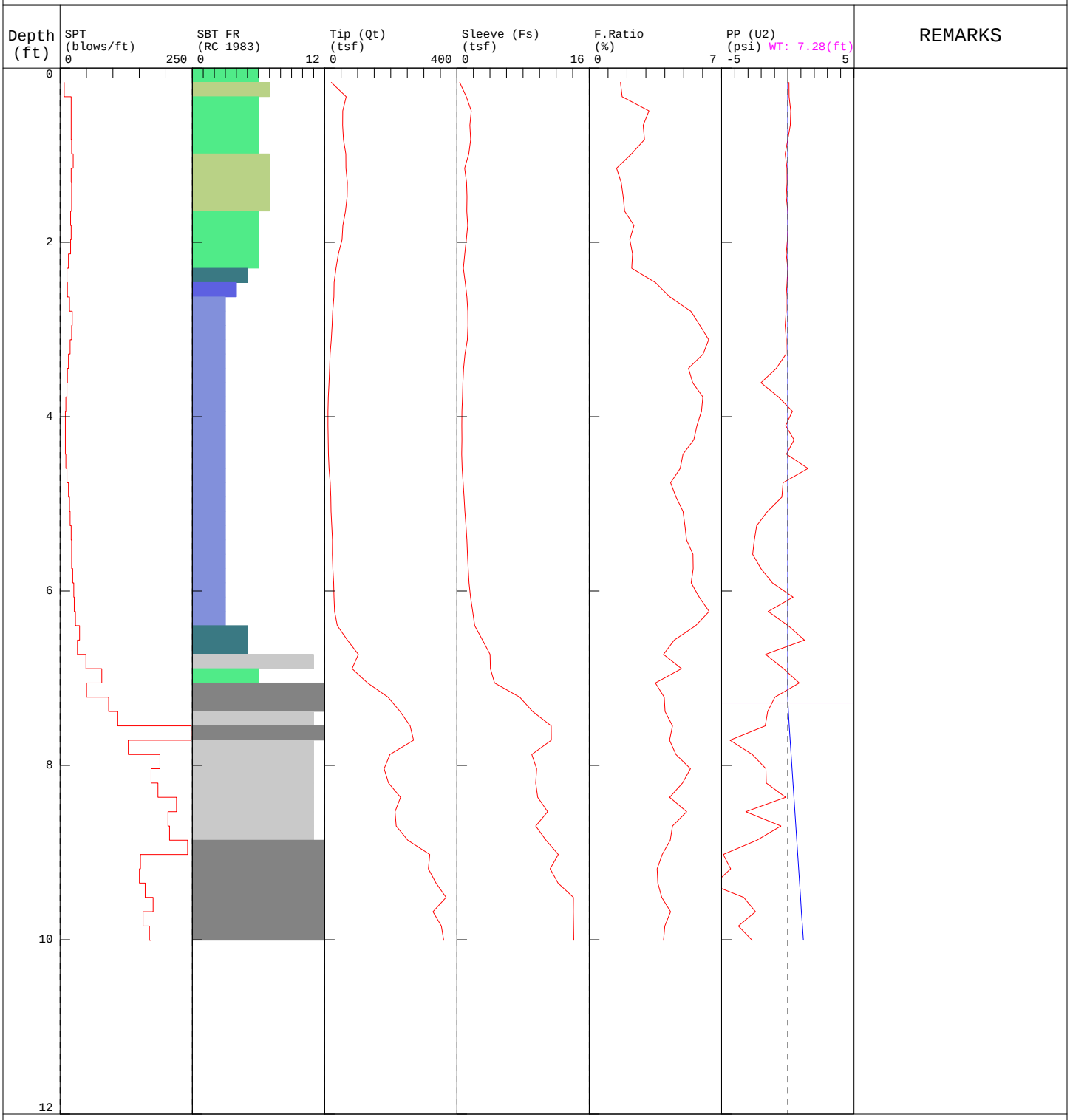
The Wallace Group / CPT-8 / 29160 Coffin Butte Rd Corvallis

OPERATOR: OGE BAK
CONE ID: DDG1296
TEST DATE: 11/8/2022 12:20:14 PM
TOTAL DEPTH: 19.685 ft



The Wallace Group / CPT-9 / 29160 Coffin Butte Rd

OPERATOR: OGE DMM
CONE ID: DDG1532
TEST DATE: 9/23/2022 11:14:11 AM
TOTAL DEPTH: 10.007 ft



1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty cl
6 sandy silt to clayey si
7 silty sand to sandy si
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

*SBT/SPT CORRELATION: UBC-1983

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

APPENDIX B

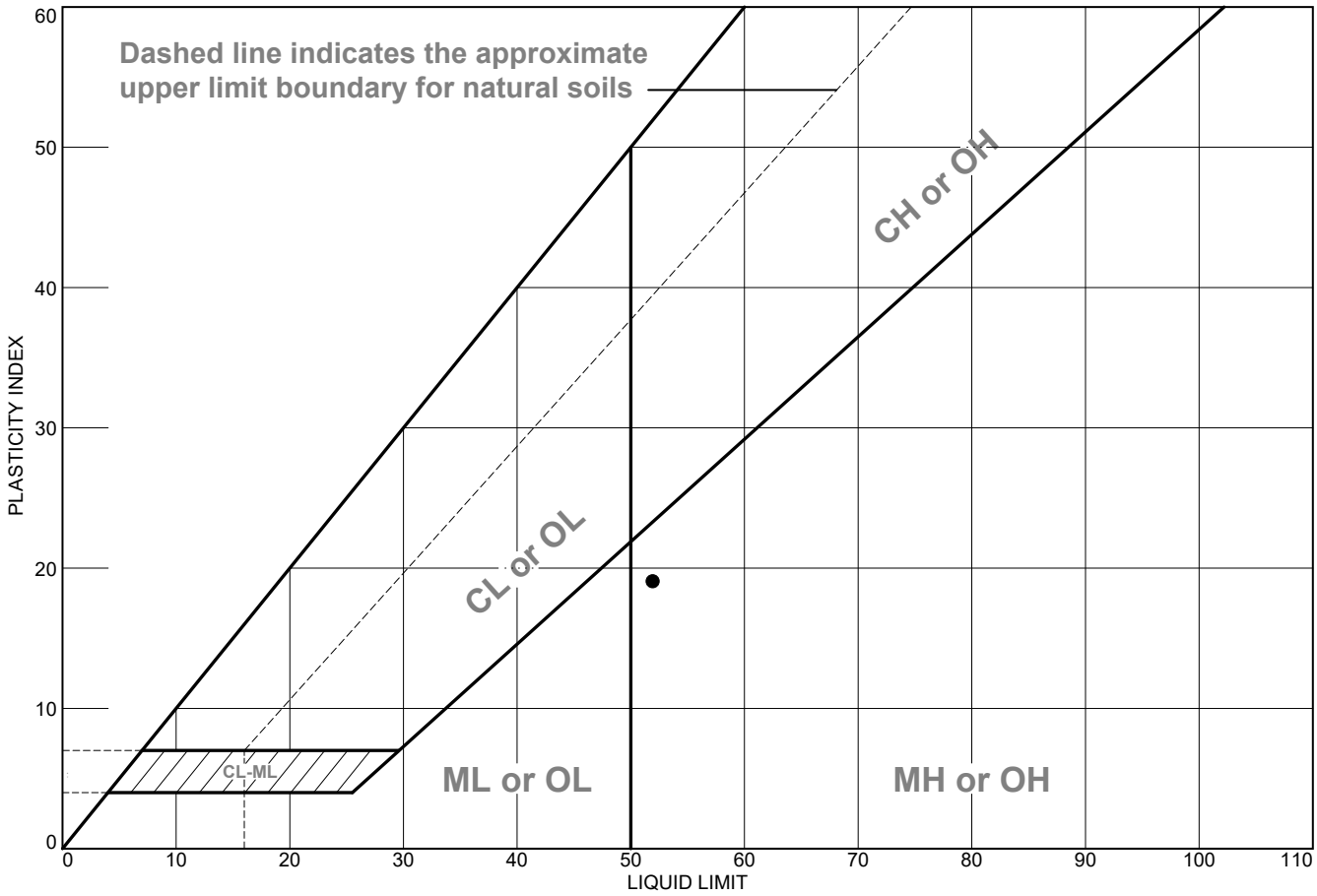
TABLE B - LABORATORY TESTING SUMMARY
Coffin Butte Landfill Expansion

Boring Number	Sample Type	Top Depth (feet, bgs)	Corrected SPT N-Value (blows per foot)	Material Description	Moisture Content, ASTM D2216 (percent)	Point Load Testing, ASTM D5731 UCS (PSI)	Atterberg Limits, ASTM D4318 Liquid Limit	Atterberg Limits, ASTM D4318 Plastic Limit	Atterberg Limits, ASTM D4318 Plasticity Index	Grain Size, ASTM D422 Percent <#40	Grain Size, ASTM D422 Percent <200	Consolidation, ASTM D2435 C_{EC}	Consolidation, ASTM D2435 C_{ER}	Consolidation, ASTM D2435 OCR	UU Triaxial, ASTM D2850 Cell Pressure (psf)	UU Triaxial, ASTM D2850 Deviator Stress (psf)	CU Triaxial, ASTM D4767 Total c (psf)	CU Triaxial, ASTM D4767 Total phi (degrees)	CD Triaxial, ASTM D7181 Effective c (psf)	CD Triaxial, ASTM D7181 Effective phi (degrees)	CD Direct Shear, ASTM D3080 Effective c (psf)	CD Direct Shear, ASTM D3080 Effective phi (degrees)	Flexible Wall Permeability, ASTM D5084 Saturation (percent)	Flexible Wall Permeability, ASTM D5084 Average k (cm/sec)
BH-01	SPT	7.5	22	SILTY SAND WITH GRAVEL (SM)	33.7	-	52	33	19	-	33.3	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-01	SPT	30.0	64	CLAYEY AND SILTY SAND (SC-SM)	39.1	-	-	-	-	-	36.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-02	Shelby	13	-	SANDY SILT (ML)	36.1	-	-	-	-	-	-	-	-	-	-	-	1000	8.8	-	-	-	-	-	-
BH-03	SPT	10	60/1"	SILTY GRAVEL WITH SAND (GM)	20.0	-	-	-	-	-	13.2	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	21.5	-	BRECCIATED BASALT WITH SILTSTONE	-	624	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	28.5	-	BRECCIATED BASALT WITH SILTSTONE	-	5377	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	32.5	-	BRECCIATED BASALT WITH SILTSTONE	-	2297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	36.5	-	BRECCIATED BASALT WITH SILTSTONE	-	264	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	47.5	-	BRECCIATED BASALT WITH SILTSTONE	-	439	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	60	-	BRECCIATED BASALT WITH SILTSTONE	-	248	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	67	-	BRECCIATED BASALT WITH SILTSTONE	-	2460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	73	-	BRECCIATED BASALT WITH SILTSTONE	-	473	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	79	-	BRECCIATED BASALT WITH SILTSTONE	-	473	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	85	-	BRECCIATED BASALT WITH SILTSTONE	-	677	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	87	-	BRECCIATED BASALT WITH SILTSTONE	-	979	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	103	-	BRECCIATED BASALT WITH SILTSTONE	-	223	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	105	-	BRECCIATED BASALT WITH SILTSTONE	-	3242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-03	HQ Core	108	-	BRECCIATED BASALT WITH SILTSTONE	-	640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-04	SPT	2.5	19	CLAYEY AND SILTY SAND (SC-SM)	36.9	-	-	-	-	-	41.2	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	SPT	3.0	46	SILTY SAND WITH GRAVEL (SM)	37.2	-	67	37	30	-	22.7	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	11	-	BRECCIATED BASALT WITH SILTSTONE	-	929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	30	-	BRECCIATED BASALT WITH SILTSTONE	-	1022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	47	-	BRECCIATED BASALT WITH SILTSTONE	-	5332	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	61	-	BRECCIATED BASALT WITH SILTSTONE	-	324	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	90	-	BRECCIATED BASALT WITH SILTSTONE	-	18061	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	105	-	BRECCIATED BASALT WITH SILTSTONE	-	374	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	120	-	BRECCIATED BASALT WITH SILTSTONE	-	1059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	125	-	BRECCIATED BASALT WITH SILTSTONE	-	1529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-05	HQ Core	127	-	BRECCIATED BASALT WITH SILTSTONE	-	1204	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-06	Shelby	5.0	-	SANDY LEAN CLAY (CL)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-07	Shelby	10	-	SANDY LEAN CLAY WITH GRAVEL (CL)	65.0	-	-	-	-	-	-	0.32	0.025	4.8	-	-	-	-	-	-	350	37	-	-
BH-08	SPT	20	83	CLAYEY SAND WITH GRAVEL (SC)	23.2	-	-	-	-	-	21.3	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	26	-	BRECCIATED BASALT WITH SILTSTONE	-	350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	35	-	BRECCIATED BASALT WITH SILTSTONE	-	481	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	44	-	BRECCIATED BASALT WITH SILTSTONE	-	631	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	46	-	BRECCIATED BASALT WITH SILTSTONE	-	1410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	57	-	BRECCIATED BASALT WITH SILTSTONE	-	14194	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	57	-	BRECCIATED BASALT WITH SILTSTONE	-	7636	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-09	HQ Core	69	-	BRECCIATED BASALT WITH SILTSTONE	-	1059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-10	SPT	5.0	18	SANDY FAT CLAY WITH GRAVEL (CH)	32.0	-	60	25	35	-	74.6	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-10	SPT	20	60/2"	SILTY GRAVEL WITH SAND (GM)	20.5	-	-	-	-	-	27.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-11	SPT	5.0	11	SILTY SAND (SM)	49.7	-	-	-	-	-	33.5	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-11	Shelby	12	-	SANDY SILT (ML)	80.7	-	-	-	-	-	-	0.31	0.04	4.7	880	1039	-	-	-	-	-	-	-	-
					69.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97	$4.11x10^{-6}$
BH-11	SPT	15	5	SANDY ELASTIC SILT (MH)	65.9	-	85	44	41	-	65.9	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-11	SPT	30	6	SANDY SILT (ML)	72.2	-	-	-	-	-	54.9	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-12	SPT	7.5	5	SANDY ELASTIC SILT (MH)	61.1	-	78	42	36	-	50.7	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-12	Shelby	10	2	SANDY ELASTIC SILT (MH)	63.9	-	-	-	-	-	-	0.33	0.03	8.4	770	1154	-	-	-	-	-	-	-	-
BH-12	Shelby	20	7	SANDY ELASTIC SILT (MH)	64.9	-	-	-	-	-	-	0.17	0.025	2.3	-	-	-	-	-	-	200	41	-	-
BH-12	SPT	30	4	SILTY SAND (SM)	66.3	-	67	46	21	-	48.2	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-12	SPT	45	34	SILTY SAND (SM)	44.2	-	-	-	-	-	38.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-13	SPT	25	19	SILTY SAND WITH GRAVEL (SM)	47.7	-	-	-	-	-	27.1	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE B - LABORATORY TESTING SUMMARY
Coffin Butte Landfill Expansion

Boring Number	Sample Type	Top Depth (feet, bgs)	Corrected SPT N-Value (blows per foot)	Material Description	Moisture Content, ASTM D2216 (percent)	Point Load Testing, ASTM D5731 UCS (PSI)	Atterberg Limits, ASTM D4318 Liquid Limit	Plastic Limit	Plasticity Index	Grain Size, ASTM D422 Percent <#40	Percent <200	Consolidation, ASTM D2435 C_{EC}	C_{ER}	OCR	UU Triaxial, ASTM D2850 Cell Pressure (psf)	Deviator Stress (psf)	CU Triaxial, ASTM D4767 Total c (psf)	Total phi (degrees)	CD Triaxial, ASTM D7181 Effective c (psf)	Effective phi (degrees)	CD Direct Shear, ASTM D3080 Effective c (psf)	Effective phi (degrees)	Flexible Wall Permeability, ASTM D5084 Saturation (percent)	Average k (cm/sec)
BH-13	SPT	30	56	SILTY SAND WITH GRAVEL (SM)	25.2						18.8	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-14	SPT	5.0	7	SANDY FAT CLAY (CH)	32.6	-	56	25	31	-	77.8	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-14	SPT	15	11	SANDY FAT CLAY WITH GRAVEL (CH)	32.4	-	62	23	39	-	62.2	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-14	SPT	20	92/11"	SILTY SAND WITH GRAVEL (SM)	15.0	-	-	-	-	-	21.0	-	-	-	-	-	-	-	-	-	-	-	-	-
BH-14	SPT	25	60/1"	SILTY SAND WITH GRAVEL (SM)	4.1	-	-	-	-	-	18.1	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-01	Grab	3.0	-	SANDY CLAY (CH)	29.9	-	58	26	32	99.2	98.1	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-01	Grab	8.5	-	SANDY CLAY (CH)	35.6	-	54	23	31	99.0	97.4	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Grab	3.0	-	SANDY CLAY (CH)	22.6	-	63	25	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Grab	7.0	-	SANDY CLAY (CL)	37.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Grab	13.5	-	SANDY CLAY (CL)	40.1	-	75	37	38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Shelby	18.5	-	SANDY CLAY (CL)	69.8	-	-	-	-	-	-	-	-	-	-	-	-	-	0	33.3	-	-	-	-
GP/CPT-04	Grab	22.0	-	SANDY SILT (ML)	75.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Grab	25.0	-	ELASTIC SILT WITH SAND (MH)	69.7	-	78	48	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Grab	27.0	-	SANDY SILT (ML)	70.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-04	Shelby	28.0	-	SANDY SILT (ML)	65.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	35.5	-	-
GP/CPT-05	Grab	6.5	-	ELASTIC SILT WITH SAND (MH)	42.6	-	73	39	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-05	Shelby	10.0	-	SANDY CLAY (CL)	41.2, 48.2, 41.2	-	-	-	-	-	-	-	-	-	-	-	-	-	150	39	-	-	-	-
GP/CPT-05	Grab	14.0	-	SILTY SAND WITH GRAVEL (SM)	45.1, 28.9	-	-	-	-	72	36.4	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-06	Grab	7.0	-	ELASTIC SILT (MH)	39.0	-	80	44	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-06	Grab	18.0	-	SANDY SILT (ML)	71.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-06	Grab	24.0	-	ELASTIC SILT (MH)	75.0	-	84	54	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-06	Grab	27.0	-	SANDY SILT (ML)	80.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-07	Grab	2.0	-	SANDY CLAY (CL)	26.9	-	-	-	-	81	53.1	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-07	Grab	12.0	-	CLAYEY SAND WITH GRAVEL (SC)	38.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-07	Grab	16.0	-	CLAYEY SAND (SC)	25.5	-	-	-	-	82	45.9	-	-	-	-	-	-	-	-	-	-	-	-	-
GP/CPT-09	Grab	2.0	-	CLAY (CH)	28.3	-	73	20	53	97.3	92.9	-	-	-	-	-	-	-	-	-	-	-	-	-

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty Sand with Gravel	52	33	19	Not Tested	33.3	SM

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-01 **Depth:** 7.5-9' **Sample Number:** S-1

Remarks:

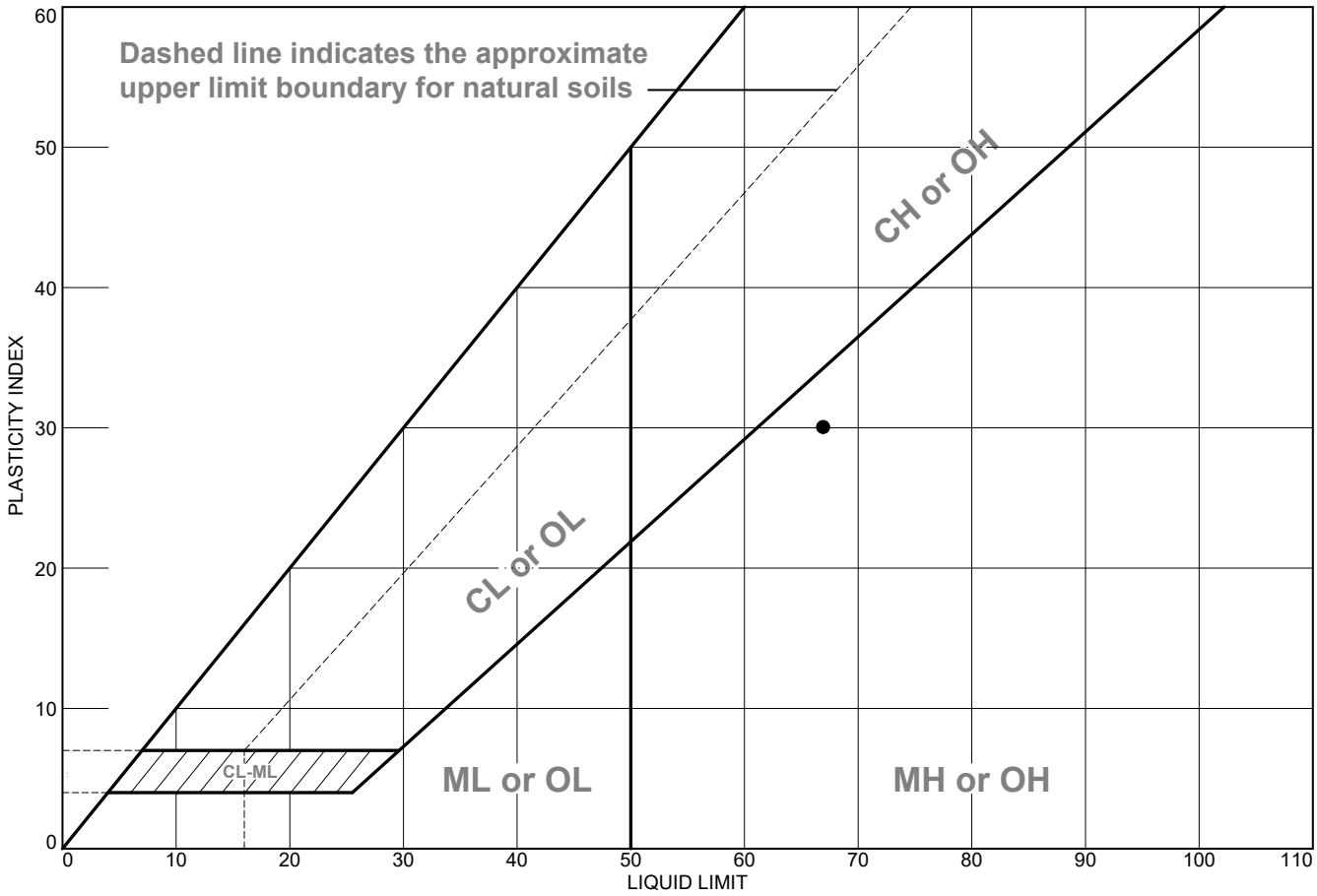
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-1

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty Sand with Gravel	67	37	30	Not Tested	22.7	SM

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-05 **Depth:** 3' **Sample Number:** S-2

Remarks:

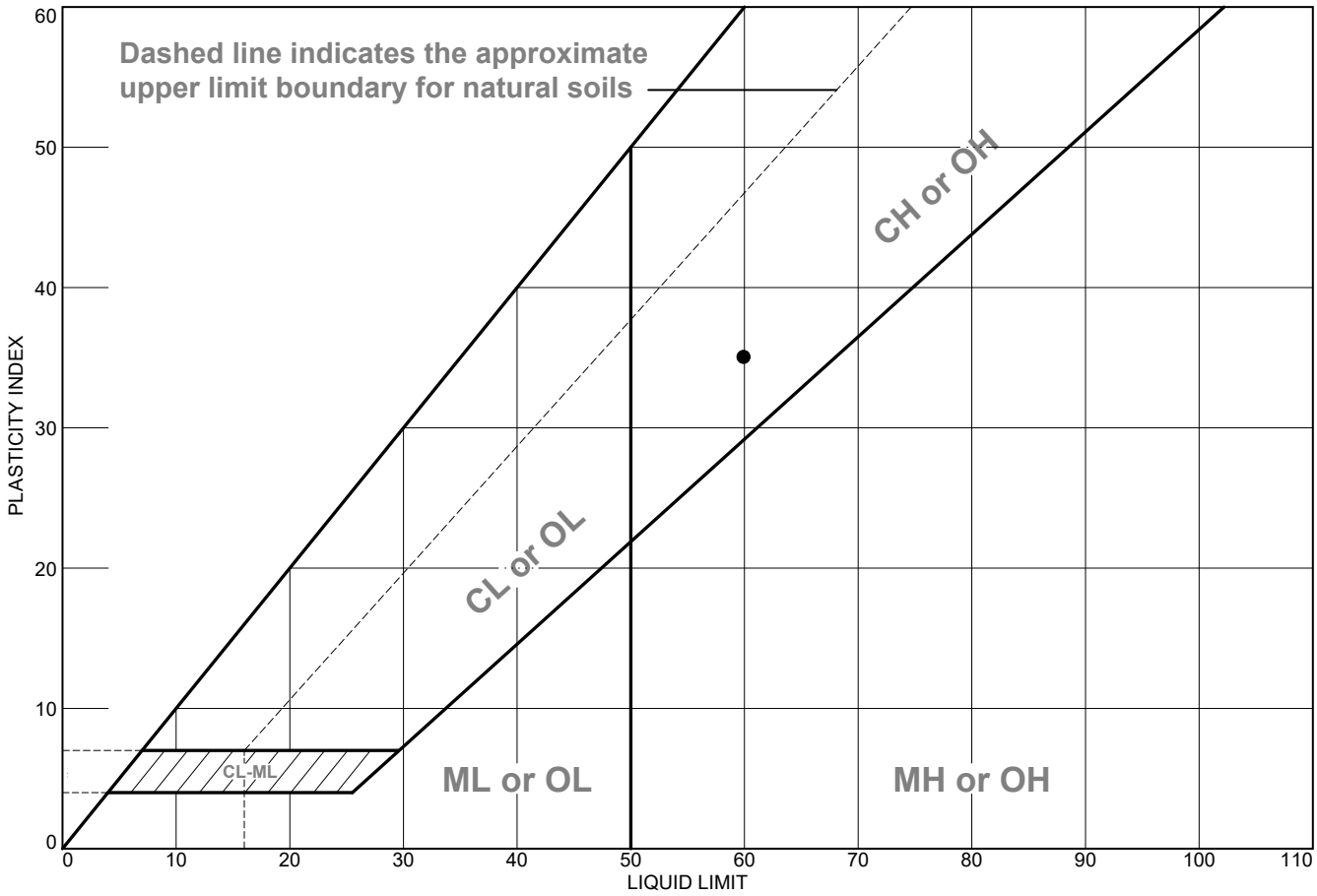
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-2

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy Fat Clay with Gravel	60	25	35	Not Tested	74.6	CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-10 **Depth:** 5-6.5' **Sample Number:** S-2

Remarks:

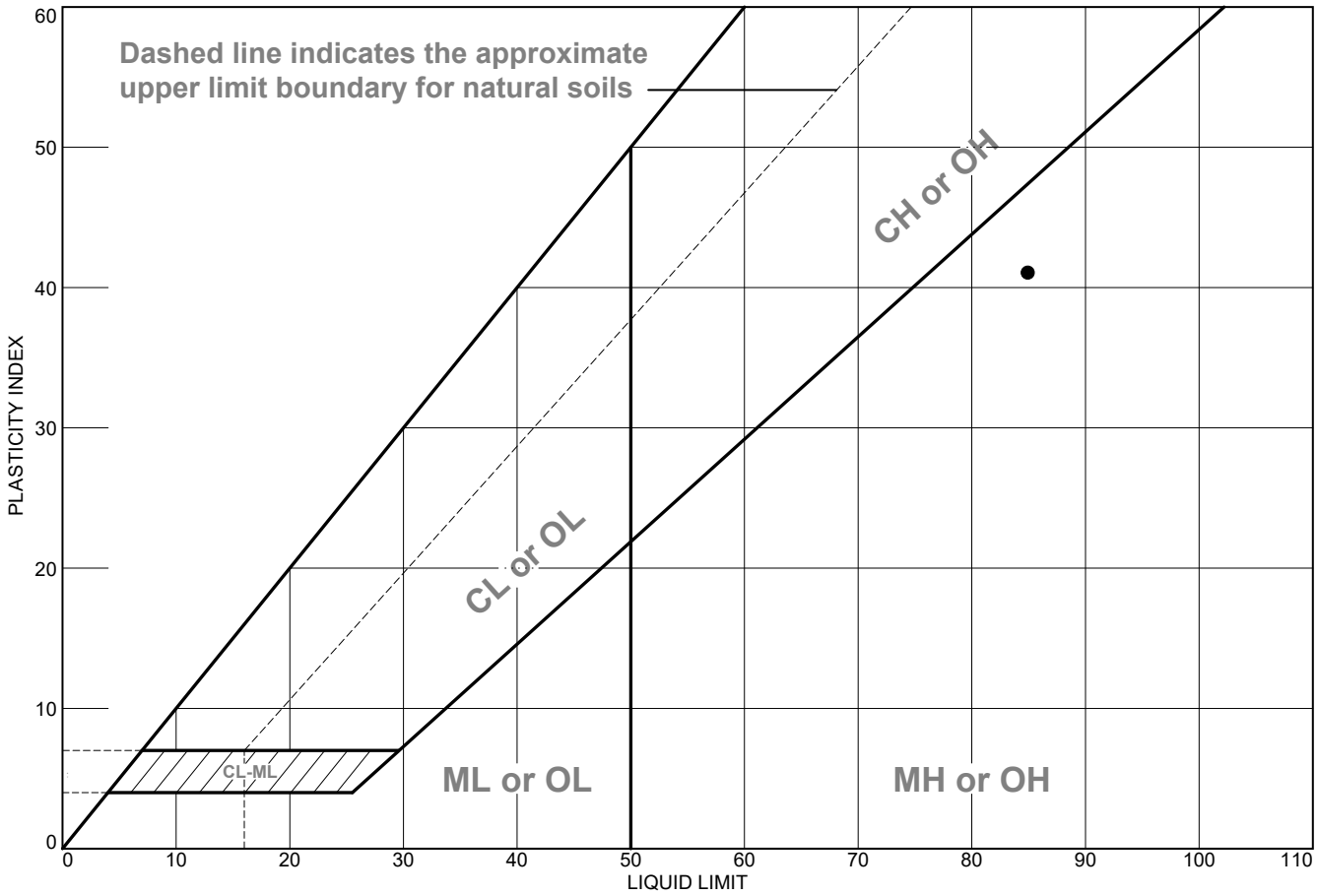
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-3

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy Silt	85	44	41	Not Tested	65.9	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-11 **Depth:** 15-16.5' **Sample Number:** S-7

Remarks:

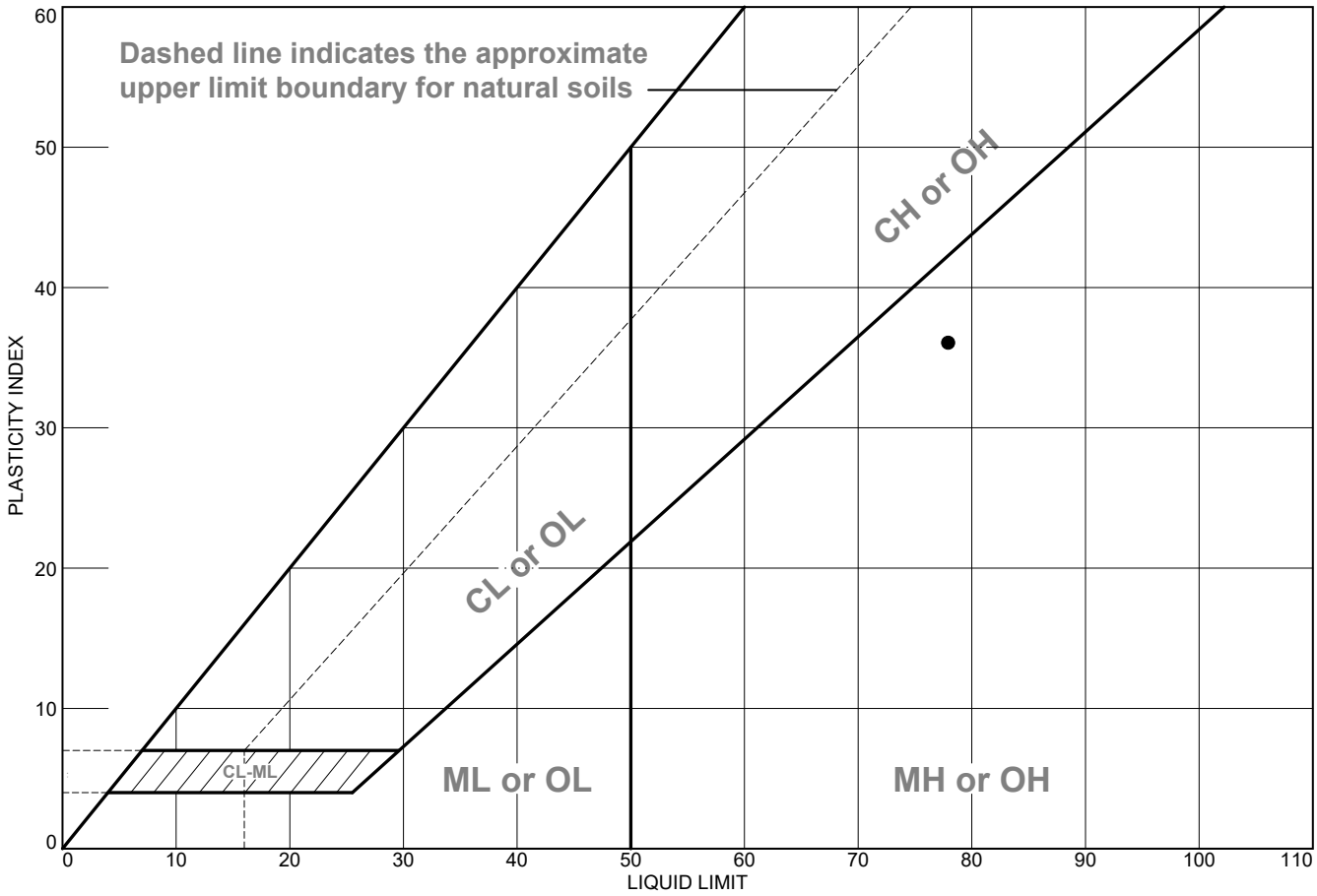
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-4

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy Elastic Silt	78	42	36	Not Tested	50.7	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-12 **Depth:** 7.5-9' **Sample Number:** S-3

Remarks:

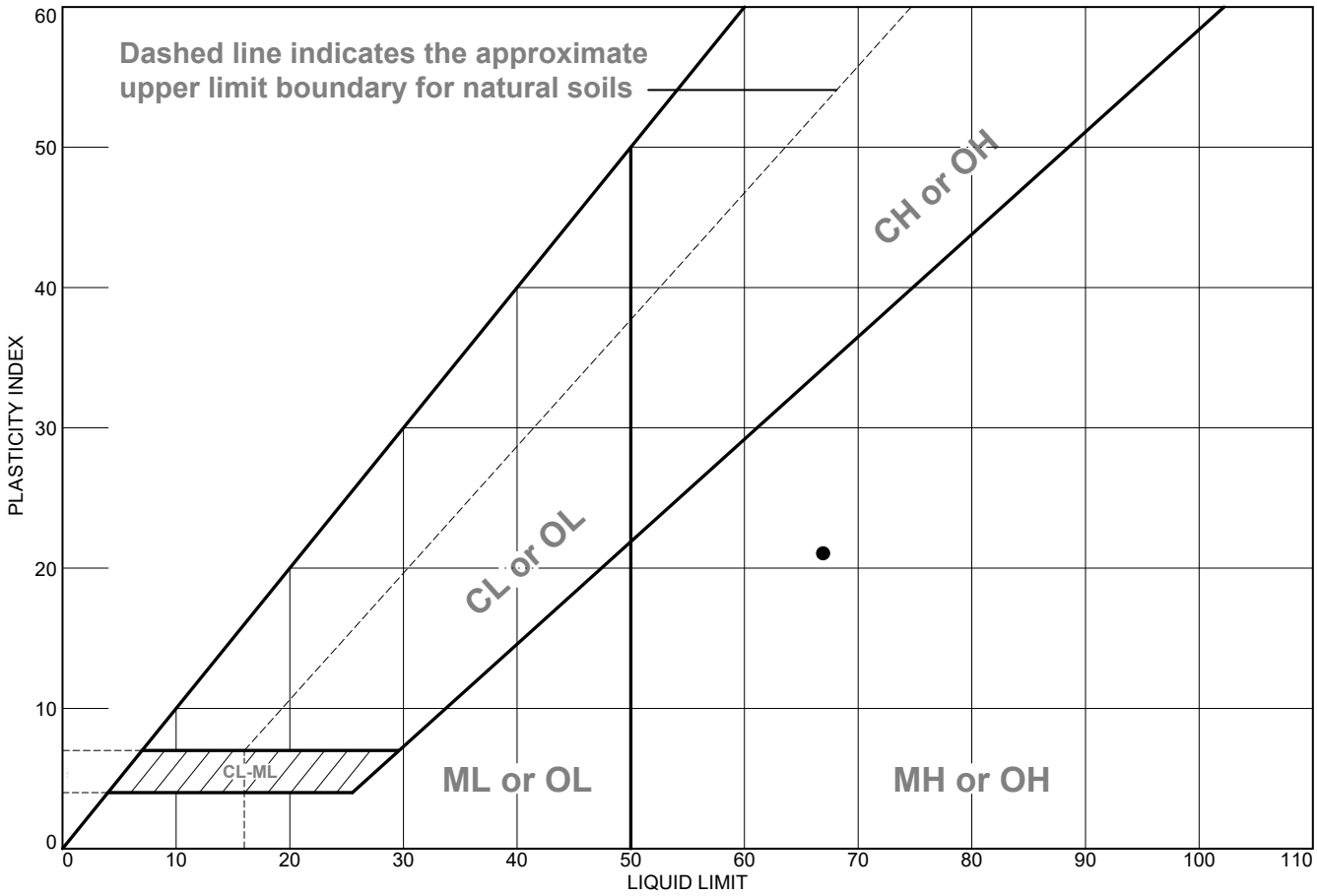
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-5

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty Sand	67	46	21	Not Tested	48.2	SM

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-12 **Depth:** 30-31.5' **Sample Number:** S-9

Remarks:

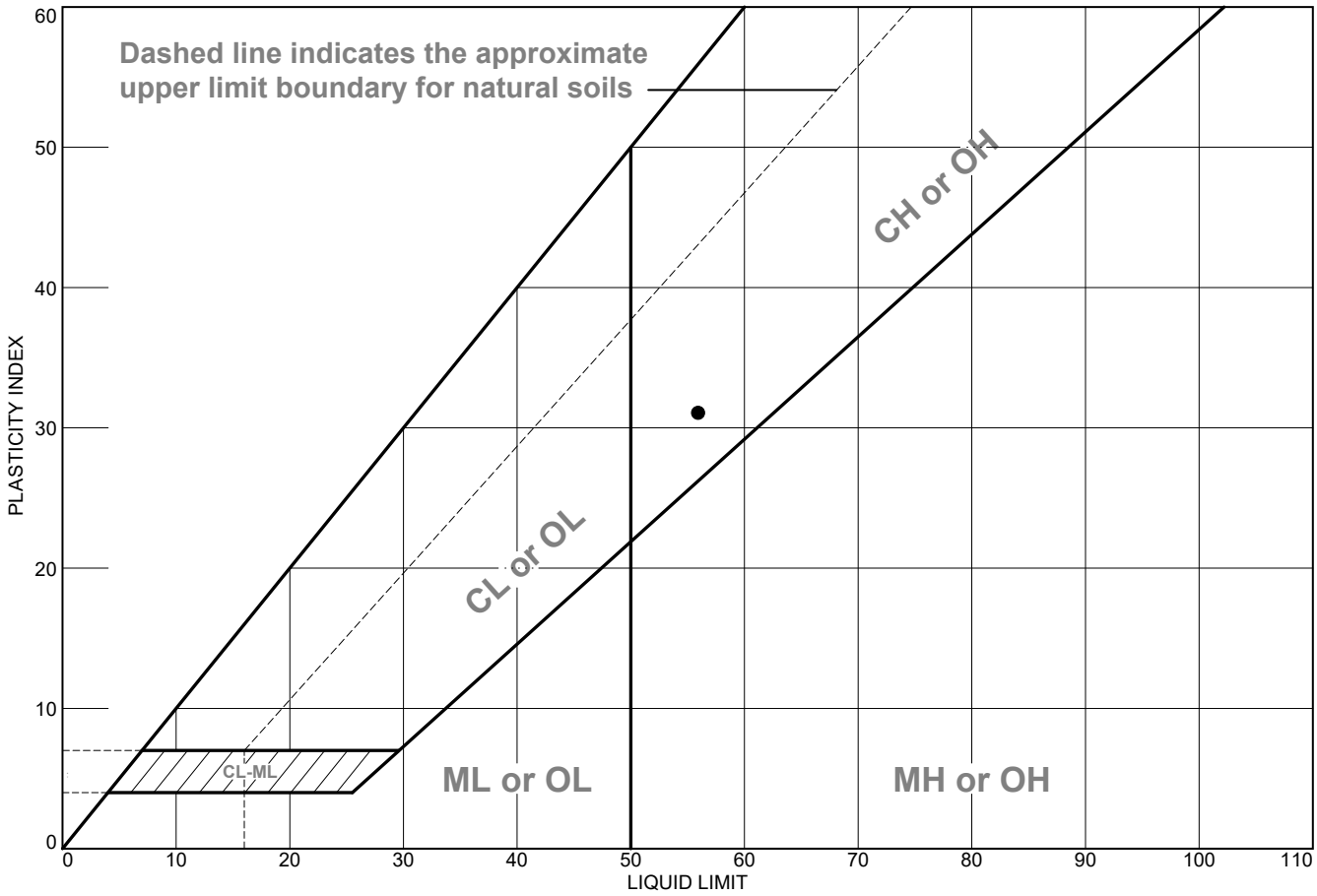
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-6

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy Fat Clay	56	25	31	Not Tested	77.8	CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-14 **Depth:** 5-6.5' **Sample Number:** S-2

Remarks:

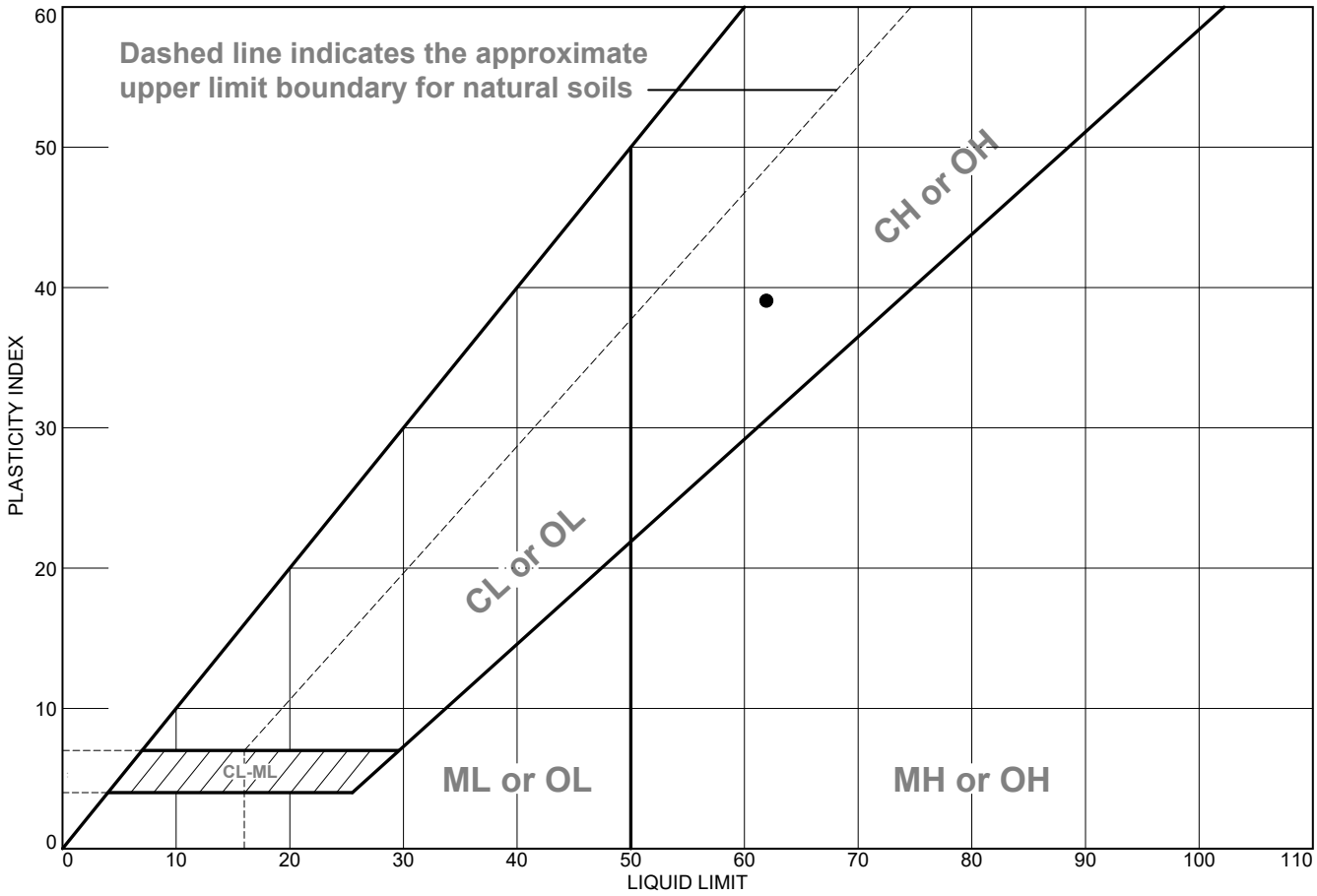
●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-7

Tested By: PJH **Checked By:** LMS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy Fat Clay	62	23	39	Not Tested	62.2	CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** BH-14 **Depth:** 15-16.5' **Sample Number:** S-4

Remarks:

●Sampled By: SMW
Sample Date: Week of 08-16-21
ASTM D4318 - Multipoint Method
Wet Prepped, Liquid Limit Device, Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-8

Tested By: PJH **Checked By:** LMS

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

62915 NE 18th St, Ste 1
Bend, OR 97701
541.382.4707 Tel.
www.wallacegroup-inc.com

No. 200 Sieve Wash

(Material Finer than No. 200 Sieve)

ASTM C117 / D-1140

Client: Civil & Env. Consultants, Inc.
Project Coffin Butte Landfill
Location: Corvallis, OR
Sample Location: Borings
Date Sampled: 8/17/2021

Project Number: 21129 - 1
Lab Number: WGG0233
Technician: PJH
Date Received: 9/17/2021
Date Analyzed: 11/29/2021

Location	BH-01	BH-03	BH-11
Depth	7.5'	10'	15'
Wet Weight	340.6	510	360.1
Dry Weight	254.8	425	199.3
Moisture %	33.7%	20.0%	80.7%
Weight After Wash	170.0	369.1	67.9
Weight Passing #200	84.8	55.9	131.4
% Passing #200	33.3%	13.2%	65.9%

Location	BH-11	BH-12	BH-12
Depth	30'	7.5'	30'
Wet Weight	455.4	417.2	400.1
Dry Weight	264.4	259	240.6
Moisture %	72.2%	61.1%	66.3%
Weight After Wash	119.3	127.6	124.7
Weight Passing #200	145.1	131.4	115.9
% Passing #200	54.9%	50.7%	48.2%

REVIEWED BY: L. Splitter
DATE: 1/24/2022

Note: Data and results shown above include ASTM Test Methods C117 and D1140. This report pertains only to the material tested and/or inspected and is not to be reproduced without prior authorization of Wallace Group. If part of a larger document, this report is not to be removed or reproduced separately. This report is the property of the Client and shall not be distributed to other parties without Client's permission.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

62915 NE 18th St, Ste 1
Bend, OR 97701
541.382.4707 Tel.
www.wallacegroup-inc.com

No. 200 Sieve Wash

(Material Finer than No. 200 Sieve)

ASTM C117 / D-1140

Client: Civil & Env. Consultants, Inc.
Project Coffin Butte Landfill
Location: Corvallis, OR
Sample Location: Borings
Date Sampled: 8/17/2021

Project Number: 21129 - 1
Lab Number: WGG0233
Technician: PJH
Date Received: 9/17/2021
Date Analyzed: 11/29/2021

Location	BH-12	BH-13	BH-13
Depth	45'	25'	30'
Wet Weight	284.7	464.7	443.2
Dry Weight	197.4	314.6	353.9
Moisture %	44.2%	47.7%	25.2%
Weight After Wash	122.4	230.5	287.3
Weight Passing #200	75	85.1	66.6
% Passing #200	38.0%	27.1%	18.8%

Location	BH-14	BH-14	BH-14
Depth	5'	20'	15'
Wet Weight	452.7	664.6	443.5
Dry Weight	341.5	577.8	335
Moisture %	32.6%	15.0%	32.4%
Weight After Wash	75.8	456.3	126.5
Weight Passing #200	265.7	121.5	208.5
% Passing #200	77.8%	21.0%	62.2%

REVIEWED BY: L. Splitter
DATE: 1/24/2022

Note: Data and results shown above include ASTM Test Methods C117 and D1140. This report pertains only to the material tested and/or inspected and is not to be reproduced without prior authorization of Wallace Group. If part of a larger document, this report is not to be removed or reproduced separately. This report is the property of the Client and shall not be distributed to other parties without Client's permission.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

62915 NE 18th St, Ste 1
Bend, OR 97701
541.382.4707 Tel.
www.wallacegroup-inc.com

No. 200 Sieve Wash

(Material Finer than No. 200 Sieve)

ASTM C117 / D-1140

Client: Civil & Env. Consultants, Inc.
Project Coffin Butte Landfill
Location: Corvallis, OR
Sample Location: Borings
Date Sampled: 8/17/2021

Project Number: 21129 - 1
Lab Number: WGG0233
Technician: PJH
Date Received: 9/17/2021
Date Analyzed: 11/30/2021

Location	BH-01	BH-04	BH-05
Depth	30'	2.5'	3'
Wet Weight	499.8	491.6	291.2
Dry Weight	359.3	359.1	212.2
Moisture %	39.1%	36.9%	37.2%
Weight After Wash	229.9	211.1	164.0
Weight Passing #200	129.4	148.0	48.2
% Passing #200	36.0%	41.2%	22.7%

Location	BH-08	BH-10	BH-10
Depth	20'	5'	20'
Wet Weight	510.6	389.5	104.6
Dry Weight	414.5	295	86.8
Moisture %	23.2%	32.0%	20.5%
Weight After Wash	326.4	74.8	63.4
Weight Passing #200	88.1	220.2	23.4
% Passing #200	21.3%	74.6%	27.0%

REVIEWED BY: L. Splitter
DATE: 1/24/2022

Note: Data and results shown above include ASTM Test Methods C117 and D1140. This report pertains only to the material tested and/or inspected and is not to be reproduced without prior authorization of Wallace Group. If part of a larger document, this report is not to be removed or reproduced separately. This report is the property of the Client and shall not be distributed to other parties without Client's permission.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

62915 NE 18th St, Ste 1
Bend, OR 97701
541.382.4707 Tel.
www.wallacegroup-inc.com

No. 200 Sieve Wash

(Material Finer than No. 200 Sieve)

ASTM C117 / D-1140

Client: Civil & Env. Consultants, Inc.
Project Coffin Butte Landfill
Location: Corvallis, OR
Sample Location: Borings
Date Sampled: 8/17/2021

Project Number: 21129 - 1
Lab Number: WGG0233
Technician: PJH
Date Received: 9/17/2021
Date Analyzed: 11/30/2021

Location	BH-11	BH-14
Depth	5'	25'
Wet Weight	371.2	48.4
Dry Weight	247.9	46.5
Moisture %	49.7%	4.1%
Weight After Wash	164.9	38.1
Weight Passing #200	83	8.4
% Passing #200	33.5%	18.1%

REVIEWED BY: L. Splitter
DATE: 1/24/2022

Note: Data and results shown above include ASTM Test Methods C117 and D1140. This report pertains only to the material tested and/or inspected and is not to be reproduced without prior authorization of Wallace Group. If part of a larger document, this report is not to be removed or reproduced separately. This report is the property of the Client and shall not be distributed to other parties without Client's permission.

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Report of: One-dimensional consolidation, direct shear, unconsolidated undrained triaxial compression and flexible wall permeability testing.

Sample Identification

As requested, NTI completed one-dimensional consolidation testing, direct shear testing, unconsolidated undrained triaxial compression testing and flexible wall permeability testing on samples delivered to our laboratory on 9/15/21 and 10/22/21. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following table and page.

Laboratory Testing

Sample ID: BH-7 ST-1 @ 10.0-12.0 Ft.

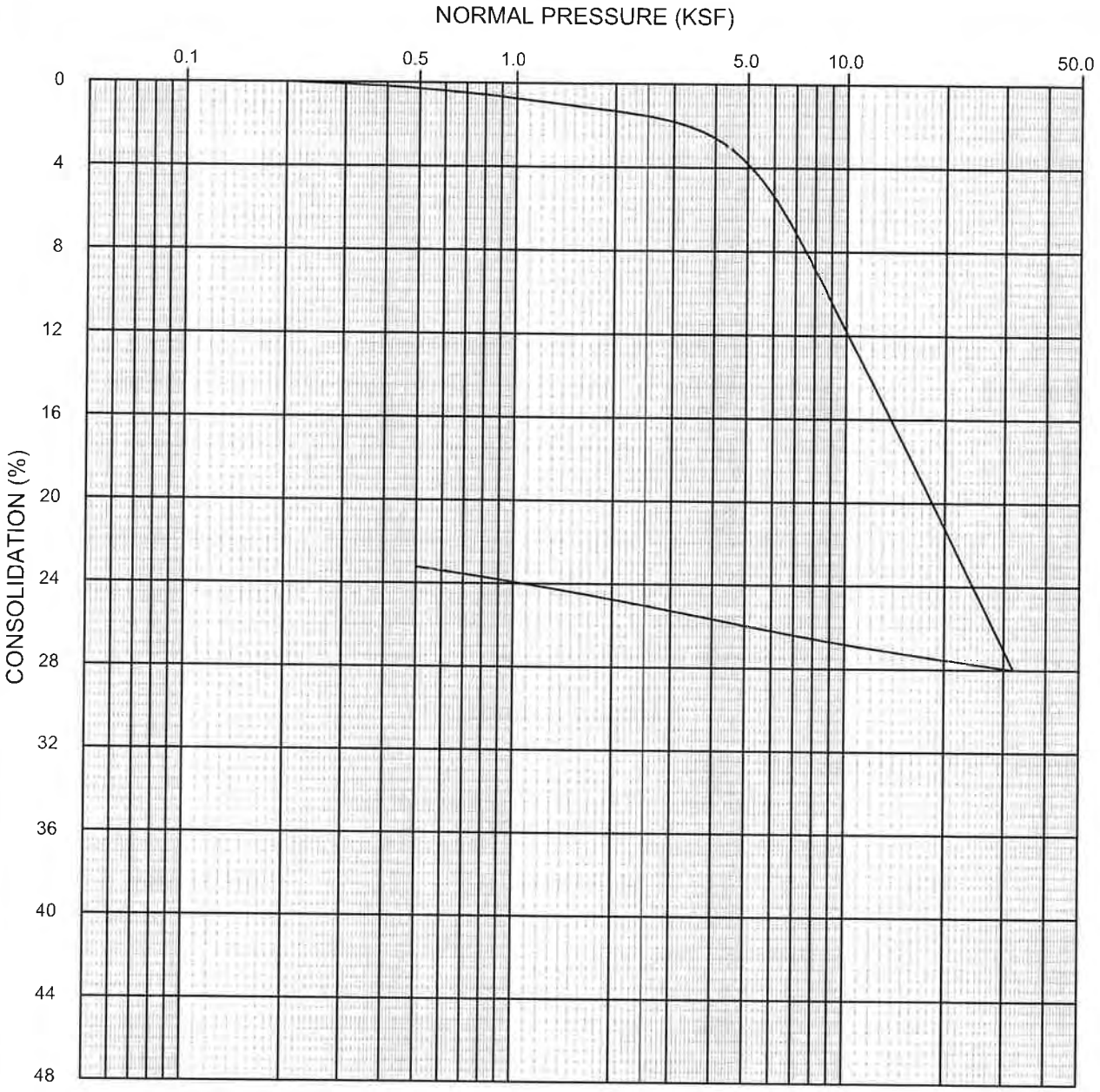
One Dimensional Consolidation of Soil (ASTM D2435)			
Test	**Initial Conditions**		**Final Conditions**
Moisture Content, (%)	65.0		56.9
Dry Unit Weight, (pcf)	54.4		70.3
Height of Specimen, (inches)	0.75		0.57
Load (ksf)	**Dial Reading (inches)**	**Load (ksf)**	**Dial Reading (inches)**
Initial	0.0006	16.0	0.1365
0.5	0.0032	32.0	0.2099
1.0	0.0056	8.0	0.1993
2.0	0.0095	2.0	0.1857
4.0	0.0192	0.5	0.1751
8.0	0.0662		

Attachments: Laboratory Test Results
Consolidation Test Results

Copies: (1) Addressee

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

REVIEWED BY: Michael A. Ginsbach MG



SYMBOL	SAMPLE LOCATION	NORMAL PRESSURE AT SATURATION (KSF)
———	BH-7 ST-1 @ 10.0 - 12.0 FT.	0.50

CONSOLIDATION TEST RESULTS - ASTM D2435

PROJECT NO. 3691.1.1	WALLACE GROUP, INC. COFFIN BUTTE	LAB NO. 21-430

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

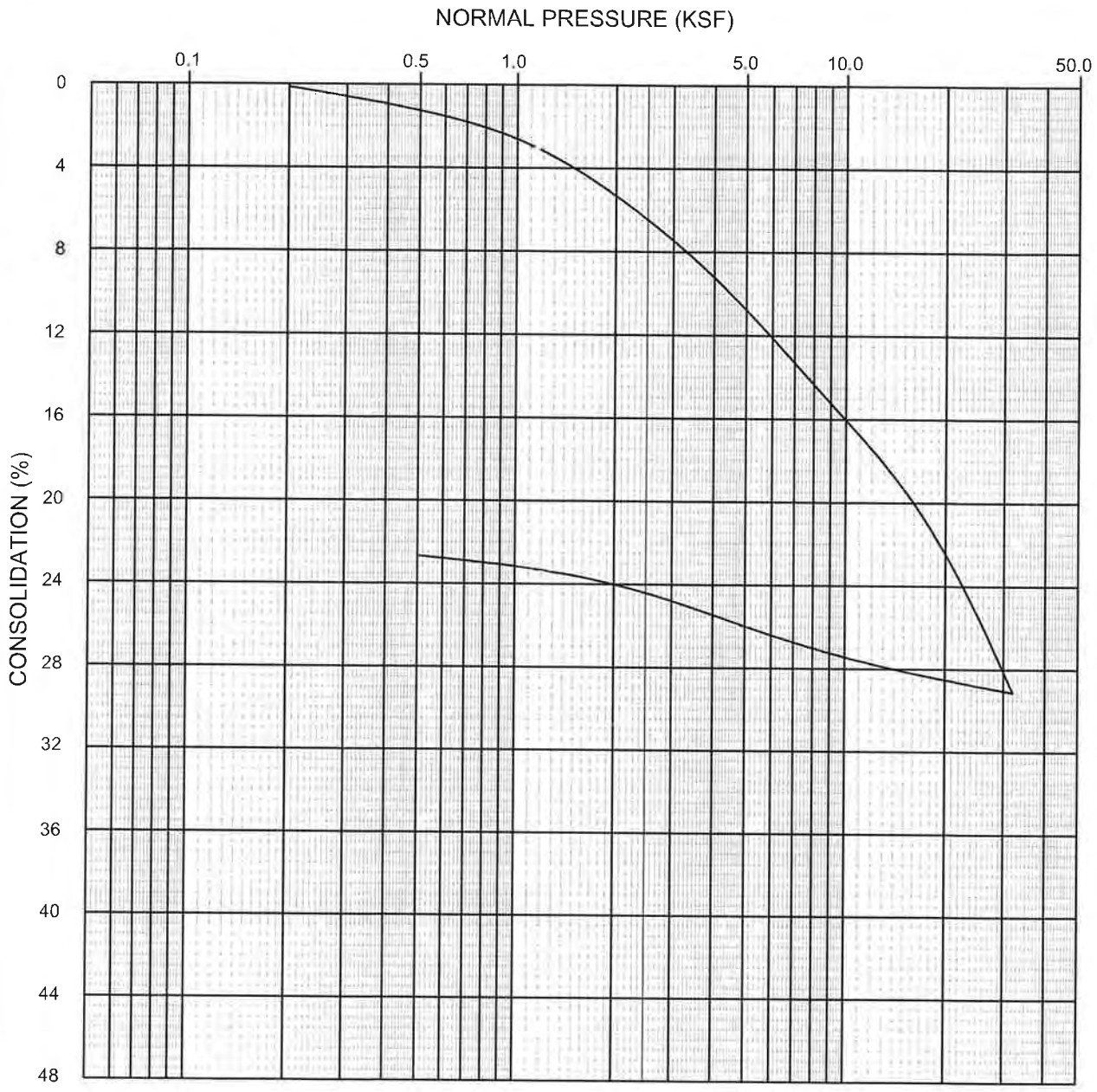
Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-11 ST1-S6 @ 12.0-14.0 Ft.

One Dimensional Consolidation of Soil (ASTM D2435)			
Test	**Initial Conditions**		**Final Conditions**
Moisture Content, (%)	75.6		60.1
Dry Unit Weight, (pcf)	52.3		65.7
Height of Specimen, (inches)	0.75		0.58
Load (ksf)	**Dial Reading (inches)**	**Load (ksf)**	**Dial Reading (inches)**
Initial	0.0008	16.0	0.1571
0.5	0.0094	32.0	0.2177
1.0	0.0199	8.0	0.2026
2.0	0.0401	2.0	0.1829
4.0	0.0694	0.5	0.1700
8.0	0.1076		

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.



SYMBOL	SAMPLE LOCATION	NORMAL PRESSURE AT SATURATION (KSF)
———	BH-11 ST-1 S-6 @ 12.0 - 14.0 FT.	0.50

CONSOLIDATION TEST RESULTS - ASTM D2435

PROJECT NO. 3691.1.1	WALLACE GROUP, INC. COFFIN BUTTE	LAB NO. 21-430

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

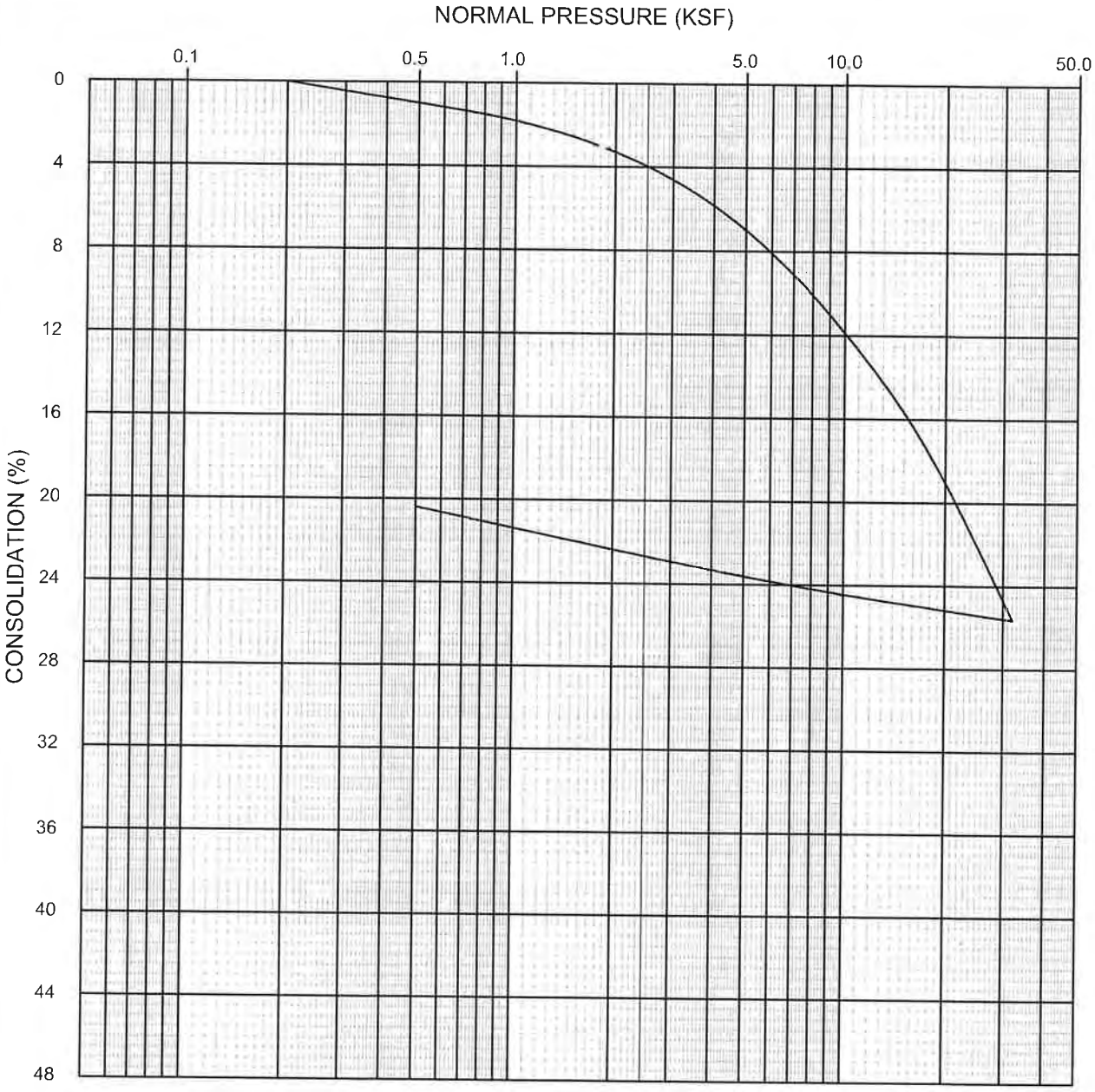
Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-12A ST-2 @ 10.0-12.0 Ft.

One Dimensional Consolidation of Soil (ASTM D2435)			
Test	**Initial Conditions**		**Final Conditions**
Moisture Content, (%)	63.9		56.9
Dry Unit Weight, (pcf)	58.1		69.4
Height of Specimen, (inches)	0.75		0.60
Load (ksf)	**Dial Reading (inches)**	**Load (ksf)**	**Dial Reading (inches)**
Initial	0.0000	16.0	0.1235
0.5	0.0075	32.0	0.1920
1.0	0.0140	8.0	0.1815
2.0	0.0245	2.0	0.1680
4.0	0.0435	0.5	0.1535
8.0	0.0760		

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.



SYMBOL	SAMPLE LOCATION	NORMAL PRESSURE AT SATURATION (KSF)
———	BH-12A ST-2 @ 10.0 - 12.0 FT.	0.50

CONSOLIDATION TEST RESULTS - ASTM D2435

PROJECT NO. 3691.1.1	WALLACE GROUP, INC. COFFIN BUTTE	LAB NO. 21-430

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

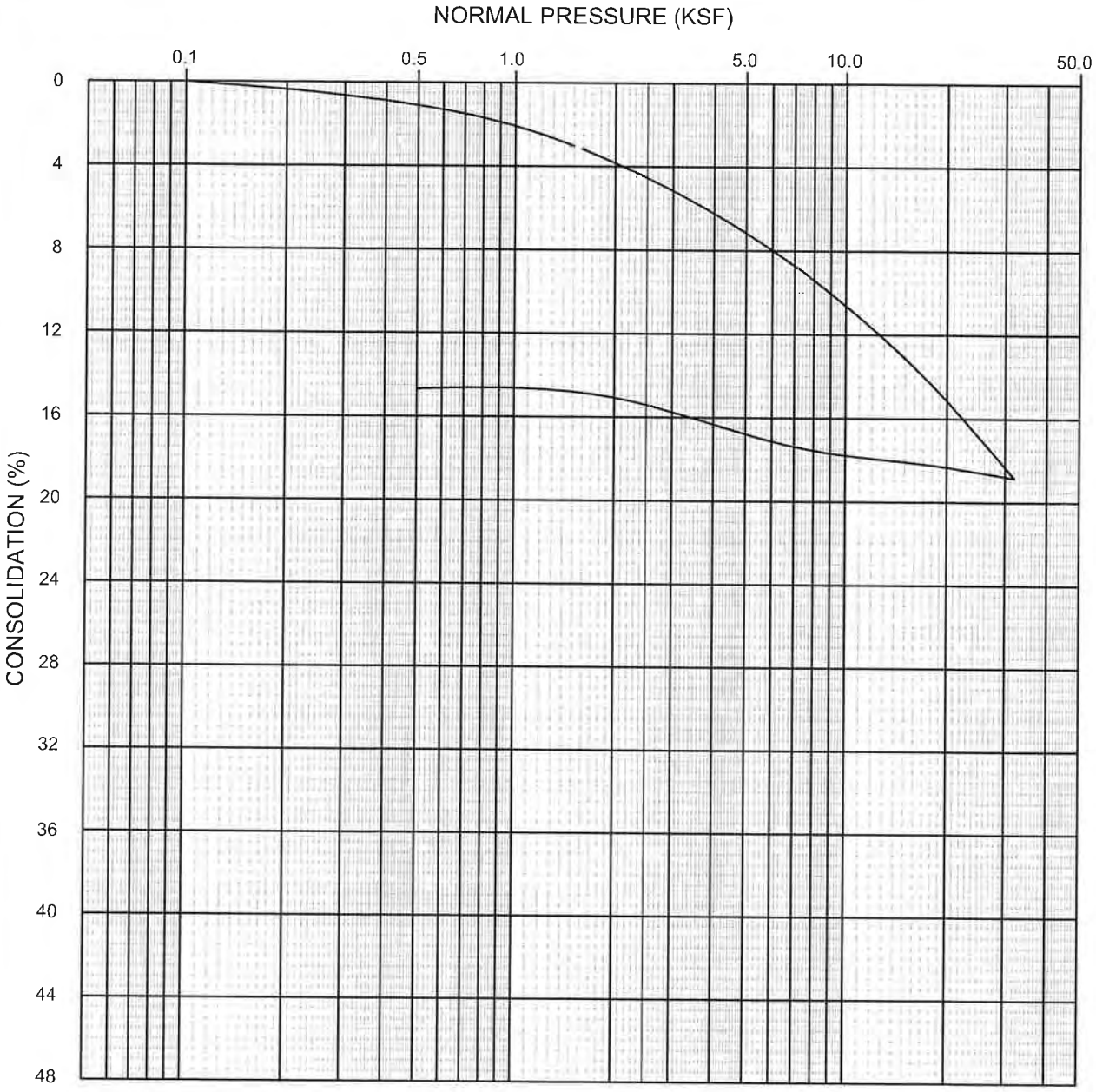
Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-12A ST-3 @ 20.0-22.0 Ft.

One Dimensional Consolidation of Soil (ASTM D2435)			
Test	**Initial Conditions**	**Final Conditions**	
Moisture Content, (%)	64.9	47.7	
Dry Unit Weight, (pcf)	62.5	74.9	
Height of Specimen, (inches)	1.0	0.85	
Load (ksf)	**Dial Reading (inches)**	**Load (ksf)**	**Dial Reading (inches)**
Initial	-0.0010	16.0	0.1354
0.5	0.0107	32.0	0.1880
1.0	0.0207	8.0	0.1753
2.0	0.0380	2.0	0.1509
4.0	0.0623	0.5	0.1464
8.0	0.0944		

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.



SYMBOL	SAMPLE LOCATION	NORMAL PRESSURE AT SATURATION (KSF)
———	BH-12A ST-3 @ 20.0 - 22.0 FT.	0.50

CONSOLIDATION TEST RESULTS - ASTM D2435

PROJECT NO. 3691.1.1	WALLACE GROUP, INC. COFFIN BUTTE	LAB NO. 21-430

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-11 ST1-S6 @ 12.0-14.0 Ft.

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils – Sample Data (ASTM D2850)				
Mass (grams)	**Length (inches)**	**Diameter (inches)**	**Moisture Content (percent)**	**Dry Density (pcf)**
993.4	6.103	2.846	69.8	57.4

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Spiller, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

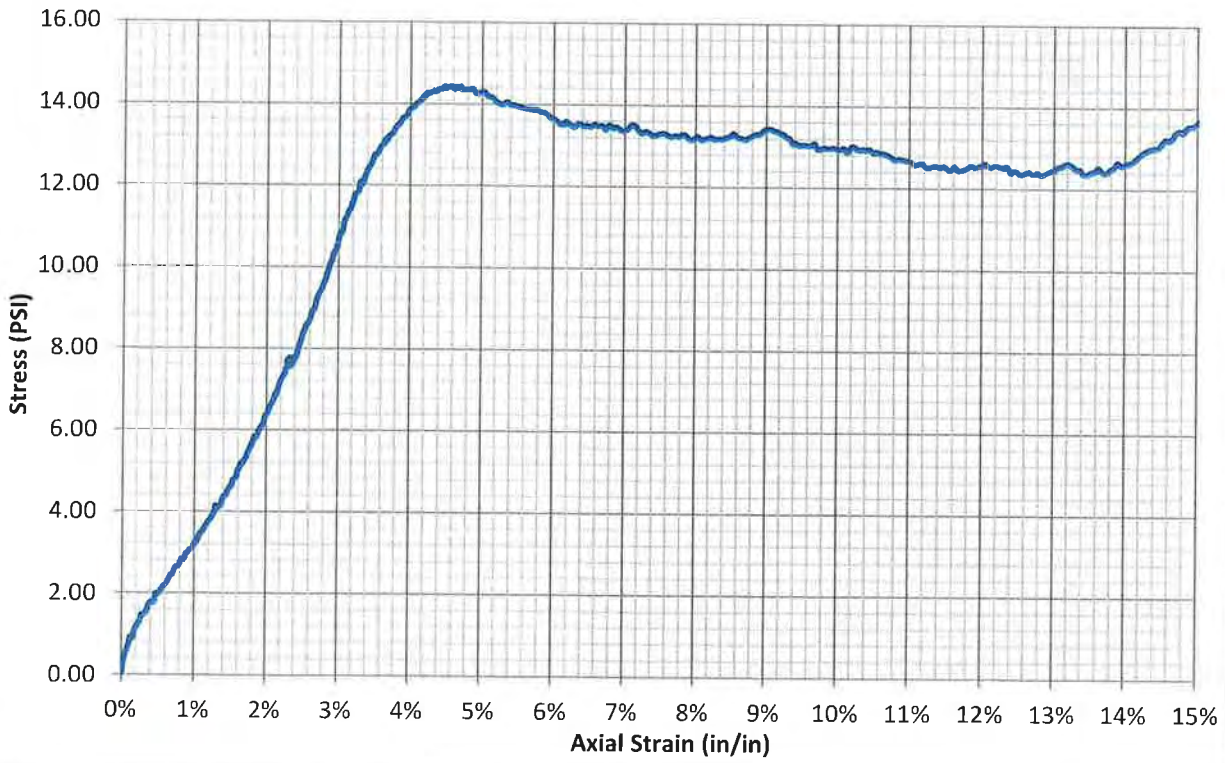
Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-11 ST-1-S6 @ 13.5-14.0 Ft.

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils – Test Data (ASTM D2850)			
Strain Rate (%/min)	**Peak Strength (psi)**	**Confining Pressure (psf)**	**Notes**
0.01831	14.435	880	Shear at base, blocky.

Stress Strain Figure



This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-12A ST-2 @ 10.0-12.0 Ft.

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils – Sample Data (ASTM D2850)				
Mass (grams)	**Length (inches)**	**Diameter (inches)**	**Moisture Content (percent)**	**Dry Density (pcf)**
1031.1	6.110	2.853	56.8	64.2

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

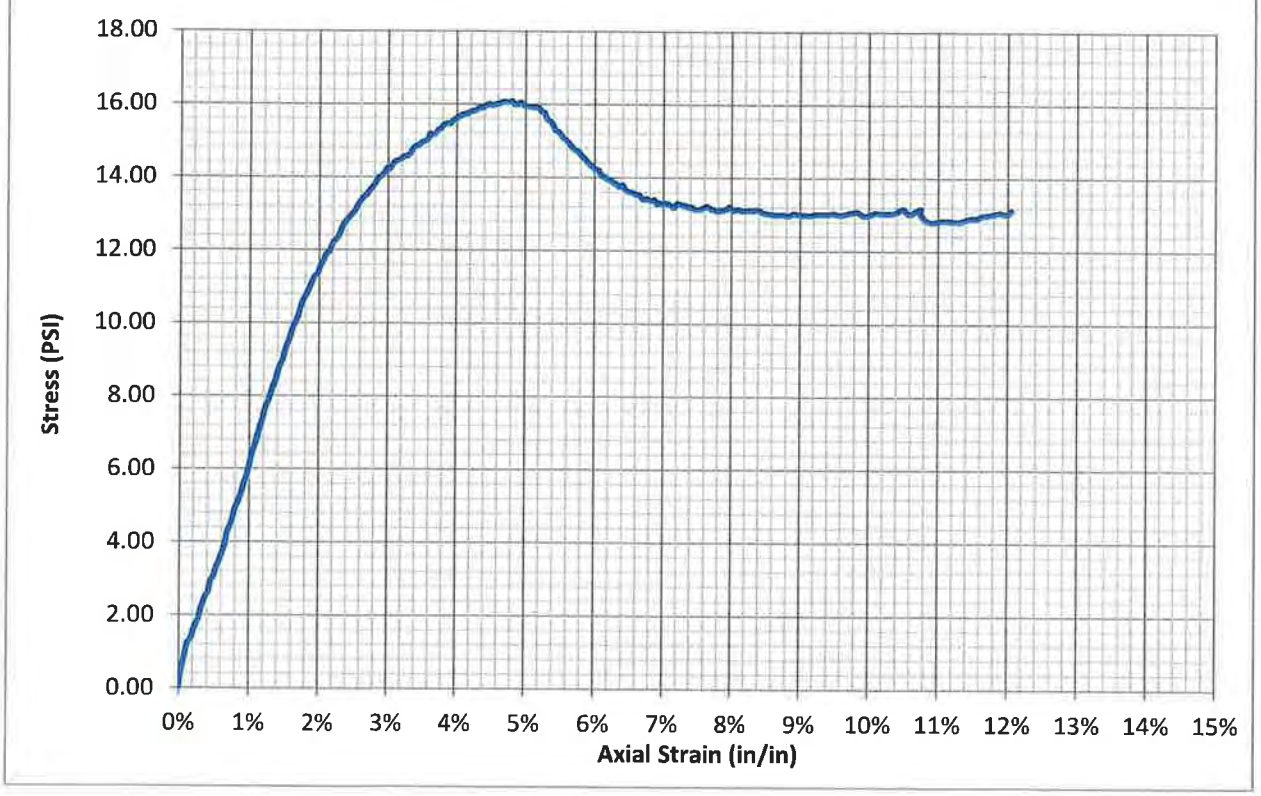
Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-12A ST-2 @ 10.0-12.0 Ft.

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils – Test Data (ASTM D2850)			
Strain Rate (%/min)	**Peak Strength (psi)**	**Confining Pressure (psf)**	**Notes**
0.03055	16.093	770	Decomposed rock. Contains many small fractures.

Stress Strain Figure



This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503 682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-11 ST-S6@12.0-14.0 Ft.

Flexible Wall Permeability – Sample Data (ASTM D5084 – Method C)

Mass (grams)	Length (inches)	Diameter (inches)	Area (sq. inches)	Moisture Content (percent)	Dry Density (pcf)
351.6	2.172	2.861	6.427	69.8	56.5

Flexible Wall Permeability – Test Data (ASTM D5084 – Method C)

Sample Condition	Saturation at Time of Testing (percent)	Head (psi)	Hydraulic Gradient (in/in)
undisturbed	97	0.5	6.80

Flexible Wall Permeability – Test Results (ASTM D5084 – Method C)

Test 1 k (cm/sec)	Test 2 k (cm/sec)	Test 3 k (cm/sec)	Test 4 k (cm/sec)	Average k (cm/sec)
4.17×10^{-6}	4.01×10^{-6}	4.11×10^{-6}	4.15×10^{-6}	4.11×10^{-6}

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.
 REVIEWED BY: Michael A. Ginsbach

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To: Lisa Splitter, P.E., G.E.
Wallace Group, Inc.
62915 NE 18th St, Ste. 1
Bend, Oregon 97701

Date: 12/16/2021

Lab No.: 21-430

Project: Coffin Butte (Project #21129-1)

Project No.: 3691.1.1

Sample ID: BH-7 ST-1 @ 10.0-12.0 Ft.

Direct Shear Test of Soils Under Consolidated Drained Conditions – Sample Data (ASTM D3080)			
Test	**500psf Normal Load Initial Conditions**	**1500psf Normal Load Initial Conditions**	**2500psf Normal Load Initial Conditions**
Moisture Content, (%)	53.8	57.3	61.8
Dry Unit Weight, (pcf)	62.1	58.7	55.9
Peak Shear Strength, (psf)	701	1497	2196

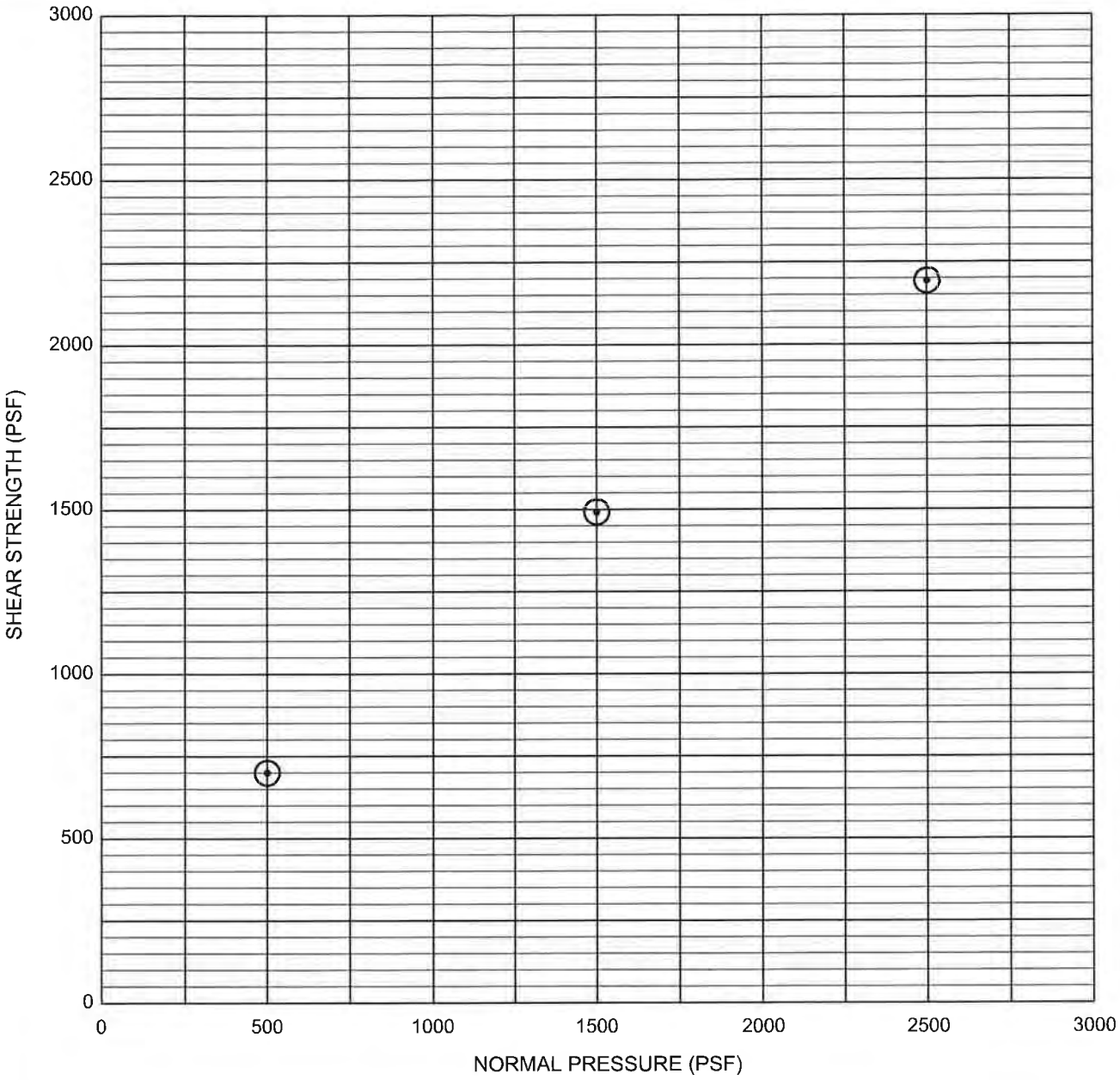
Note: Displacement rate used during testing, 0.00017 inches/minute

Sample ID: BH-12A ST-3 @ 20.0-22.0 Ft.

Direct Shear Test of Soils Under Consolidated Drained Conditions – Sample Data (ASTM D3080)			
Test	**500psf Normal Load Initial Conditions**	**1500psf Normal Load Initial Conditions**	**2500psf Normal Load Initial Conditions**
Moisture Content, (%)	55.9	57.7	63.1
Dry Unit Weight, (pcf)	62.2	59.9	59.6
Peak Shear Strength, (psf)	567	1340	2164

Note: Displacement rate used during testing, 0.00013 inches/minute

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

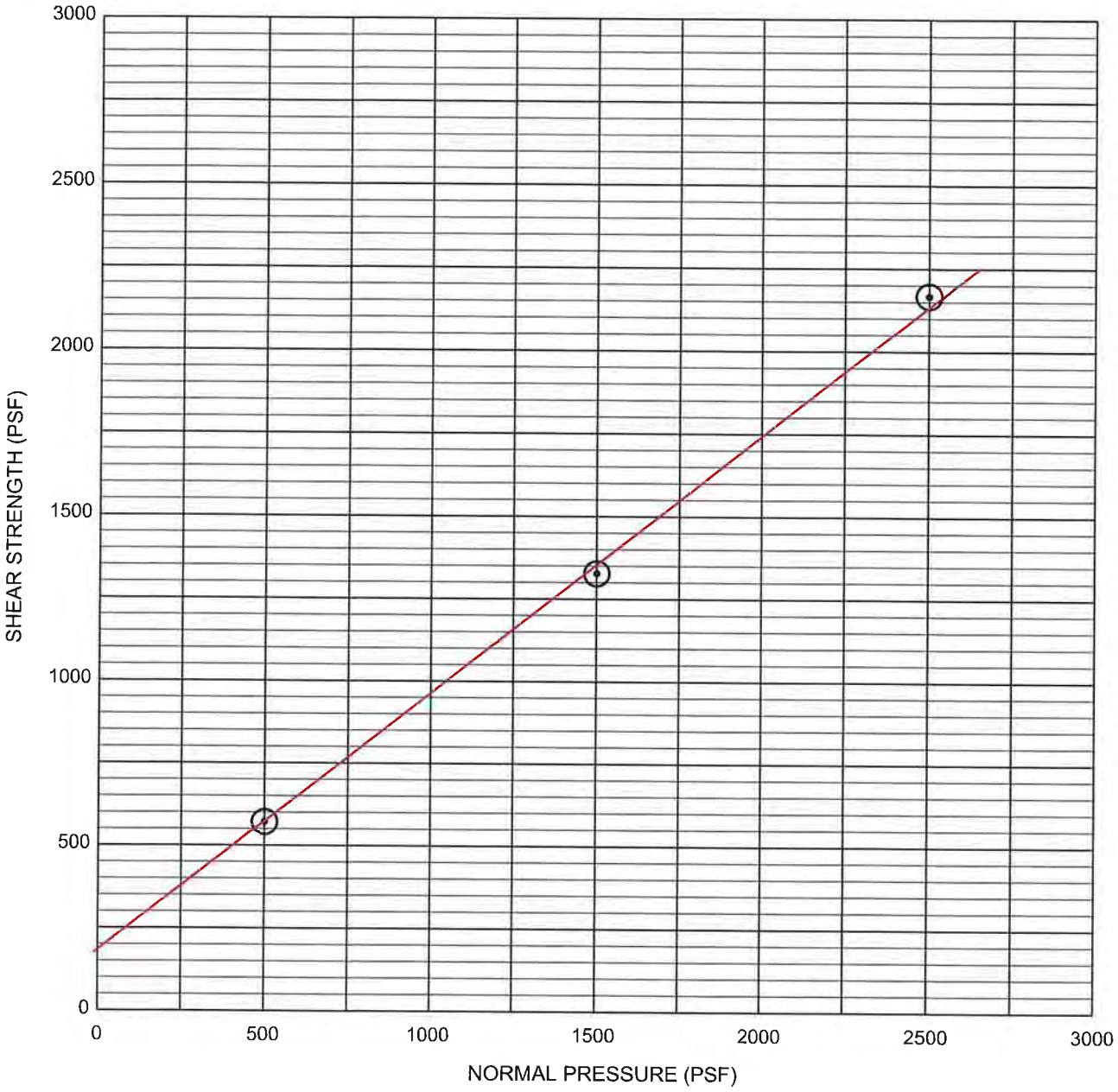


SYMBOL	SAMPLE LOCATION	COHESION (psf)	FRICTION ANGLE	REMARKS
⊙	BH-7, ST-1 @ 10.0 - 12.0 FT.	--		SATURATED; UNDISTURBED

DIRECT SHEAR TEST RESULTS - ASTM D3080

PROJECT NO. 3691.1.1	WALLACE GROUP, INC. COFFIN BUTTE	LAB NO. 21-430

Northwest Testing, Inc.



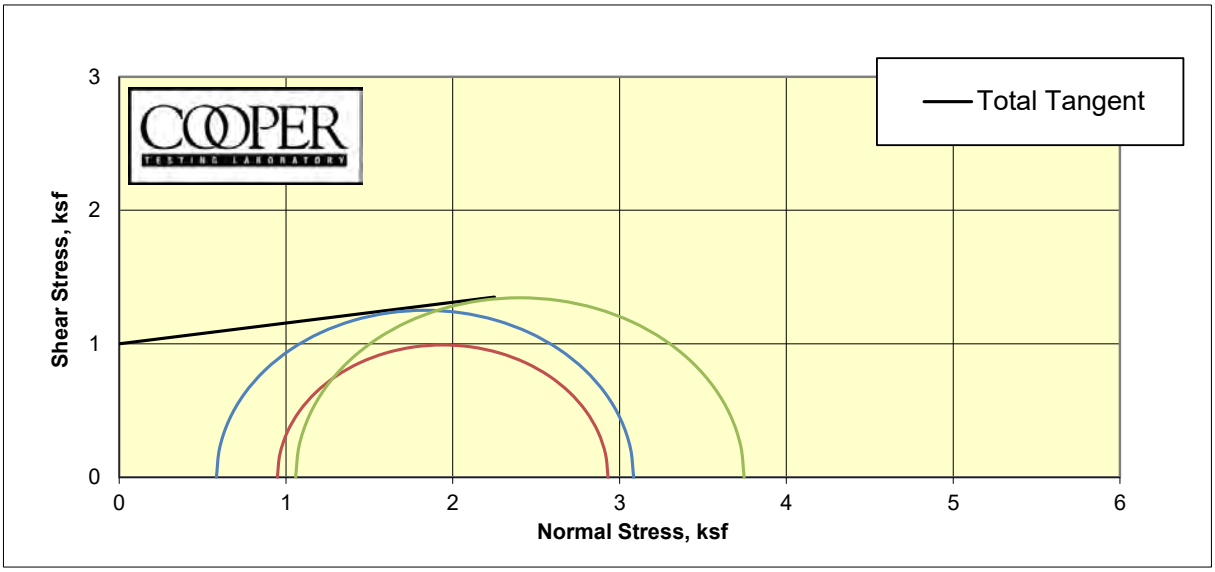
SYMBOL	SAMPLE LOCATION	COHESION (psf)	FRICTION ANGLE	REMARKS
⊙	BH-12A, ST-3 @ 20.0 - 22.0 FT.			SATURATED; UNDISTURBED

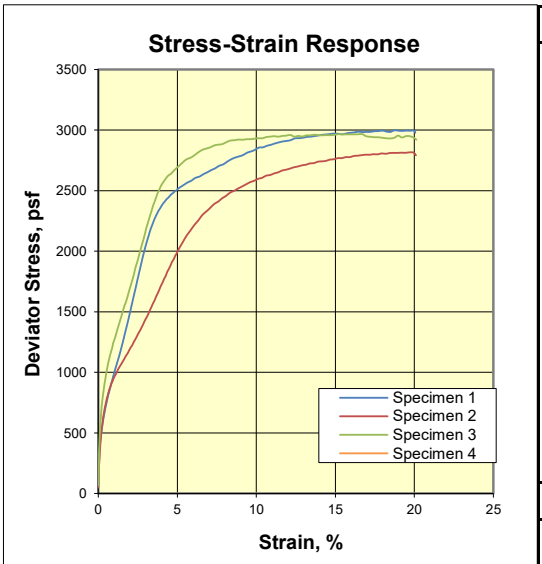
DIRECT SHEAR TEST RESULTS - ASTM D3080

PROJECT NO. 3691.1.1	WALLACE GROUP, INC. COFFIN BUTTE	LAB NO. 21-430

Northwest Testing, Inc.

Consolidated Undrained Triaxial Compression
ASTM D4767m





CTL Number:	1152-001
Client Name:	The Wallace Group
Project Name:	Coffin Butte Landfill
Project Number:	21129-1
Date:	12/23/2021 By: MD/DC
Total C	1.000 ksf
Total phi	8.8 degrees
Eff. C	N/A ksf
Eff. Phi	N/A degrees ©

Remarks: Engineering judgement is required to determine phi and cohesion, no phi or cohesion is reported. To add phi and cohesion to the report go to the "Report" tab and in cells M18 through P19 enter end points for a line through the Mohr's circles. The points plotted can be changed on the "Shear Values" tab using cells B3, F3, and J3.

Specimen	1	2	3	4
Boring	BH-2	BH-2	BH-2	
Sample	ST-1	ST-1	ST-1	
Depth	13(Tip-13.5")	13(Tip-6.5")	13(Tip-1/2")	
Visual Description	Olive Brown CLAY	Olive Brown CLAY	Olive Brown CLAY	
MC (%)	36.1	35.7	36.3	
Dry Density (pcf)	85.6	83.4	85.3	
Saturation (%)	98.7	92.6	98.6	
Void Ratio	1.007	1.059	1.012	
Diameter (in)	2.87	2.87	2.87	
Height (in)	5.99	5.75	5.98	
	Final			
MC (%)	36.2	36.0	36.3	
Dry Density (pcf)	86.0	86.3	85.9	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.996	0.990	0.998	
Diameter (in)	2.87	2.83	2.87	
Height (in)	5.97	5.73	5.94	
Cell Pressure (psi)	63.6	66.4	67.6	
Back Pressure (psi)	59.6	59.8	60.3	
	Total Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	2.501	1.983	2.689	
Excess PP (psi)				
Sigma 1 (ksf)	3.084	2.931	3.747	
Sigma 3 (ksf)	0.583	0.948	1.058	
P (ksf)	1.834	1.940	2.402	
Q (ksf)	1.251	0.991	1.345	
Stress Ratio	5.292	3.091	3.542	
Rate (in/min)	0.0300	0.0287	0.0299	

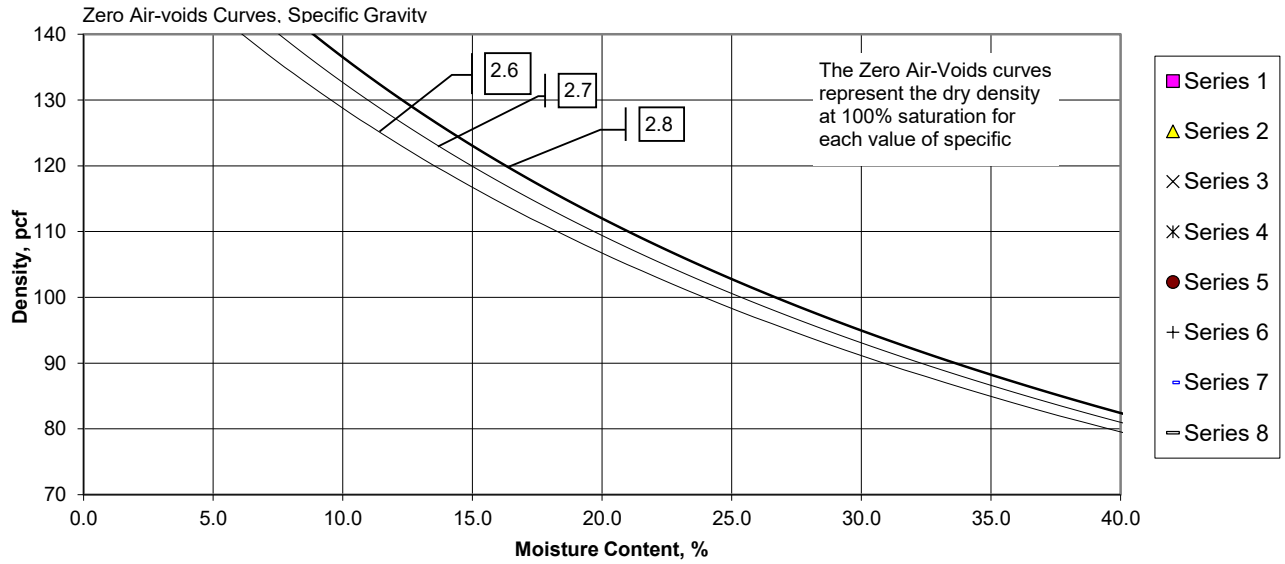
BENCHMARK GEOTECHNICAL LABS

Moisture-Density-Porosity Report
(ASTM D7263b)

BGL Job No:	026-029	**Project No.**	21129	**By:**	PJ
Client:	The Wallace Group	**Date:**	10/13/22		
Project Name:	Coffin Butte Landfill	**Remarks:**			

Boring:	GP-04	GP-04	GP-04	GP-04	GP-04	GP-04	GP-05	GP-05
Sample:	S-1	S-2	S-3	S-4	S-5	S-6	S-2	S-3
Depth, ft:	3	7	13.5	22	25	27	6.5-8	14-17
Visual Description:	Reddish Brown CLAY	Red CLAY	Red CLAY	Yellow & Brown SILT	Yellow & Brown SILT	Yellow & Brown SILT	Brown & Dark Brown SILT	Mottled Dark Grayish Brown Sandy SILT
Actual G_s								
Assumed G_s								
Moisture, %	22.6	37.3	40.1	75.6	69.7	70.3	42.6	45.1
Wet Unit wt, pcf								
Dry Unit wt, pcf								
Dry Bulk Dens.ρb, (g/cc)								
Saturation, %								
Total Porosity, %								
Volumetric Water Cont,Θw,%								
Volumetric Air Cont., Θa,%								
Void Ratio								
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered to be approximate.



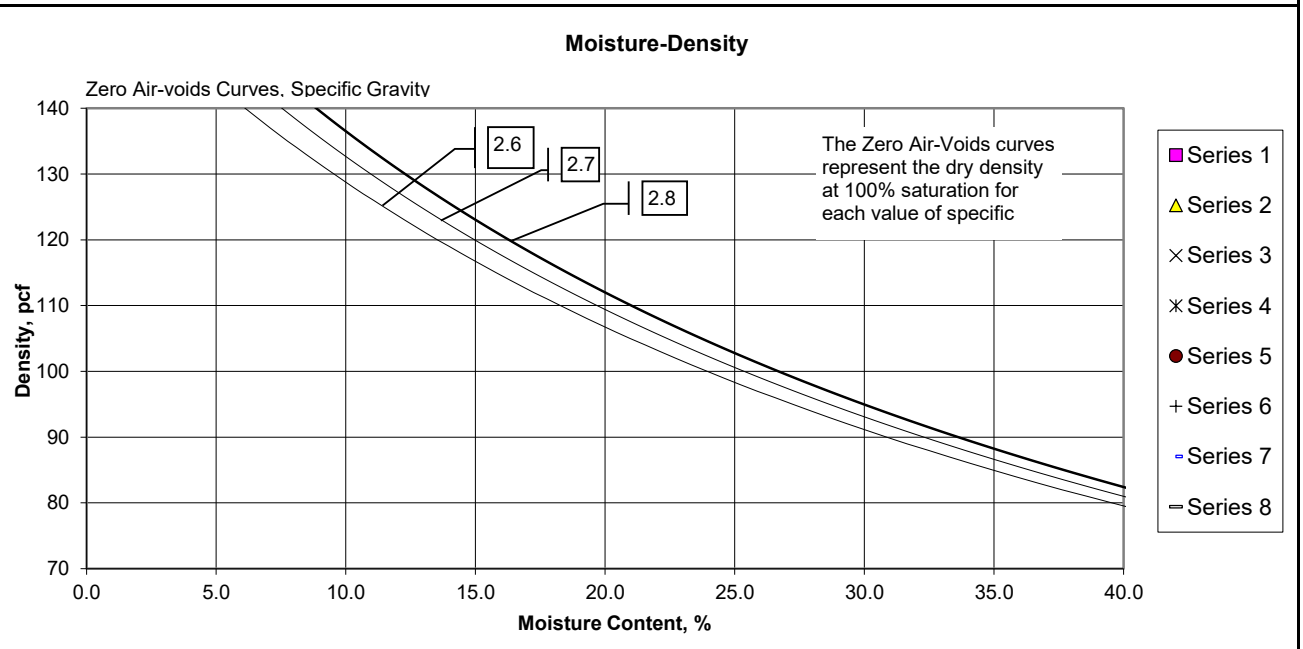
BENCHMARK GEOTECHNICAL LABS

Moisture-Density-Porosity Report
(ASTM D7263b)

BGL Job No:	026-029	**Project No.**	21129	**By:**	PJ
Client:	The Wallace Group	**Date:**	10/13/22		
Project Name:	Coffin Butte Landfill	**Remarks:**			

Boring:	GP-06	GP-06	GP-07					
Sample:	S-4	S-6	-					
Depth, ft:	18	27	12-14					
Visual Description:	Mottled Dark Brown & Yellow SILT	Brownish Yellow & Yellowish Brown SILT	Brown & Very Pale Brown SILT, trace Sand					
Actual G_s								
Assumed G_s								
Moisture, %	71.9	80.6	38.3					
Wet Unit wt, pcf								
Dry Unit wt, pcf								
Dry Bulk Dens.ρb, (g/cc)								
Saturation, %								
Total Porosity, %								
Volumetric Water Cont,Θw,%								
Volumetric Air Cont., Θa,%								
Void Ratio								
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered to be approximate.

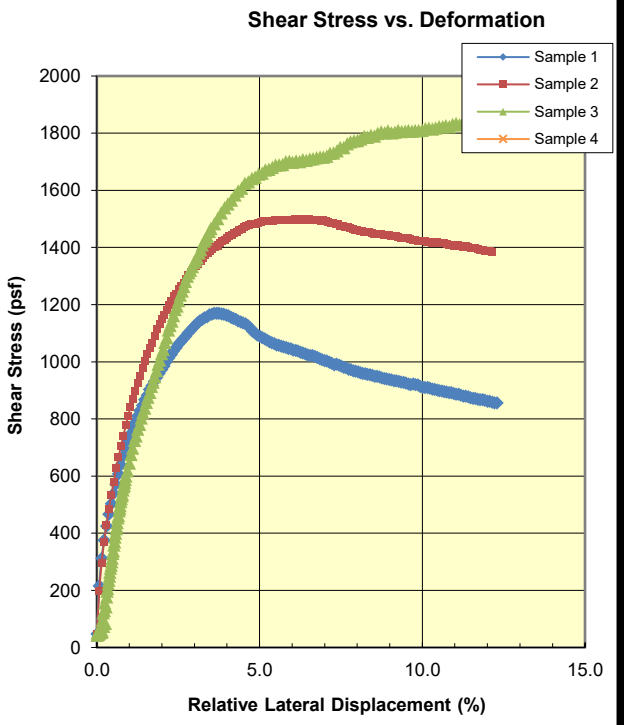


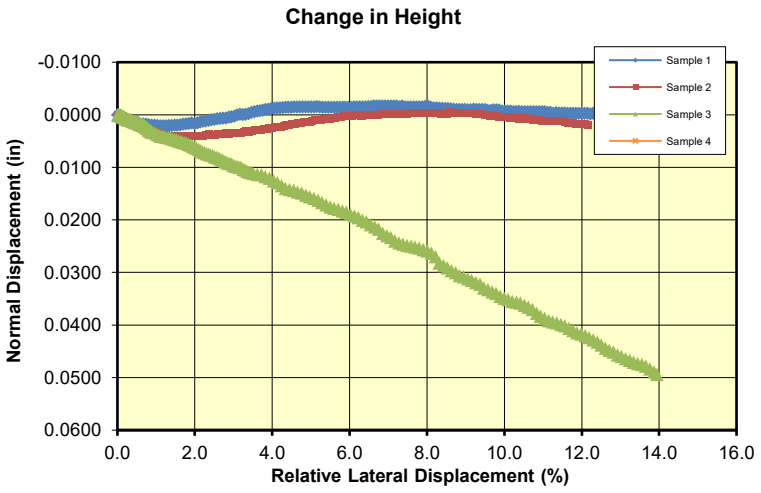
Consolidated Drained Direct Shear (ASTM D3080)

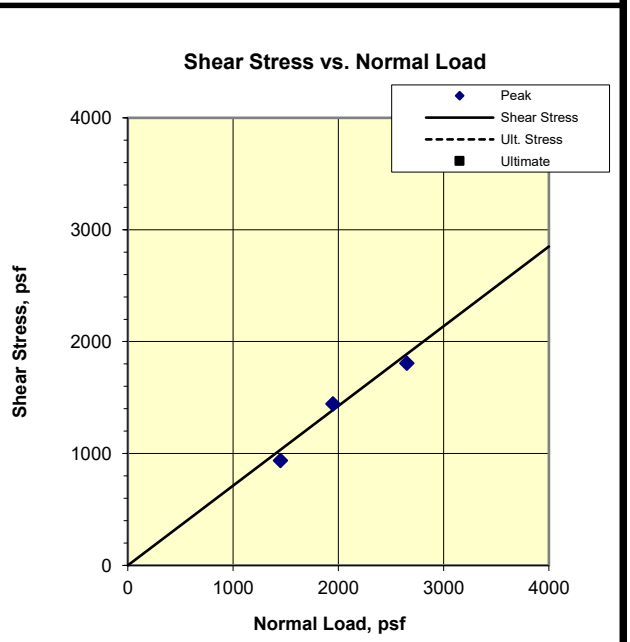
CTL Job #:	1152-002	Project #:	21129-4	By:	MD
Client:	Wallace Group	Date:	1/3/2023	Checked:	PJ
Project Name:	Coffin Butte Landfill Expansion	Remolding Info:			

Specimen Data	1	2	3	4
Boring:	GP-4	GP-4	GP-4	
Sample:	ST-3	ST-3	ST-3	
Depth (ft):	28-30.5	28-30.5	28-30.5	
Visual Description:	Yellowish Brown CLAY w/ Sand	Yellowish Brown CLAY w/ Sand	Yellowish Brown CLAY w/ Sand	
Normal Load (psf)	1450	1950	2650	
Dry Mass of Specimen (g)	102.0	103.4	101.2	
Initial Height (in)	0.98	0.99	1.01	
Initial Diameter (in)	2.87	2.85	2.87	
Initial Void Ratio	1.851	1.788	1.962	
Initial Moisture (%)	65.4	62.9	69.6	
Initial Wet Density (pcf)	101.4	102.1	100.1	
Initial Dry Density (pcf)	61.3	62.7	59.0	
Initial Saturation (%)	99.0	98.5	99.3	
ΔHeight Consol (in)	0.0209	0.0340	0.0580	
At Test Void Ratio	1.790	1.692	1.792	
At Test Moisture (%)	63.5	59.9	63.7	
At Test Wet Density (pcf)	102.4	103.9	102.5	
At Test Dry Density (pcf)	62.6	64.9	62.6	
At Test Saturation (%)	99.3	99.2	99.6	
Strain Rate (%/min)	0.01	0.01	0.01	
Strengths Picked at	9%	9%	9%	
Shear Stress (psf)	938	1442	1808	
ΔHeight (in) at 9%	-0.0010	0.0023	0.0308	
Ultimate Stress (psf)				

Phi (deg)	35.5	Ult. Phi (deg)	
Cohesion (psf)	0	Ult. Cohesion (psf)	



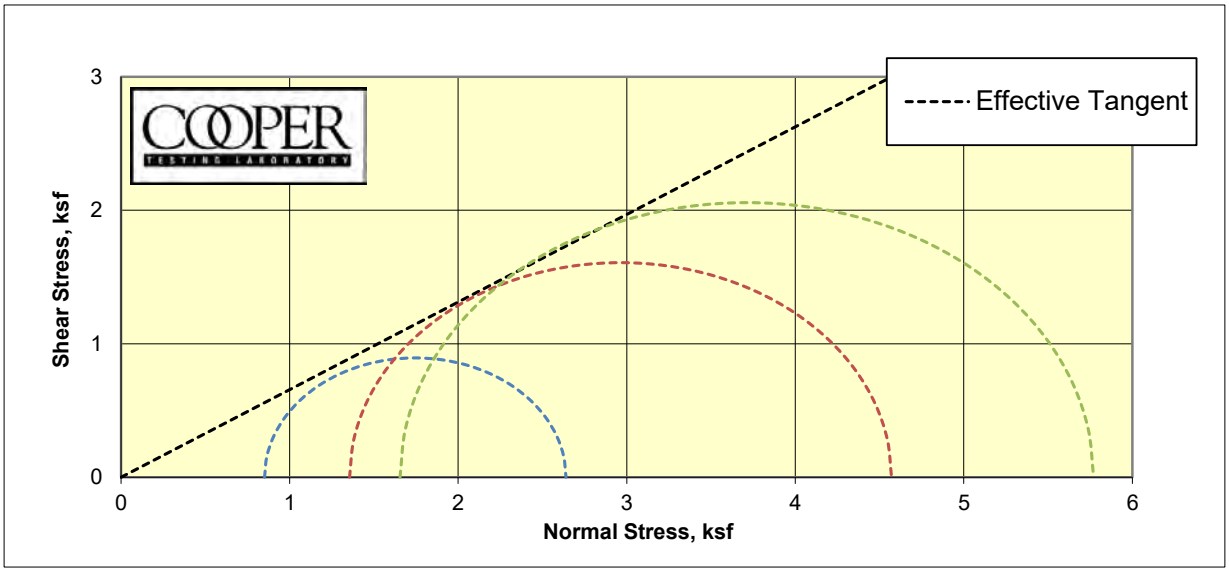


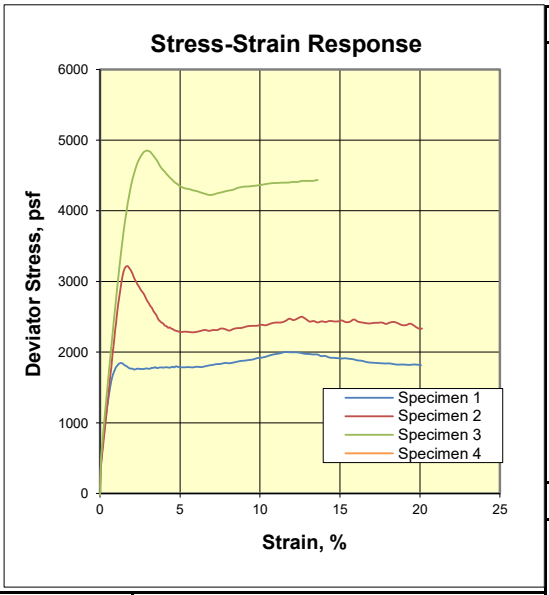


Remarks:

©

Consolidated Drained Triaxial Compression
ASTM D7181





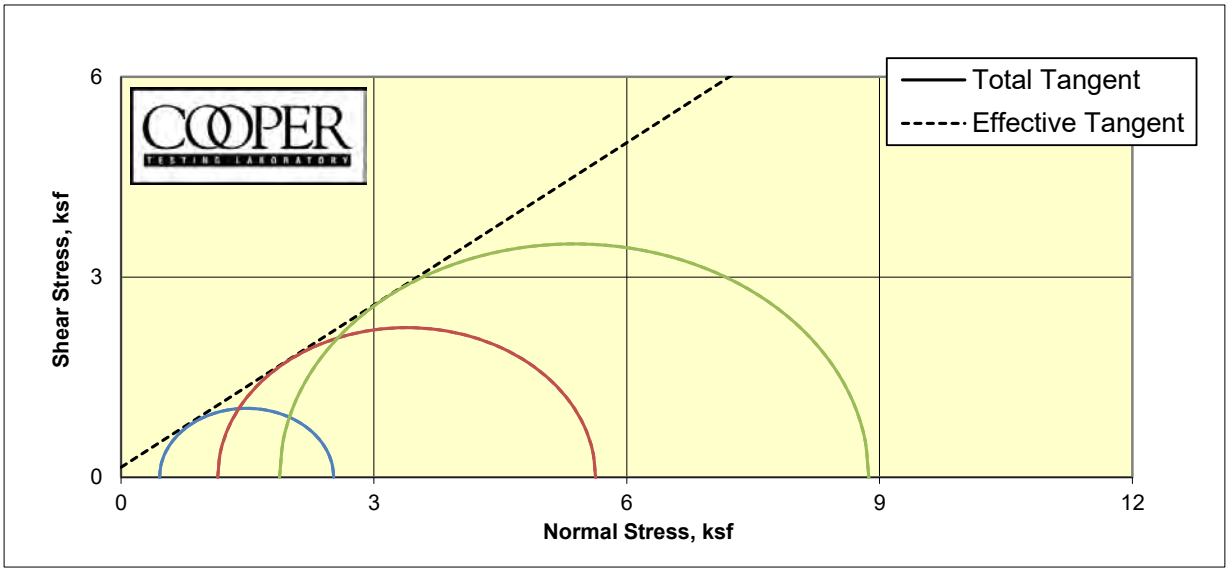
CTL Number:	1152-002
Client Name:	The Wallace Group
Project Name:	Coffin Butte Landfill Expansion
Project Number:	21129-4
Date:	12/13/2022 By: MD/DC

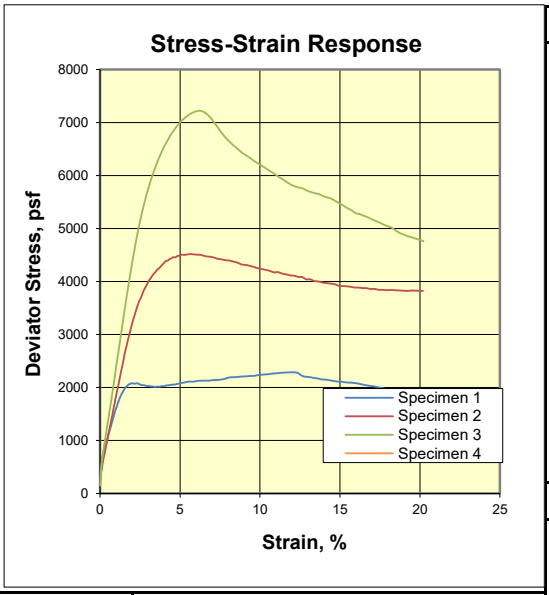
Total C	N/A	ksf
Total phi	N/A	degrees
Eff. C	0.000	ksf
Eff. Phi	33.3	degrees ©

Specimen	1	2	3	4
Boring	GP-4	GP-4	GP-4	
Sample	ST-2	ST-2	ST-2	
Depth	17.5(Tip-15")	18.5(Tip-7.5")	18.5(-1")	
Visual Description	Reddish Yellow CLAY w/ Sand (Silty)/ SILT w/ Sand (slightly plastic)	Reddish Yellow CLAY w/ Sand (Silty)/ SILT w/ Sand (slightly plastic)	Reddish Yellow CLAY w/ Sand (Silty)/ SILT w/ Sand (slightly plastic)	
MC (%)	65.7	69.8	69.0	
Dry Density (pcf)	62.6	58.9	59.8	
Saturation (%)	97.8	95.0	96.1	
Void Ratio	2.063	2.257	2.204	
Diameter (in)	2.87	2.87	2.87	
Height (in)	5.98	5.98	6.01	
	Final			
MC (%)	69.8	70.8	66.1	
Dry Density (pcf)	62.3	59.7	61.3	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	2.075	2.210	2.130	
Diameter (in)	2.88	2.86	2.85	
Height (in)	5.96	5.94	5.97	
Cell Pressure (psi)	105.5	110.0	112.3	
Back Pressure (psi)	99.7	100.6	100.8	
	Effective Stresses At:			
Strain (%)	1.7	1.7	1.7	
Deviator (ksf)	1.788	3.215	4.115	
Excess PP (psi)	-0.1	-0.1	-0.1	
Sigma 1 (ksf)	2.640	4.571	5.770	
Sigma 3 (ksf)	0.851	1.356	1.655	
P (ksf)	1.745	2.963	3.712	
Q (ksf)	0.894	1.608	2.058	
Stress Ratio	3.101	3.372	3.487	
Rate (in/min)	0.0004	0.0004	0.0004	

Fig B-33

Consolidated Drained Triaxial Compression
ASTM D7181





CTL Number:	1152-002
Client Name:	The Wallace Group
Project Name:	Coffin Butte Landfill Expansion
Project Number:	21129-4
Date:	12/20/2022 By: MD/DC

Total C	N/A	ksf
Total phi	N/A	degrees
Eff. C	0.150	ksf
Eff. Phi	39.0	degrees ©

Specimen	1	2	3	4
Boring	GP-5	GP-5	GP-5	
Sample	ST-1	ST-1	ST-1	
Depth	10(Tip-15")	10(Tip-7.5")	10(Tip-.5")	
Visual Description	Reddish Yellow Clayey SAND w/ Gravel	Dark Brown Mottled Yellow Silty SAND grading to Reddish Yellow Clayey SAND w/ Gravel	Dark Brown Mottled Yellow Silty SAND	
MC (%)	41.2	48.2	41.2	
Dry Density (pcf)	78.5	71.4	78.8	
Saturation (%)	95.5	94.4	96.1	
Void Ratio	1.186	1.405	1.179	
Diameter (in)	2.87	2.87	2.87	
Height (in)	5.98	5.98	5.99	
	Final			
MC (%)	49.3	50.8	40.0	
Dry Density (pcf)	78.6	72.1	78.8	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	1.185	1.382	1.177	
Diameter (in)	2.88	2.87	2.89	
Height (in)	5.94	5.92	5.92	
Cell Pressure (psi)	102.7	108.2	114.0	
Back Pressure (psi)	99.7	100.2	100.9	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	2.065	4.484	6.993	
Excess PP (psi)	-0.2	0.0	0.0	
Sigma 1 (ksf)	2.523	5.630	8.873	
Sigma 3 (ksf)	0.457	1.147	1.880	
P (ksf)	1.490	3.389	5.376	
Q (ksf)	1.033	2.242	3.497	
Stress Ratio	5.517	4.910	4.721	
Rate (in/min)	0.0004	0.0004	0.0004	

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

62915 NE 18th St, Ste 1
Bend, OR 97701
541.382.4707
www.wallacegroup-inc.com

OVEN DRY MOISTURE CONTENT
ASTM D-2216

Client:	CEC, Inc.	**Date Sampled:**	9/22/2022
Project Name:	Coffin Butte Landfill	**Project No. :**	21129 - 1
Technician:	PJH	**Lab No.:**	WGG0281
Reviewed By:	LMS	**Date Analyzed:**	10/14/2022

Location	GP-06		GP-06
Depth	7'		24'
Wt. Dish & Wet Soil	639.3		463.3
Wt Dish & Dry Soil	528.1		300.3
Wt of Dish	242.9		83.0
Wt of Water	111.2		163.0
Wt of Dry Soil	285.2		217.3
Percent Moisture	39.0		75.0

Note: Data and results shown above include ASTM Test Method D2216. This report pertains only to the material tested and/or inspected and is not to be reproduced without prior authorization of Wallace Group. If part of a larger document, this report is not to be removed or reproduced separately. This report is the property of the Client and shall not be distributed to other parties without Client's permission.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

62915 NE 18th St, Ste 1
Bend, OR 97701
541.382.4707 Tel.
www.wallacegroup-inc.com

No. 200 Sieve Wash

(Material Finer than No. 200 Sieve)

ASTM C117 / D-1140

Client: Civil & Environmental Consultants
Project Coffin Butte Landfill
Location: Corvallis, OR
Sample Location: GP-09 & GP-01
Date Sampled: 9/22/2022

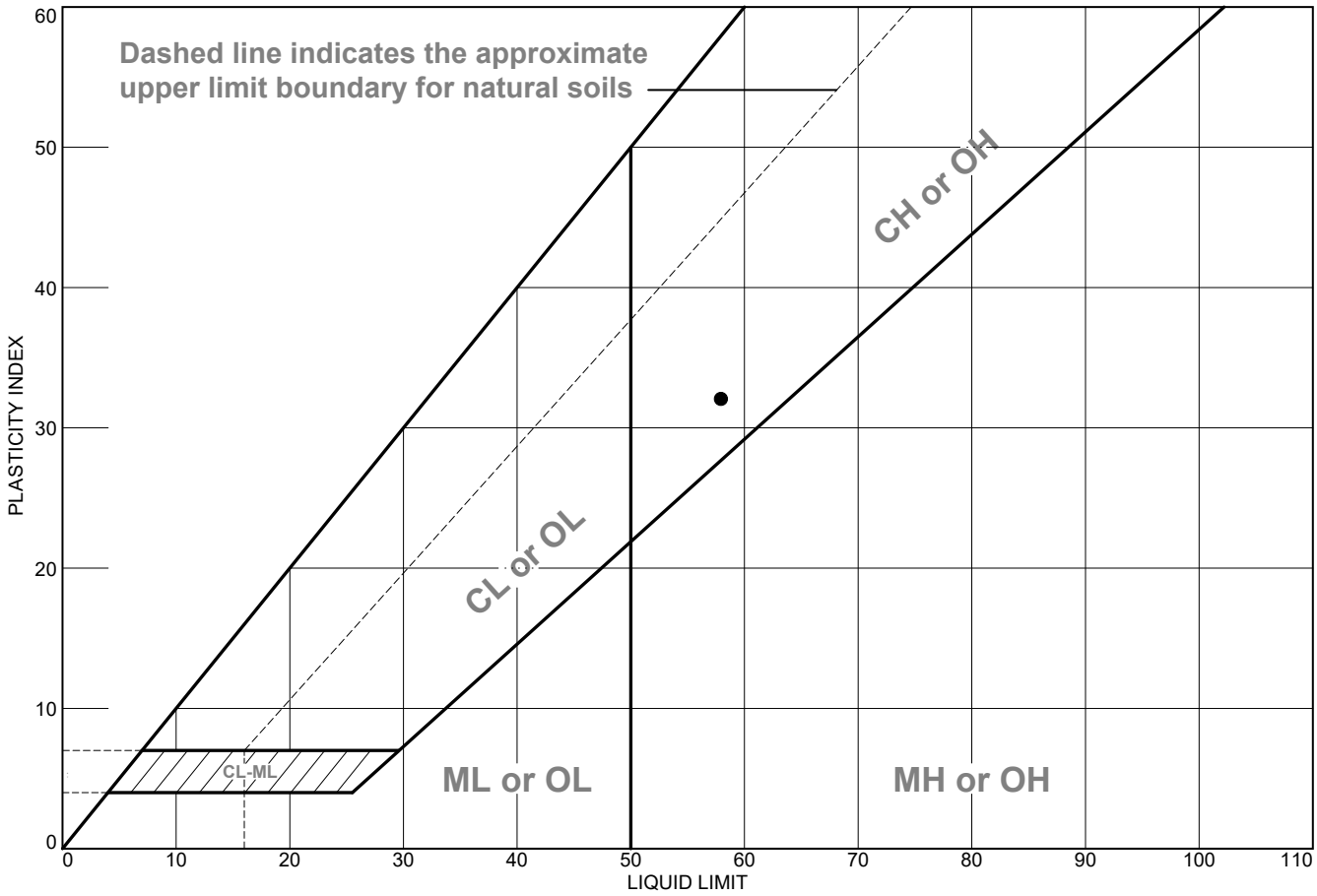
Project Number: 21129 - 1
Lab Number: WGG0281
Technician: PJH
Date Received: 9/25/2022
Date Analyzed: 10/17/2022

Location	GP-09	GP-01	GP-01
Depth	2 - 4'	3'	8.5'
Wet Weight	464.8	493.4	383.9
Dry Weight	362.3	379.7	283.1
Moisture %	28.3%	29.9%	35.6%
Weight After Wash	25.8	7.1	7.4
Weight Passing #200	336.5	372.6	275.7
% Passing #200	92.9%	98.1%	97.4%

REVIEWED BY: L. Splitter
DATE: 6/30/2023

Note: Data and results shown above include ASTM Test Methods C117 and C1140. This report pertains only to the material tested and/or inspected and is not to be reproduced without prior authorization of Wallace Group. If part of a larger document, this report is not to be removed or reproduced separately. This report is the property of the Client and shall not be distributed to other parties without Client's permission.

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clay	58	26	32	99.2%	98.1%	CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-01 **Depth:** 3' **Sample Number:** S-1

Remarks:

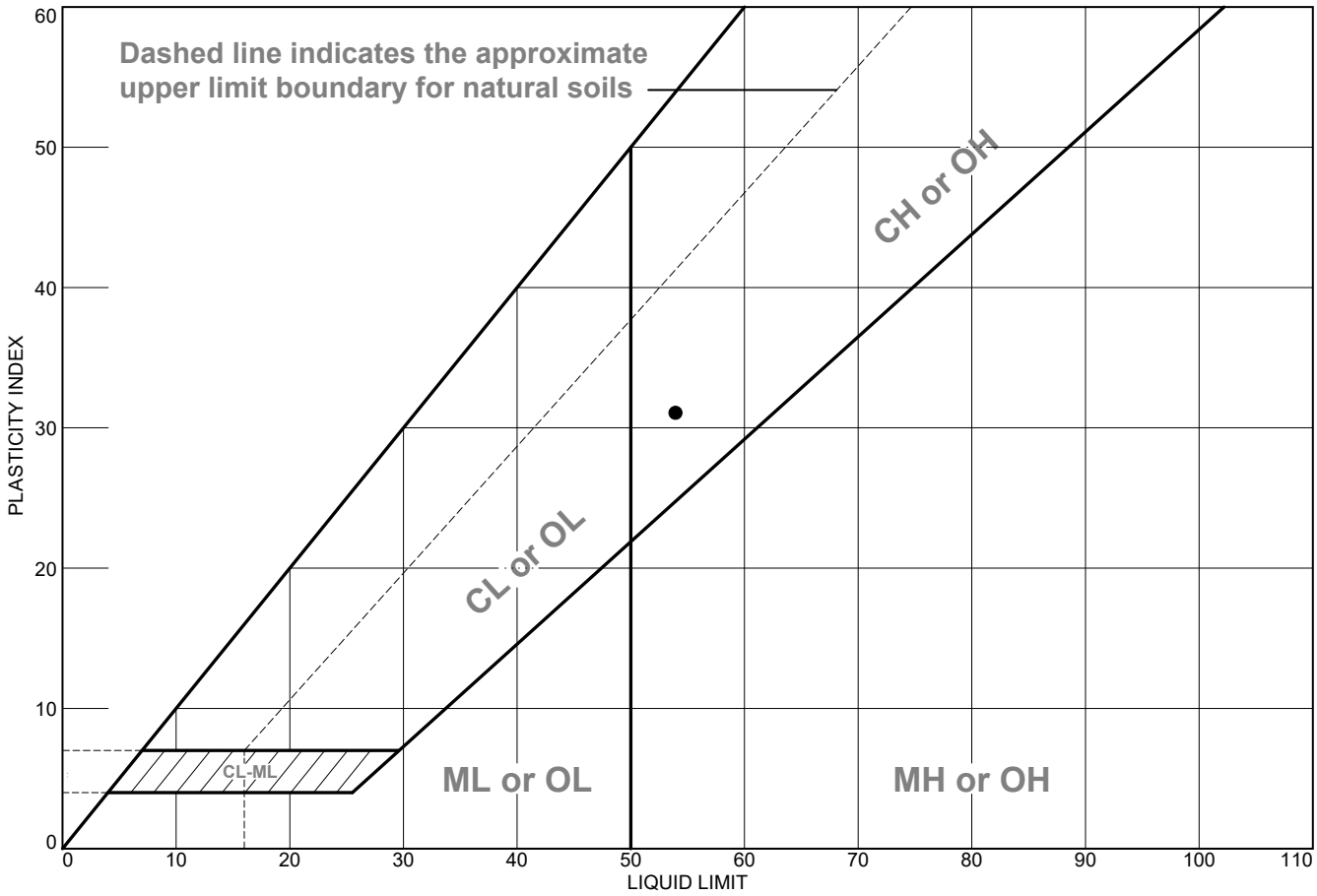
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-37

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clay	54	23	31	99.0%	97.4%	CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-01 **Depth:** 8.5' **Sample Number:** S-2

Remarks:

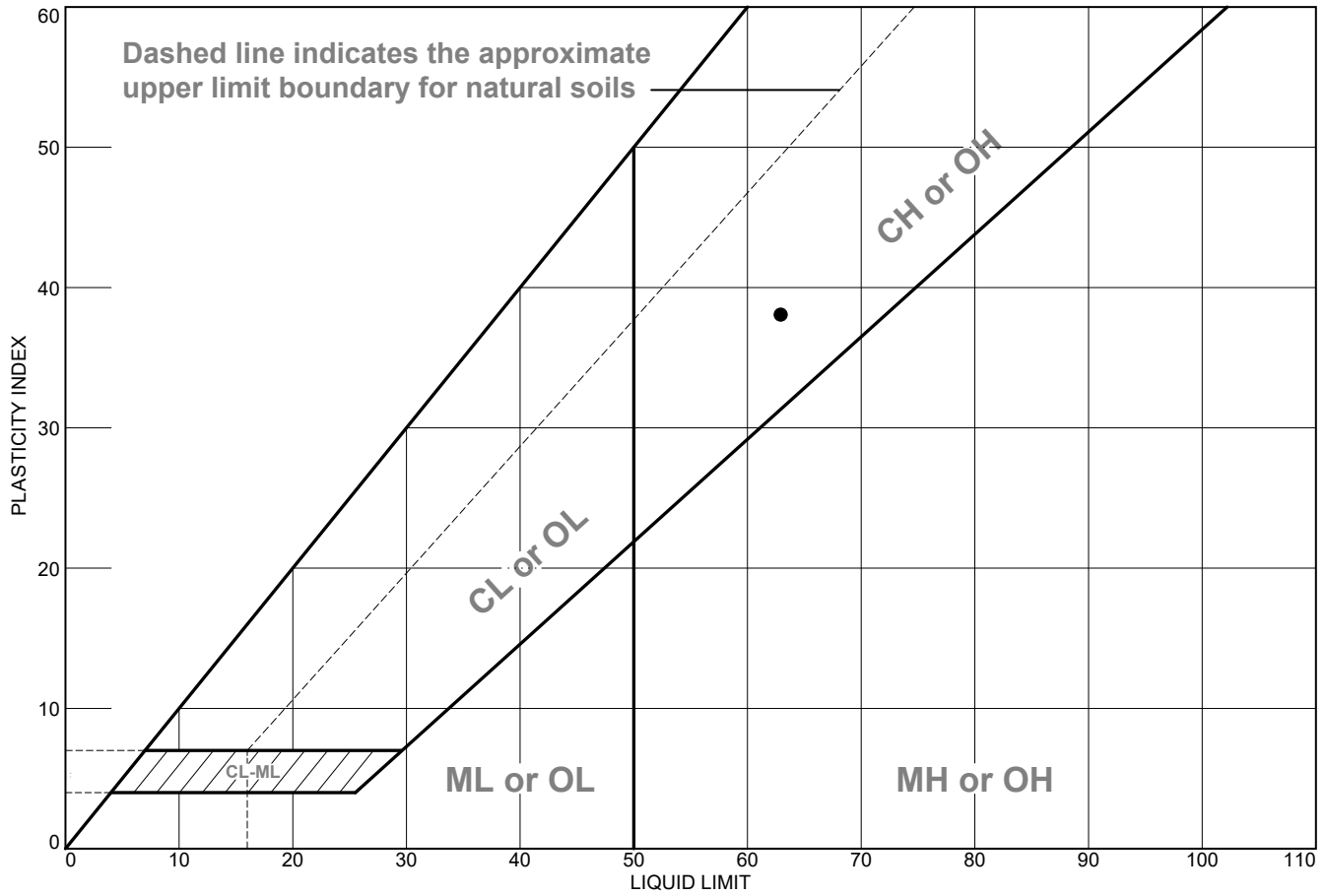
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-38

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clay	63	25	38	Not Tested	Not Tested	MH-CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-04 **Depth:** 3' **Sample Number:** S-1

Remarks:

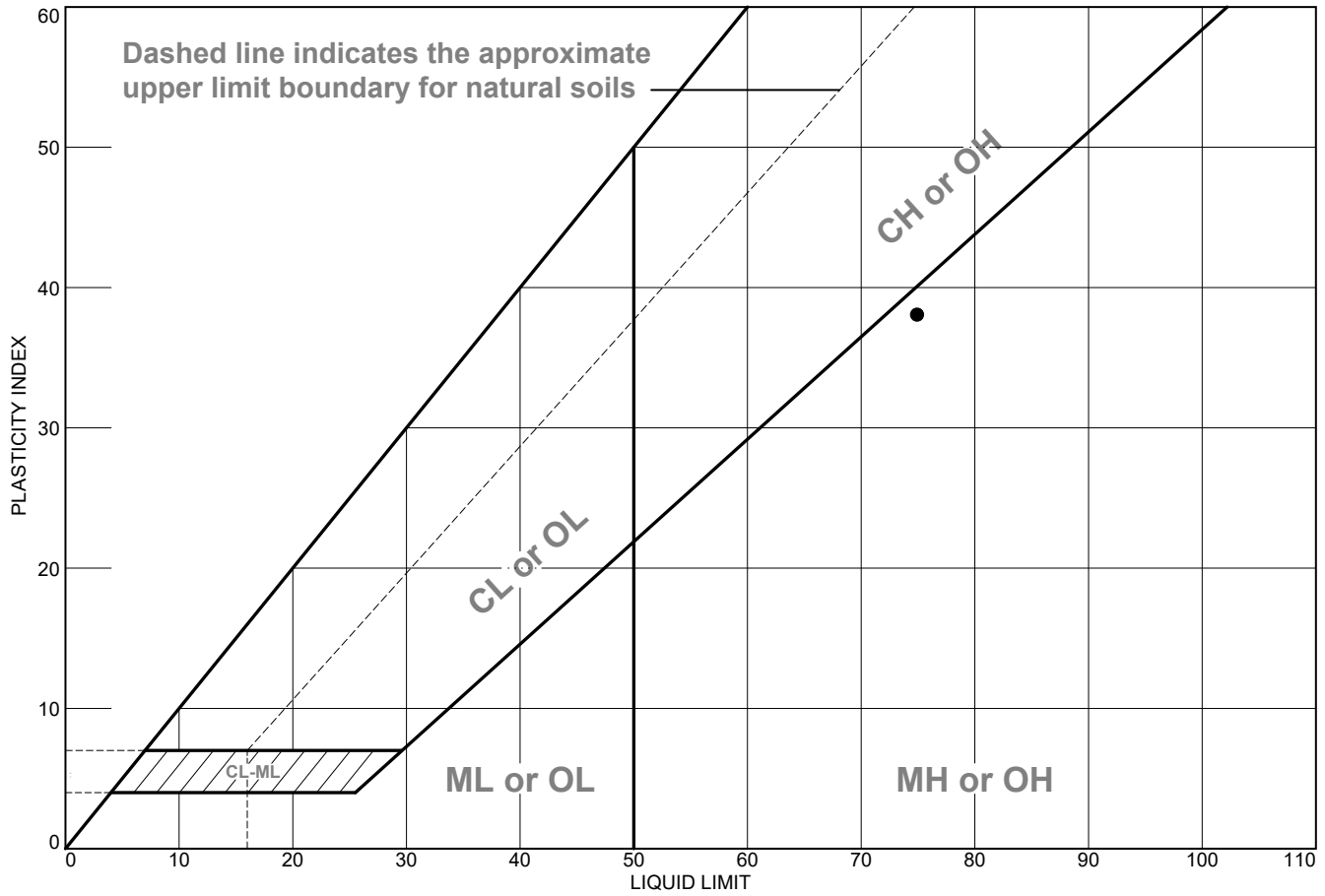
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-39

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Elastic Silt with Sand	75	37	38	Not Tested	Not Tested	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-04 **Depth:** 17' **Sample Number:** S-3

Remarks:

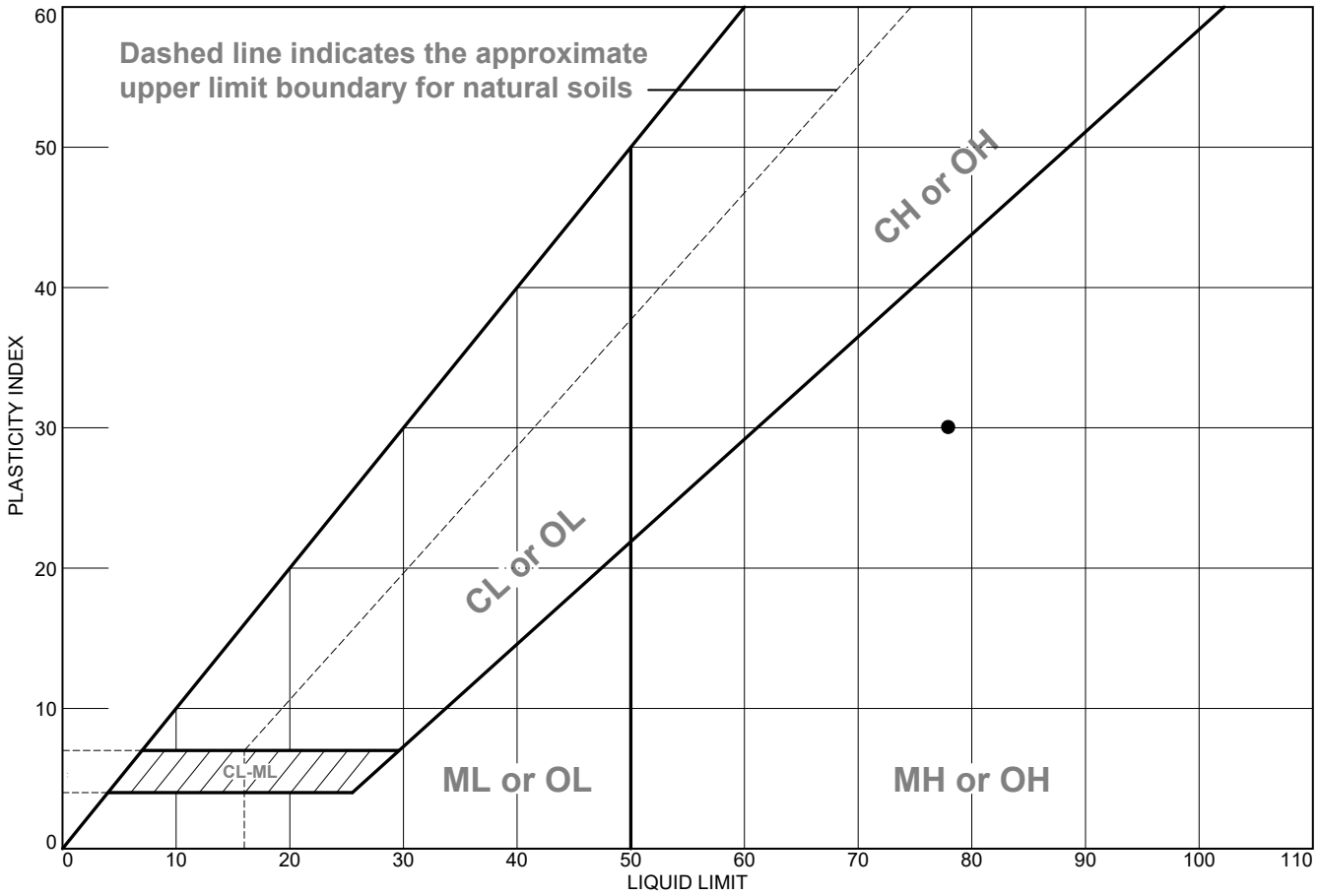
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-40

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Elastic Silt with Sand	78	48	30	Not Tested	Not Tested	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-04 **Depth:** 25' **Sample Number:** S-5

Remarks:

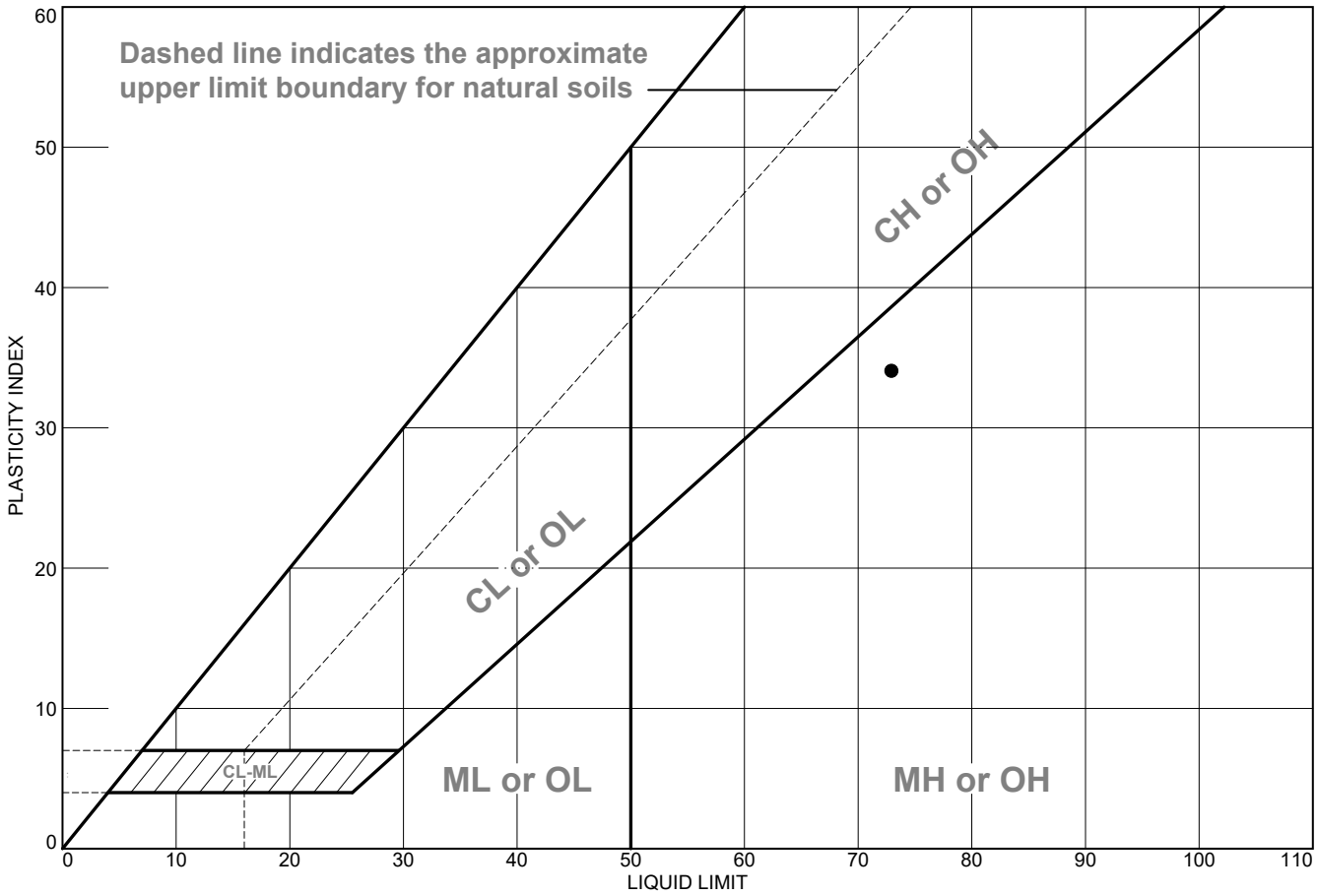
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-41

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Elastic Silt with Sand	73	39	34	Not Tested	Not Tested	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-05 **Depth:** 6.5 - 8' **Sample Number:** S-2

Remarks:

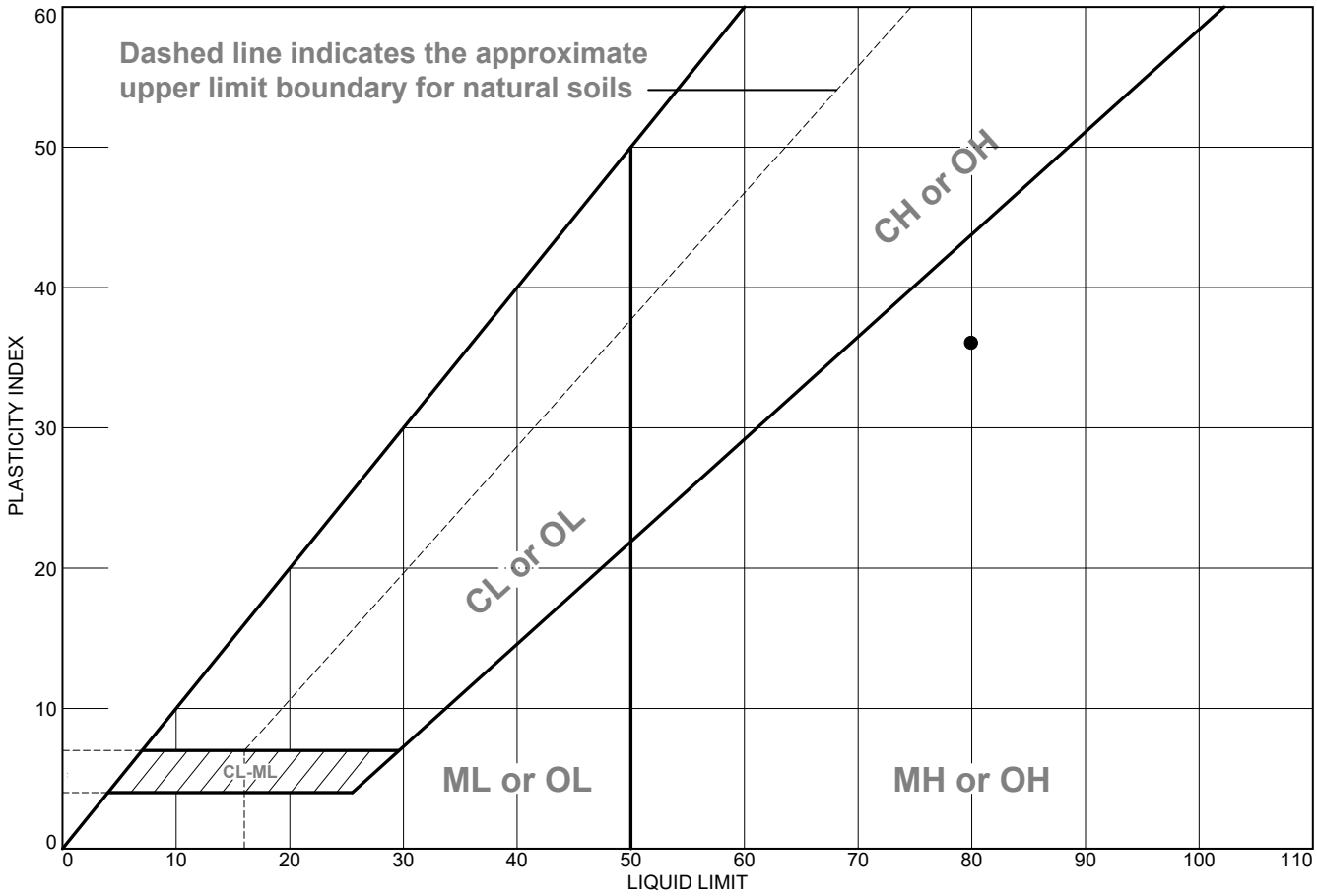
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-42

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Elastic Silt	80	44	36	Not Tested	Not Tested	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-06 **Depth:** 7' **Sample Number:** S-2

Remarks:

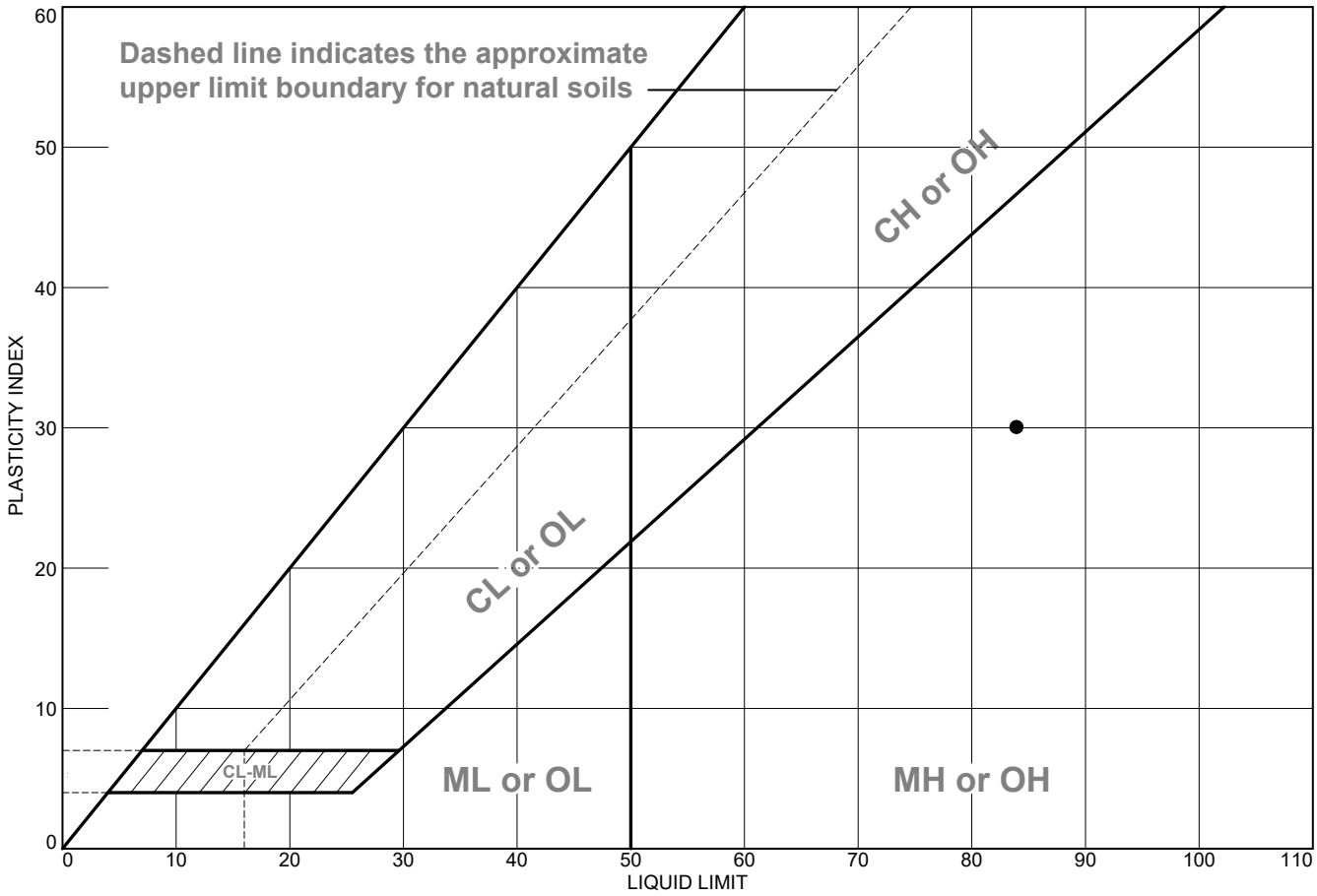
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-43

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Elastic Silt	84	54	30	Not Tested	Not Tested	MH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-06 **Depth:** 24' **Sample Number:** S-5

Remarks:

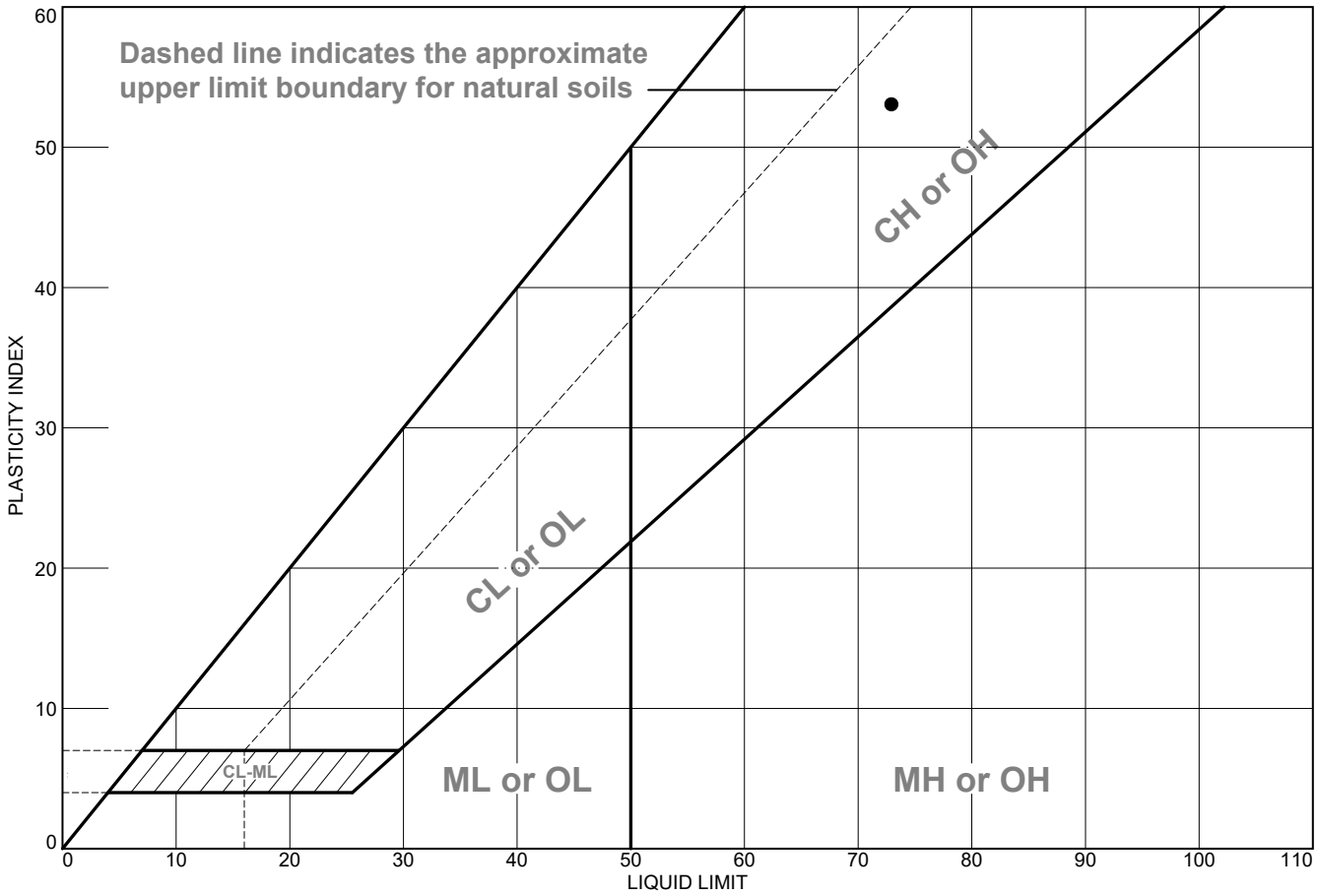
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-44

Tested By: PJH **Checked By:** LMS

Plasticity Index of Soil (D4318)



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Fat Clay with Organics	73	20	53	97.3%	92.9%	CH

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

●**Source of Sample:** GP-09 **Depth:** 2 - 4' **Sample Number:** S-1

Remarks:

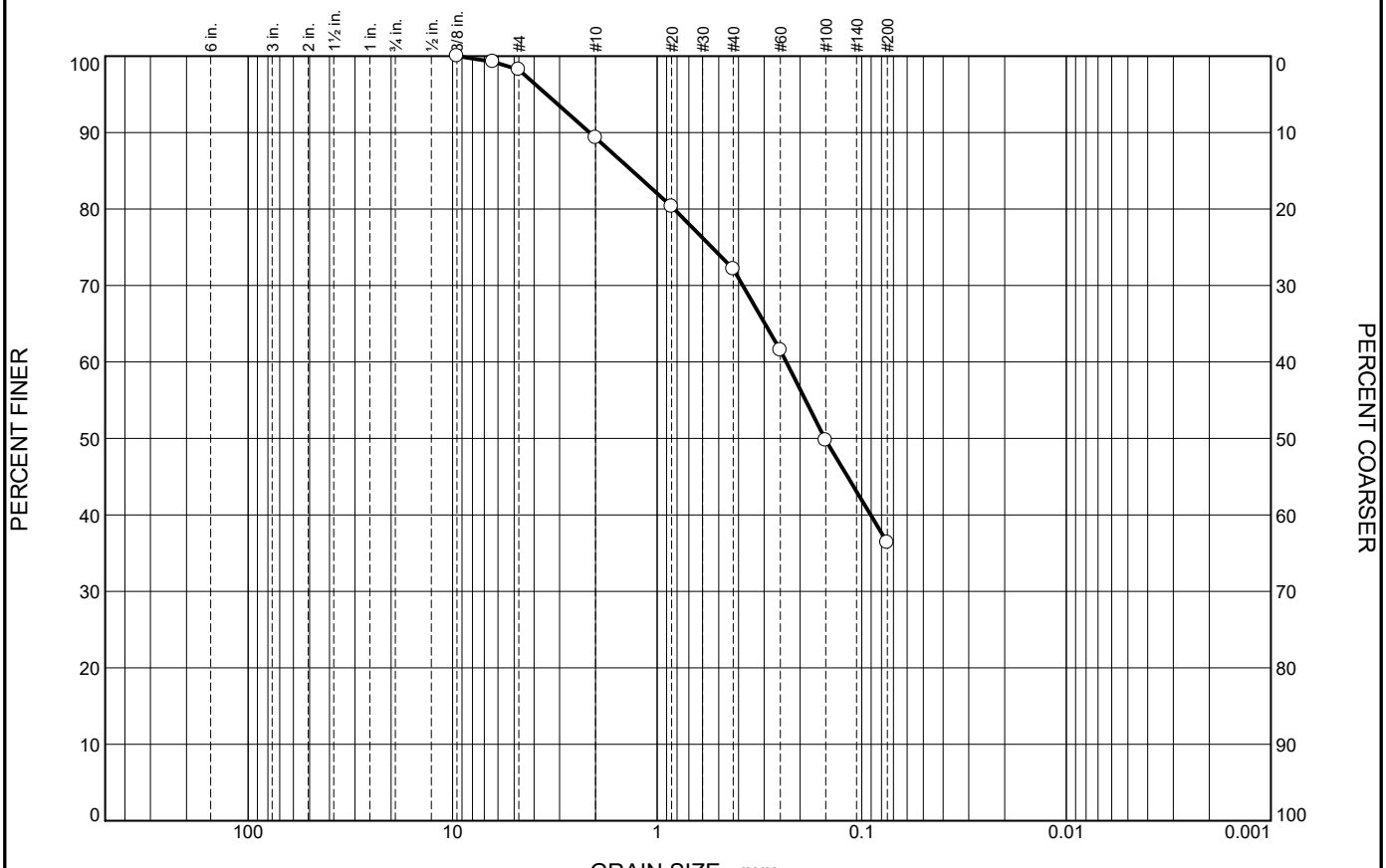
●Lab No.: WGG0281
Sampled By: SMW on 09-22-22
ASTM D4318 | Multipoint Method A
Wet Prepped, Manual Liquid Limit Device & Hand Rolled

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-45

Tested By: PJH **Checked By:** LMS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.8	8.9	17.1	35.8	36.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	Not Tested	Not Tested	1.3264	0.2338	0.1516					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ Silty, Clayey Sand	10-17-22	SC-SM	28.9%

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

○ **Source of Sample:** GP-05 **Depth:** 14' **Sample Number:** S-3

Remarks:

○Lab No.: WGG0281

Sampled By: SMW

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-46

Tested By: PJH **Checked By:** LMS

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.8	1.5	15.5	28.1	53.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	Not Tested	Not Tested	0.5479	0.1135						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ Sandy Clay	10-17-22	--	26.9%

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

○ **Source of Sample:** GP-07 **Depth:** 2 - 4' **Sample Number:** S-1

Remarks:

○Lab No.: WGG0281

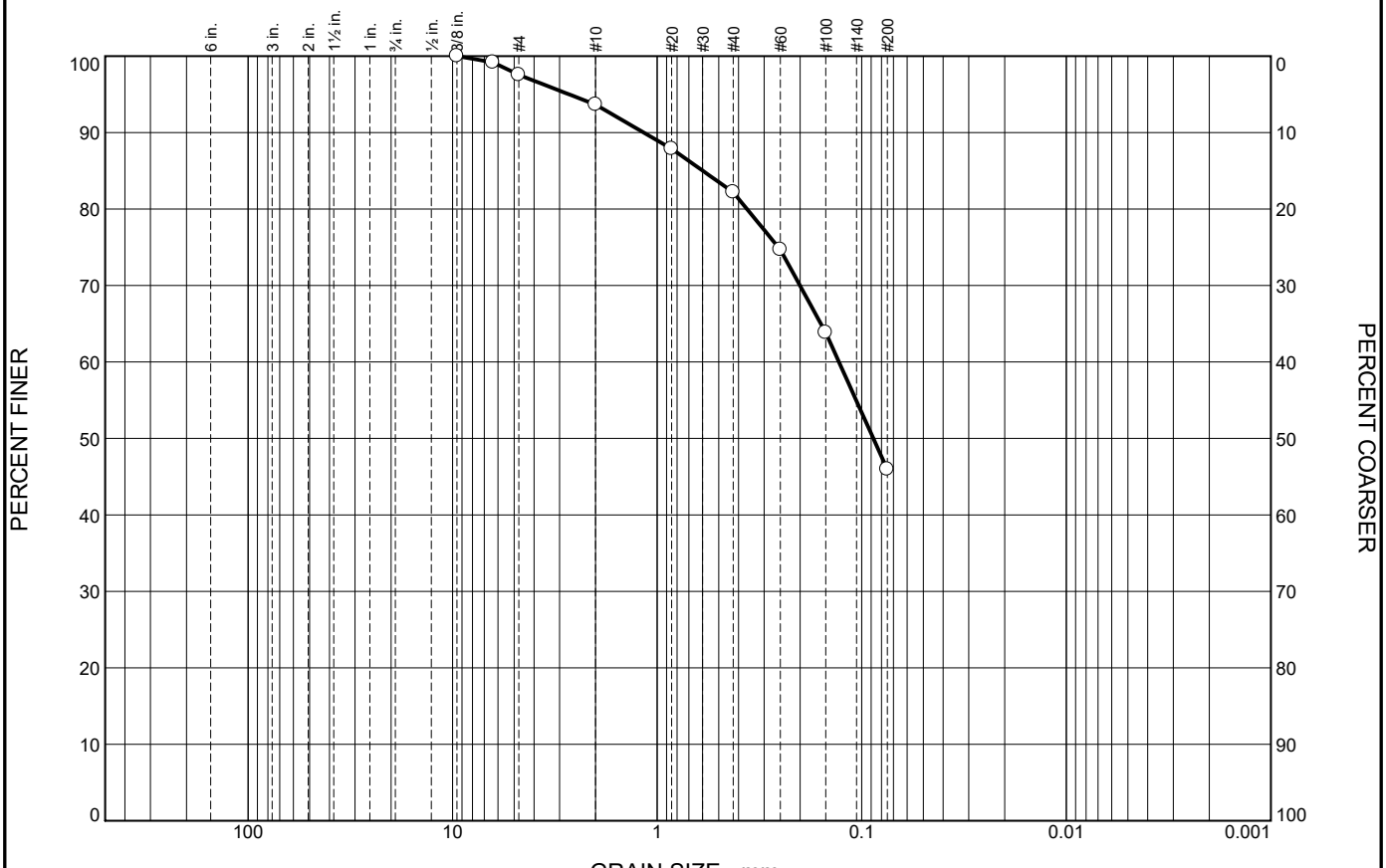
Sampled By: SMW on 09-22-22

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-47

Tested By: PJH **Checked By:** LMS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.4	4.0	11.4	36.3	45.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○	Not Tested	Not Tested	0.5986	0.1293	0.0878					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○ Clayey Sand	10-17-22	SC-SM	25.5%

Project No. 21129 **Client:** Civil & Environmental Consultants, Inc.

Project: Coffin Butte Landfill

○ **Source of Sample:** GP-07 **Depth:** 16 - 18' **Sample Number:** S-3

Remarks:

○Lab No.: WGG0281

Sampled By: SMW on 09-22-22

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS
P| 541.382.4707
wallacegroup-inc.com
62915 NE 18th Street, St. 1
Bend, Oregon 97701

Figure B-48

Tested By: PJH **Checked By:** LMS

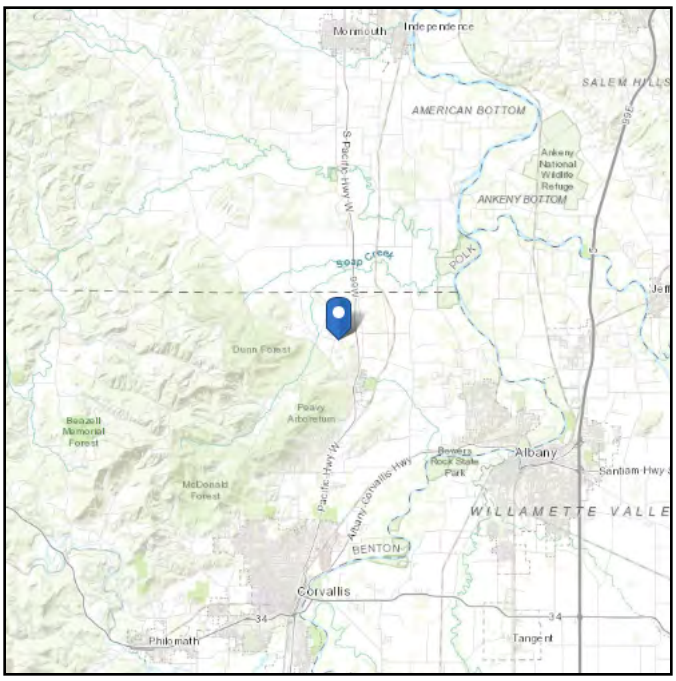
WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

APPENDIX C

ASCE Hazards Report

Address:
28972 Coffin Butte Rd
Corvallis, Oregon
97330

Standard:	ASCE/SEI 7-22	**Latitude:**	44.695572
Risk Category:	II	**Longitude:**	-123.233928
Soil Class:	D - Stiff Soil	**Elevation:**	297.144000732361 ft (NAVD 88)



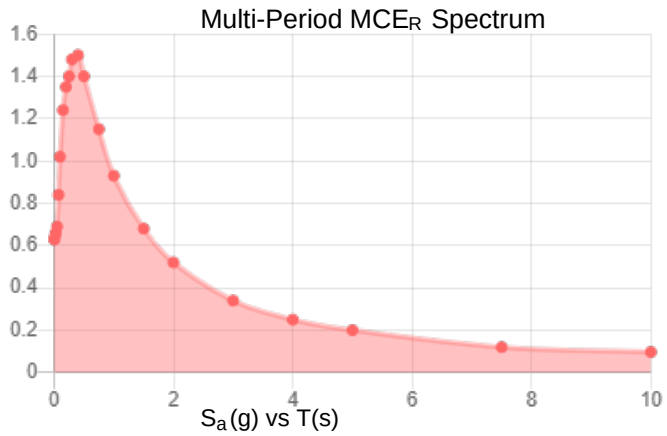
Seismic

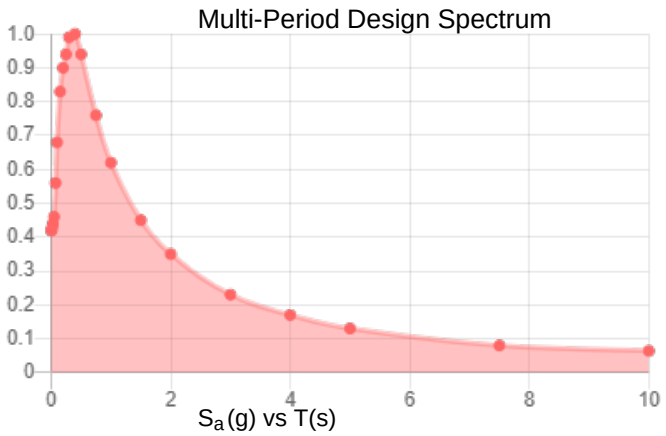
Site Soil Class: D - Stiff Soil

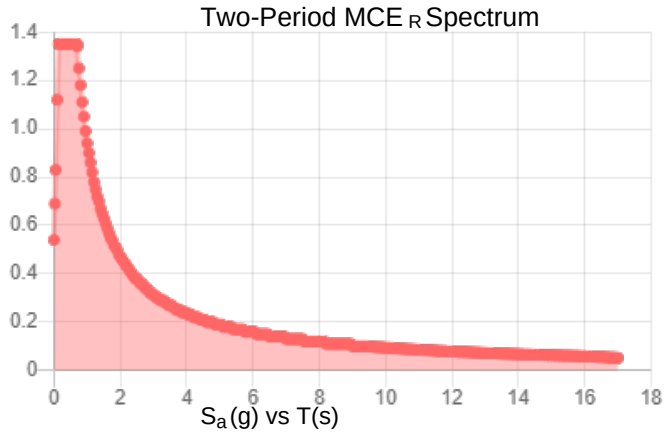
Results:

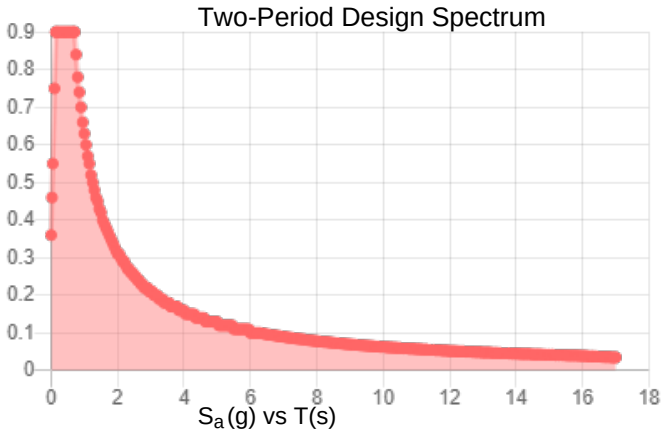
PGA_M :	0.61	T_L :	16
S_{MS} :	1.35	S_S :	1.05
S_{M1} :	0.94	S_1 :	0.44
S_{DS} :	0.9	V_{S30} :	260
S_{D1} :	0.63		

Seismic Design Category: D









MCE_R Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum

Vertical ground motion data has not yet been made available by USGS.

Data Accessed: **Sun Jul 14 2024**

Date Source:
USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

APPENDIX D

Existing conditions at BH-05 during the geotechnical exploration.

Drilling performed with track-mounted CME rig, operated by Western States Drilling, on February 16 through 18, 2021 and HazTech Drilling on November 8 through 16, 2022. Note the skid steer and cleared road required for site access.

Drilling was performed using hollow-stem auger, mud-rotary, and HQ wireline coring techniques.

Boring location B-13, which is typical of the dense onsite vegetation and restricted access.

Borings were backfilled using bentonite.

Areas near known landfill utilities were advanced using a vacuum truck.

Typical rock core, consisting of brecciated and altered basaltic rocks of the Siletz River Volcanics.

Initial exploration was performed using a CAT excavator.

Test pits were advanced to the limit of the machine’s reach, or excavator refusal on competent bedrock.

Typical test pit profile, consisting of weathered in-place volcanic soils transitioning into bedrock.

Test pits were located to provide access to the proposed boring locations, and the excavator was used to clear and grade access to the borings.

The higher elevations of the site are characterized by dense vegetation, with shallower depth to rock.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

APPENDIX E

DELVE underground

Final Draft Memorandum			
To:	Lisa Splitter, PE, GE, The Wallace Group	Project:	Coffin Butte Slope Stability Analysis
From:	Jamie Schick, CEG, Delve Underground	cc:	
Prepared by:	Jamie Schick, CEG, Luke Ferguson, PE, Ethan Guzek, PG(WA), Delve Underground	Job No.:	6309.0
Date:	November 6, 2023		
Subject:	Coffin Butte Landfill Slope Stability Analysis		

1.0 Introduction and Background Information

1.1 General

This Technical Memorandum has been developed by Delve Underground (Delve) for the Coffin Butte Landfill Expansion (Project). Delve is performing this work for the Wallace Group, LLC in support of their geotechnical engineering efforts associated with the design of this facility. The Wallace Group is a subconsultant to Civil and Environmental Consultants, Inc., who is completing the landfill design for Republic Services, Inc. Figure 1 presents the site location. The project includes the relocation of Coffin Butte Road, which will require excavating two cuts in existing slopes south of the current roadway to make room for the landfill expansion. Sections of these cuts will be in excess of 100 feet in height. Delve is under contract to complete the geotechnical engineering associated with these cuts and provide cut slope recommendations.

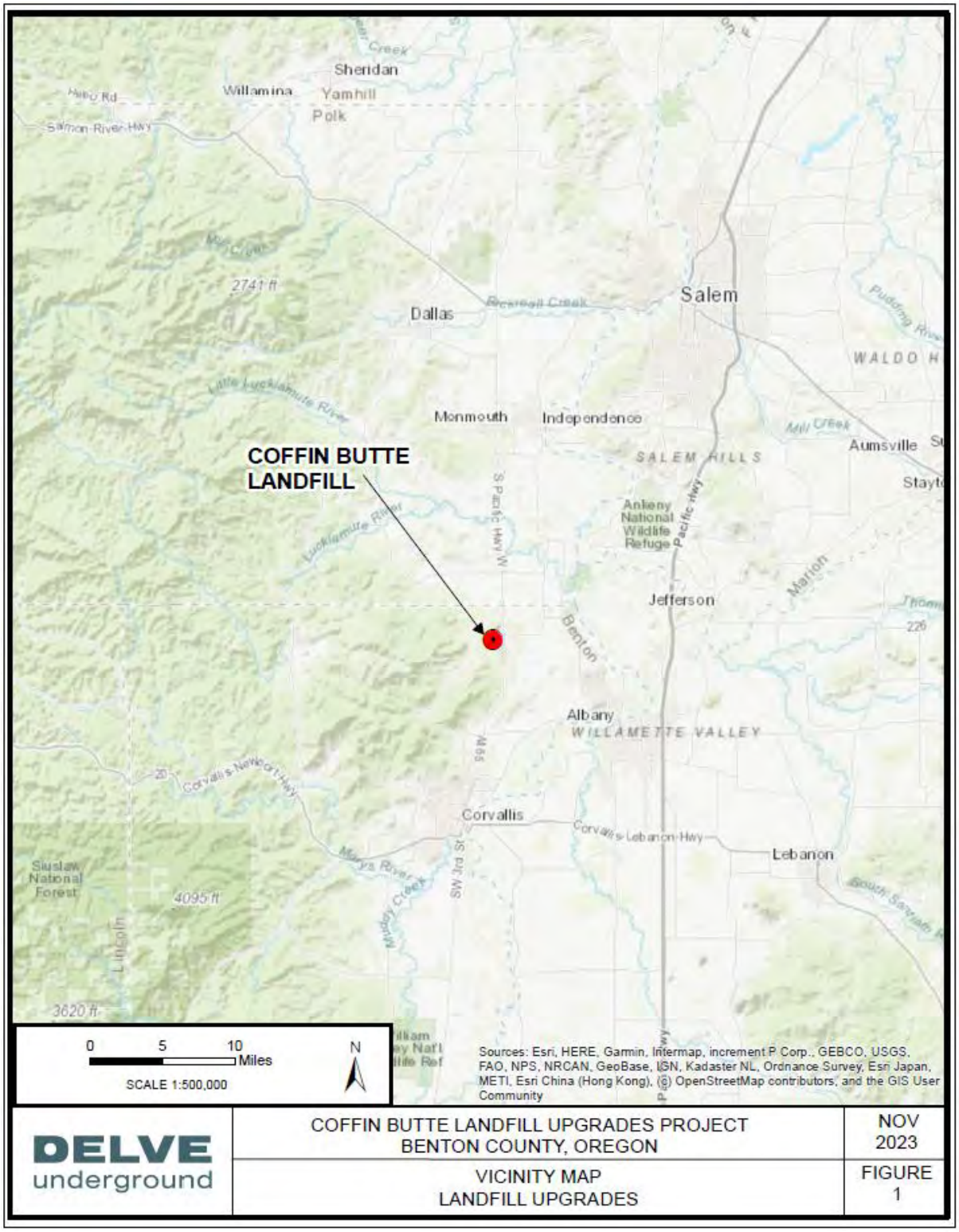


Figure 1. Vicinity map of project area.

1.2 Project Description

The Coffin Butte landfill is located in Oregon in the mid-Willamette Valley approximately 10 miles north of Corvallis, OR. Proposed upgrades to the landfill site include the construction of new landfill cells immediately south of the existing Coffin Butte Landfill. As part of the upgrade, the existing Coffin Butte Road is planned to be relocated to the south of the proposed landfill expansion area. From the intersection of Coffin Butte Road and NW Soap Creek Road, Coffin Butte Road is proposed to extend southeast, then east along the southern border of the expansion area before continuing northeast and north along the boundary of the expansion area to realign with the existing Coffin Butte Road. Construction of this reroute will include deep cuts into two separate bedrock knobs that will result in cut slopes in excess of 100-foot-high above the new road alignment. Locations of the proposed expansion area, preliminary grading plan, subsurface explorations, cross sections and Coffin Butte Road relocation provided by the Wallace Group are included in **Appendix A**.

The current cut slope geometry includes a 2 Horizontal to 1 Vertical (2H:1V) slope cut below the roadway and a 1.5H:1V cut slope above the proposed Coffin Butte Road. This memorandum summarizes our analysis, design, and recommendations regarding these proposed cuts as well as an evaluation of alternative cut angles to facilitate construction efforts and improve slope performance.

2.0 Geologic Setting

The site is located northwest of Albany, Oregon in the central portion of the Willamette Valley, an alluvial-filled structural basin located between the Oregon Coast Range and Cascade Range (Orr and Orr, 2012). Bedrock beneath the site consists of the Siletz River Volcanics, which are part of a chain of volcanic seamounts accreted to western North America during the Paleocene to early Eocene (approximately 60 million years ago) (Bela, 1979). The bedrock consists of a complex assemblage of pillow basalts with minor interbeds of tuffaceous claystone, siltstone and sandstone. The formation also includes flow breccias and coarse pyroclastic deposits. Both the east and west hillslopes at the site are underlain by this bedrock. A more complete discussion of the geologic setting and site history is contained in the project geotechnical engineering report completed by the Wallace Group (Wallace Group, 2023).

3.0 Site Exploration

3.1 Site Reconnaissance

A site reconnaissance was completed on September 29, 2021, by a senior engineering geologist from Delve Underground to inspect the project area and condition of exposed bedrock in the area. This included a reconnaissance of the existing rock quarry immediately west of the current Coffin Butte Landfill. Discontinuity mapping completed in the rock quarry was used to support the kinematic analysis for the proposed cut slope geometries.

In general, the discontinuities mapped were very persistent (greater than 30 feet in trace length) and typically filled with clay, sand, and gravel sized particles. The infilling was up to two inches in thickness. See Photographs 1 and 2 for typical exposures of mapped discontinuities. Conchoidal fractures associated with the basalt exposed in the rock quarry were not mapped.

Photograph 1. Typical steeply dipping joints in the existing Coffin Butte quarry.

Photograph 2. Steeply dipping joint trending subparallel to an existing cut face.

During the site reconnaissance, exposures of the existing soils on the eastern knob excavated for drill rig access were observed. These cuts generally consisted of silty to clayey gravels that were interpreted as shallow colluvium with decomposed bedrock near the base. Cuts were typically less than 5 foot high.

3.2 Field Exploration

A subsurface exploration program was completed in two phases due to changes in the landfill configuration during design. Wallace Group performed the subsurface exploration program for support of the project during the summer/fall of 2021 and 2022. The exploration program for the western hillslope included four borings (B-3, B-5, B-9 and B-15) which were advanced to depths of 111 feet, 131 feet, 70 feet and 165 feet and four test pits (TP-1, TP-12, TP-13 and TP-14). Four borings (B-7, BH-17, BH-18 and BH-19) and one CPT (GP/CPT-08) were drilled in the eastern hillslope. Borehole locations are shown on site plan in Appendix A.

Borings were advanced with mud rotary drilling techniques within soil material and HQ wireline, triple-tube rock coring techniques in rock materials in accordance with ASTM D 2113. Disturbed soil samples were collected in conjunction with Standard Penetration Testing (SPT) at selected intervals using a standard 2-inch diameter split-barrel sampler and automatic safety hammer system. In each test, the sampler was advanced 18 inches by dropping a 140-pound hammer, 30-inches for each strike in accordance with ASTM D1586. Details of the exploration

program are presented in the Wallace Group geotechnical report (Wallace Group, 2023). Downhole imaging in explorations was not performed.

3.3 Lab Testing

Point load testing (PLT) was conducted on select samples from borings conducted during the 2021 investigation. Test results were used to estimate the approximate intact rock strength of the bedrock. PLT results are provided in **Appendix B**. The results of point load testing are discussed in greater detail below.

4.0 Site Conditions

4.1 Surface Conditions

The eastern and western hillslopes consist of two bedrock knobs located at the north end of a ridgeline in the Willamette Valley. The knobs extend over two hundred feet above the valley floor and are generally east, north and west facing. Slopes on these hillslopes vary between approximately 15 and 25 degrees with locally shallower sections. Indications of existing slope instabilities (scarps, pistol butt, or jack strawed trees) were not observed during the site reconnaissance. Signs of springs or seeps were not observed, however it was summer at the time of the site reconnaissance.

4.2 Subsurface Conditions

The materials encountered in the project explorations were grouped into three general stratigraphic units based on their geologic origin and stratigraphic position. General units include colluvial soil, weathered rock, and rock. Engineering properties of soil and rock appear to vary between the east and west half of the site based on relative density and composition (for soils) and rock type, weathering, and intact strength (for rock). Variations in subsurface conditions are likely to exist between borings. The following paragraphs describe the geotechnical unit characteristics in greater detail in context of cut slope considerations.

- **Colluvial Soil**: Colluvial soils mantle weathered rock and rock across the project area to depths of 5 to 25 feet with soils being thinner across the west slopes and thicker across the east slopes. Colluvial materials encountered included silty sands, clayey sands, and sandy silts. In the western hillslope, colluvial soils are present in the upper 5 to 10 feet of the subsurface and typically consist of reddish-brown, medium dense to very dense silty sands, clayey sands, and sandy silts. In the eastern hillslope, colluvial soils are present in the upper 20 to 25 feet of the subsurface and typically consist of very loose to medium dense clayey sand.

- **Weathered Rock**: Decomposed to highly weathered bedrock was encountered beneath the colluvial soils. This material was typically drilled and sampled with SPTs and often

described as very dense gravels on logs. However, based on the observation that SPT tests generally encountered refusal, this material was interpreted as weathered bedrock. Typical unit thickness ranged between 3 and 7 feet.

Rock: Bedrock was encountered below the overlying soils and weathered bedrock in all borings. This unit consists primarily of fresh to highly weathered greenish gray basalt. The fresh basalt strength ranged from weak to strong. Highly weathered zones encountered were typically limited to isolated intervals only a few feet in extent. The basalt in the western hillslope was generally intensely brecciated with infilling of siltstone. The brecciation is interpreted as genetic, associated with the deposition of the basalt on seamount slopes where it often disaggregated into fragments surrounded by a silty matrix. For the purpose of this memorandum, this is referred to as a volcanic breccia. The basalt encountered in borings completed in the eastern hillslope was generally intact, with only isolated intervals of brecciation, and in general was composed predominantly of basalt with minor siltstone matrix. For the purpose of this memorandum, this is referred to as a basalt.

Point load tests (PLTs) on the basalt indicate an unconfined compressive strength (UCS) of generally 2,000 to 5,000 psi. PLT results from the siltstone matrix indicate UCS values ranging from approximately 200 to 1,000 psi.

Recovery and Rock Quality Designation (RQD) for borings BH-3, BH-5, BH-17, BH-18 and BH-19 are summarized in Table 1. RQD values indicate the rock quality is very poor to poor on the western hillslope and poor to fair on the eastern hillslope.

Table 1. Summary of Rock Core Recovery and RQD

Borehole	Recovery			RQD		
	Min	Max	Average	Min	Max	Average
Western Hillslope						
BH-3	48	100	87	0	75	47
BH-5	48	93	51	0	50	8
Eastern Hillslope						
BH-17	80	100	97	6	100	51
BH-18	95	100	100	30	80	60
BH-19	61	100	95	4	73	34

4.3 Groundwater

The project subsurface explorations did not encounter groundwater in the western hillslope except for BH-15 where groundwater was encountered at 5 feet below ground surface. In addition, information provided by Civil & Environmental Consultants (CEC) indicates groundwater in the vicinity of this area is relatively shallow, at least seasonally. Groundwater

was encountered in eastern hillslope borings BH-17, BH-18 and BH-19 at depths of approximately 16, 25, and 18 feet below ground surface (bgs), respectively.

5.0 Kinematic Analysis

When the face of a rock mass is exposed in a rock cut confining pressure is relieved and the potential exists for blocks created by natural discontinuities in the rock mass to fall out of the slope. These block failures result in safety hazards and maintenance issues. A kinematic analysis compares mapped discontinuities in the rock mass with proposed cut slope orientations to determine the potential of blocks to fail out of the proposed slope.

Project specific discontinuity orientation data was used to perform a kinematic assessment of how potential blocks formed by joints and fractures in the rock will behave when the rock mass is disturbed by a slope cut, and whether the proposed cut slope will be stable or will result in blocks created by discontinuities sliding or falling out of the slope. In the majority of designed cut slopes, blocks predominantly fail by planar sliding or wedge sliding.

5.1 Joint Sets

The mapped rock discontinuity data (consisting of 45 joint orientations) were plotted on a stereonet in the RocScience software program Dips in order to visualize the rock mass discontinuities in two dimensions. Analysis of clustering of discontinuity data suggests two prominent joint set orientations with the following orientations (dip/dip direction):

- Joint Set 1: 76/226
- Joint Set 2: 65/336

The resulting stereonet is provided in **Appendix B**.

5.2 Markland Analysis

Delve utilized the Markland Analysis technique with mapped joint orientations and an estimated rock mass peak friction angle to study the kinematic stability of the overall rock mass with respect to the proposed cut slope orientation. Where the stability of a rock slope is controlled by the structure of the rock mass, Markland Analysis is a well-documented and widely accepted design tool used to evaluate the rock slope stability relative to a proposed cut inclination (Hoek and Bray, 1981 and FHWA, 1998). The RocScience computer program Dips was used for this analysis to analyze the potential for planar and wedge sliding failures. It should be noted that Markland Analysis is a tool for evaluating the potential for specific modes of failure but does not directly calculate factors of safety.

For analysis, peak friction angle of the basalt rock mass was assumed to be 33° based observations of joint conditions and previous experience in similar basalt material. Kinematic

stability was analyzed at four different cut slope orientations, as shown in Table 1.

Table 1. Analyzed cut slope orientations.

Slope Orientation	Cut Slope Angle	Slope Cut Direction	Notes
#1	63°	010°	Approx. 1/2H:1V NNE facing slope
#2	63°	355°	Approx. 1/2H:1V NNW facing slope
#3	53°	010°	Approx. 3/4H:1V NNE facing slope
#4	53°	355°	Approx. 3/4H:1V NNW facing slope

5.2.1 Results

Stereonet outputs resulting from the Markland Analysis are provided in **Appendix C** and a summary of results is provided in this section.

Analysis suggests that the kinematic potential for planar sliding and wedge sliding is moderate at Slope Orientations #1 and #2 (cut slope angles of 63°) and low at Slope Orientations #3 and #4 (cut slope angles of 53°). Based on these results, we recommend that the slope is not cut steeper than 53° (approx. 0.75H:1V).

If the slope is cut at a steeper angle than 53° there exists the potential for planes and wedges formed by discontinuities in the rock mass to become unstable and slide out of the cut slope, resulting in potential failure during construction or ongoing rockfall which could impact operations below the cut slope. If cut at an inclination greater than 53 degrees, potentially unstable wedges and planes would likely need to be reinforced using rock anchors, increasing project cost. By cutting the slope at 53-degrees, the number of kinematically viable blocks created will be significantly reduced. Limited rock reinforcement, scaling, and rockfall mitigation (ditch or mesh) may be still required for a 53-degree cut slope and are discussed further in Section 7.0.

6.0 Limit Equilibrium Analysis

Kinematic analysis considers failure of blocks or masses of rock that have potential to fail along discontinuities in the rock mass but does not consider the global stability of the cut. To address the potential for larger scale shear failure through the rock mass, or failure through colluvial material at the brow of the slope, 2D limit equilibrium analysis was performed using the RocScience computer program SLIDE2. A limit equilibrium analysis considers all the forces driving a slope failure (mainly gravity) and the forces resisting a slope failure (mainly shear strength of the slope material) to assess the factor of safety of the slope. In addition to dry conditions, slope stability was analyzed under wet and seismic conditions where reduction of effective shear strength or external horizontal loading could potentially affect site conditions.

For limit equilibrium analysis, a factor of safety of 1.0 indicates that the forces driving a failure and the forces resisting a failure are equal, and the slope is near a state of failure. A factor of safety greater than 1.0 suggests the slope is stable, and a factor of safety less than 1.0 suggests the slope is prone to displacement or theoretically should have already failed. Generally, a factor of safety greater than 1.3 is considered allowable for permanent slopes affecting the general public (Oregon GDM, 2023). Transient groundwater and seismic loads were also considered and minimum factors of safety of 1.1 and 1.0, respectively, were considered acceptable. Assumptions and methods of limit equilibrium analysis are provided in the following sections.

6.1 Slope Geometry

Construction of 2D limit equilibrium model geometry was based on topographic and cross-section information provided by the Wallace Group (**Appendix C**). To evaluate the tallest cut sections among the provided data for cut slope analysis, Section B-B’ and D-D’ were chosen to represent the west and east slopes, respectively.

Configuration of ground surfaces for modelled sections B-B’ and D’-D’ (constructed to represent recommended cut slope inclinations) assumed the following:

- Slope of 2H:1V below the roadway.
- Slope of 0.75H:1V in rock and weathered rock above the roadway.
- Slope of 1.5H:1V to 2H:1V Slope inclinations at the brow of the slope where colluvium soil is encountered. Inclination varies between the east and west cuts depending on soil conditions anticipated based on results of exploration.

Representation of ground conditions at depth, particularly geologic unit boundaries, were constructed based upon lateral projection of adjacent borehole information for each cross section. Section B-B’ was influenced most by explorations BH-03, BH-05, and BH-15. Section D-D’ was influenced most by explorations BH-17 and BH-19. Geologic sections were constructed such that depths of unit transitions were consistent with observations in nearby explorations. Between and outside available borehole locations (along the profile) geologic interpretations were made assuming simple linear relationships across the project area, continuity of unit thicknesses or trends in thickness, and general tendency for the soil-weathered rock-rock profile to roughly parallel the existing surface topography. Model construction of the geologic profile at depth influenced the surface construction as material type and assumed unit-boundary locations influenced cut inclination transitions. In particular the interpreted boundary between soil and weathered rock dictated where the cut-slope transitions from 0.75H:1V to (1.5 - 2.0) H:1V inclination. Because of the assumptions made and variation in subsurface conditions, representation of subsurface geometry along the height of the cut should be considered approximate.

6.2 Material Strengths

Strength of soils was represented using Mohr-Coulomb criterion which includes modelling of soil strength using a frictional and cohesive component. Values selected for friction and cohesion for each unit were based on relative density of material encountered during exploration and lab tests regarding material composition. Strength of weathered rock and rock was represented using the Generalized Hoek-Brown criterion based on estimated values for unconfined compressive strength (UCS), geologic strength index (GSI) and assumed equation constants (such as the Hoek-Brown constant M_i) based on published values corresponding to rock type. For rock material strength estimates, UCS values were based on point-load testing performed on samples collected during exploration activities.

Material properties assumed for limit equilibrium analysis of Section B-B' (West Slopes) and D-D' (East Slopes) are summarized in Tables 2 and 3.

Table 2. Assumed material properties for geologic materials for Section B-B' (West Slopes).

Geologic Unit	Unit Weight	Strength Model	Friction Angle	Cohesion	UCS	GSI
Soil (Colluvium)	125 pcf	Mohr-Coulomb	34°	100 psf	-	-
Weathered Rock	165 pcf	Generalized Hoek-Brown	-	-	30,000 psf	30
Volcanic Breccia	170 pcf	Generalized Hoek-Brown	-	-	200,000 psf	45

Table 3. Assumed material properties for geologic materials for Section D-D' (East Slopes).

Geologic Unit	Unit Weight	Strength Model	Friction Angle	Cohesion	UCS	GSI
Soil (Colluvium)	125 pcf	Mohr-Coulomb	30°	150 psf	-	-
Weathered Rock	165 pcf	Generalized Hoek-Brown	-	-	30,000 psf	30
Basalt	175 pcf	Generalized Hoek-Brown	-	-	480,000 psf	55

6.3 Groundwater Conditions

Groundwater was assumed present in the bedrock based on the results of the subsurface investigation and information provided by CEC. In addition, a perched groundwater condition was evaluated to account for potential transient groundwater surcharge in colluvium and weathered rock related to high rainfall events. This was modeled as a perched groundwater condition atop the bedrock such that the weathered rock was fully saturated and the overlying colluvium was approximately 30-50% saturated in relation to unit thickness. Groundwater conditions within the bedrock were modeled by assuming saturated conditions in the bedrock and the perched groundwater condition. Dry conditions were also modeled.

6.4 Seismic Loading Parameters

Seismic loading criteria for the project were developed by the Wallace Group and include a peak ground acceleration of 0.55g at locations where rock cuts are anticipated. This was incorporated into the slope stability modeling as an external pseudo-static horizontal load condition equivalent to approximately half the PGA. This method of representing seismic forces imparted on a slope is industry standard for limit equilibrium stability modelling (Wyllie, 2018). The pseudo static horizontal load was modelled at 0.25g.

6.5 Results

Results of the limit equilibrium analysis suggest stable conditions at the following cut inclinations or shallower:

- Volcanic Breccia and Basalt: 0.75H:1V
- Weathered Rock: 0.75H:1V
- Colluvium soils (West): 1.5H:1V
- Colluvium Soils (East): 2H:1V

Calculated factors of safety for dry conditions, wet conditions, and seismic conditions are presented in Table 4. Printouts of the produced models can be found in **Appendix D**. The eastern hillslope colluvial soils were also modeled assuming a steeper 1.5H:1V slope however the resultant factors of safety did not meet the design criteria.

Table 4. Summary of Limit Equilibrium Modelling Results

Section	Dry Condition	Wet Condition	Seismic Scenario
B-B’	1.8 G	1.7 C	1.2 C
D-D’	1.8 C	1.6 C	1.1 C
*G (Global) indicates minimum factor of safety surface extended from the bottom to top of slope **C (Colluvium) indicates minimum factor of safety surface was limited to soil and weathered rock. Factor of safety for failure through bedrock was higher. ***Wet condition was not included in the seismic scenario			

As stated at the end of Section 5.0 and beginning of 6.0, this analysis considers global stability. Individual blocks of rock or raveling of colluvial material from the brow of the slope may still be a limited hazard at the proposed cut inclinations. Section 7.0 below discusses potential measures that can be taken to manage potential rockfall risks.

7.0 Rockfall Mitigation

As the cut slope is constructed, the fractured nature of the rock mass will lead to relatively small blocks being created in the exposed cut slope. Over the design life of the cut, these blocks will represent a continued source of potential rockfall from the cut face. This rockfall hazard can be mitigated through a combination of scaling, rock reinforcement, construction of a catchment ditch at the toe of the slope and installing a draped mesh over the slope.

7.1 Scaling

Scaling involves mechanically removing unstable blocks from the cut slope face either by hand or with equipment. Removing the blocks in a controlled construction environment reduces the amount of loose material on the slope and thereby reduces the rockfall hazard. This is usually the first step in rockfall mitigation and also serves to improve site safety. However, depending on the erosion and weathering rate of on-slope material, it is not typically effective as a long-term solution as a sole means and method for addressing rockfall.

7.2 Catchment Ditch

A catchment ditch constructed at the base of the cut slope serves as an area for any small falling rocks to collect in a safe area without impacting the roadway. A catchment ditch for rockfall purposes typically consists of a mono-sloped ditch, dipping away from the roadway towards the slope, constructed at a 6H:1V or 4H:1V inclination. Typical ditch construction is usually intended to capture approximately 90% of rockfall.

For an 80-foot-tall slope cut at a 0.75H:1V slope inclination, the ditch width required to catch 90% of rockfall (assume ditch inclination of 4H:1V) would be approximately 26 feet. For a 6H:1V ditch configuration the ditch would need to be approximately 31 feet wide (Pierson et al., 2001). Because slope heights across the east and west slopes are planned in excess of 90-100 feet at some locations, ditch widths greater than approximately 30 feet would likely be required to catch 90% of rockfall if using ditch catchment as the sole means of rockfall management. However, ditch widths on the order of 10 feet can be used if a drape mesh is applied to the slope to guide rockfall into the catchment ditch. Drape mesh application is discussed in the following section.

It should also be noted that depending on rockfall severity, the catchment ditch will require periodic maintenance visits to clear the ditch of fallen rocks and maintain its effectiveness. The frequency of required catchment ditch cleaning typically varies from annually at high volume rockfall slopes to every 5 or 10 years at low volume rockfall slopes.

7.3 Drape Mesh

Drape mesh installed over rock slopes guides ongoing rockfall from source areas on the slope into a catchment ditch, effectively reducing the impact of rockfall on roadway operations and

reducing the required ditch width. Drape mesh is constructed by installing ground anchors across the brow of the slope and hanging the mesh on a top cable that spans the horizontal length of the brow of the slope. Typically mesh coverage extends 5-10 feet back from the brow and extends down to 5-10 feet above the bottom of ditch. In the case of cut slopes for this project, it would be recommended that mesh be hung 10 feet back from the brow to cover colluvium material near the edge of the 0.75H:1V slope and extend to approximately 10 feet above bottom of ditch to allow for easy ditch cleanout.

7.4 Rock Reinforcement

Depending on the type of material used, drape mesh can contain blocks measuring 2-5 feet in diameter. If there are blocks on the slope larger than what the mesh can contain and that cannot be scaled, rock reinforcement may be used to pin the blocks in place. This involves drilling 3–4-inch diameter holes through the blocks and into the stable backslope, inserting a steel bar, and grouting the bar in place to effectively hold the unstable block in place. Considering that the planned cut slopes of 0.75H:1V effectively cut away the potential for sliding on the steeper persistent joints noted in the rock mass, the quantity of rock reinforcement elements would likely be limited and the length of elements would likely be limited to 10-20 feet.

It is difficult to quantify how much slope reinforcement may be needed until blasting, excavation, and scaling have been completed. However, because reinforcement of individual blocks would be primarily for rockfall management, rather than global stability, reinforcement efforts would likely be limited and sporadic assuming limited overbreak or ground disturbance from controlled blasting operations.

8.0 Construction Considerations

8.1 Blasting

Blasting associated with rock excavation will require a detailed specification to support the project. Blasting considerations that should be evaluated include minimizing fly rock, blast vibrations, and air blast. Specifications should consider the requirement of a blasting consultant on the contractor team.

8.2 Inspection

Based on our kinematic analysis, the potential for failure of the rock slope due to planar or wedge failure is considered low. However, it is possible that localized, random unmapped joints and fractures in the rock mass can create unstable blocks. Therefore, we recommend that a qualified geotechnical engineer or engineering geologist be on site during bench excavation construction to observe the slope for persistent joints inclined at 0.75H:1V inclinations or less that have the potential to daylight the slope and lead to block failures during excavation. If

instabilities are observed, mitigation options consisting of rock reinforcement or additional excavation can be explored to maintain a safe site.

8.3 Rockfall Management

It is recommended that scaling of the rockslope be performed periodically during construction to remove loose blocks from the slope. If cutting the slopes at a 0.75H:1V inclination, it is recommended that drape mesh be installed over the slope and a 10-foot-width ditch be constructed at the base of the slope. It is also recommended to maintain funds for limited amounts of steel bar rock reinforcement installation.

9.0 Closure

This report was prepared for the exclusive use of the Wallace Group, Inc. in conjunction with the Coffin Butte Landfill Upgrades Project. Our conclusions and recommendations are based on our interpretation of the information from the geotechnical exploration and analyses, as well as our professional experience and judgment.

In the performance of geotechnical work, specific information is obtained at specific locations at specific times, and geologic conditions can change over time. It should be acknowledged that variations in rock and soil conditions may exist between exploration and exposed locations and this report does not necessarily reflect variations between different explorations. The nature and extent of variation may not become evident until construction.

This report was completed within the limitations of the approved scope of work, schedule, and budget. The services rendered have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same area. Delve Underground is not responsible for the use of this report in connection with anything other than the project at the location described above.

DELVE UNDERGROUND

Jamie Schick, CEG, LEG, LHG
Senior Associate

Luke Ferguson, PE
Project Engineer

10.0 References

Bela, James, (1979). *Geologic Hazards of Eastern Benton County, Oregon, Oregon Department of Geology and Mineral Industries*, Bulletin 98.

FHWA (1998). *Rock Slopes Reference Manual*. Federal Highway Administration. Report #FWHA-HI-99-007. Wyllie, D., and Mah, C.W.

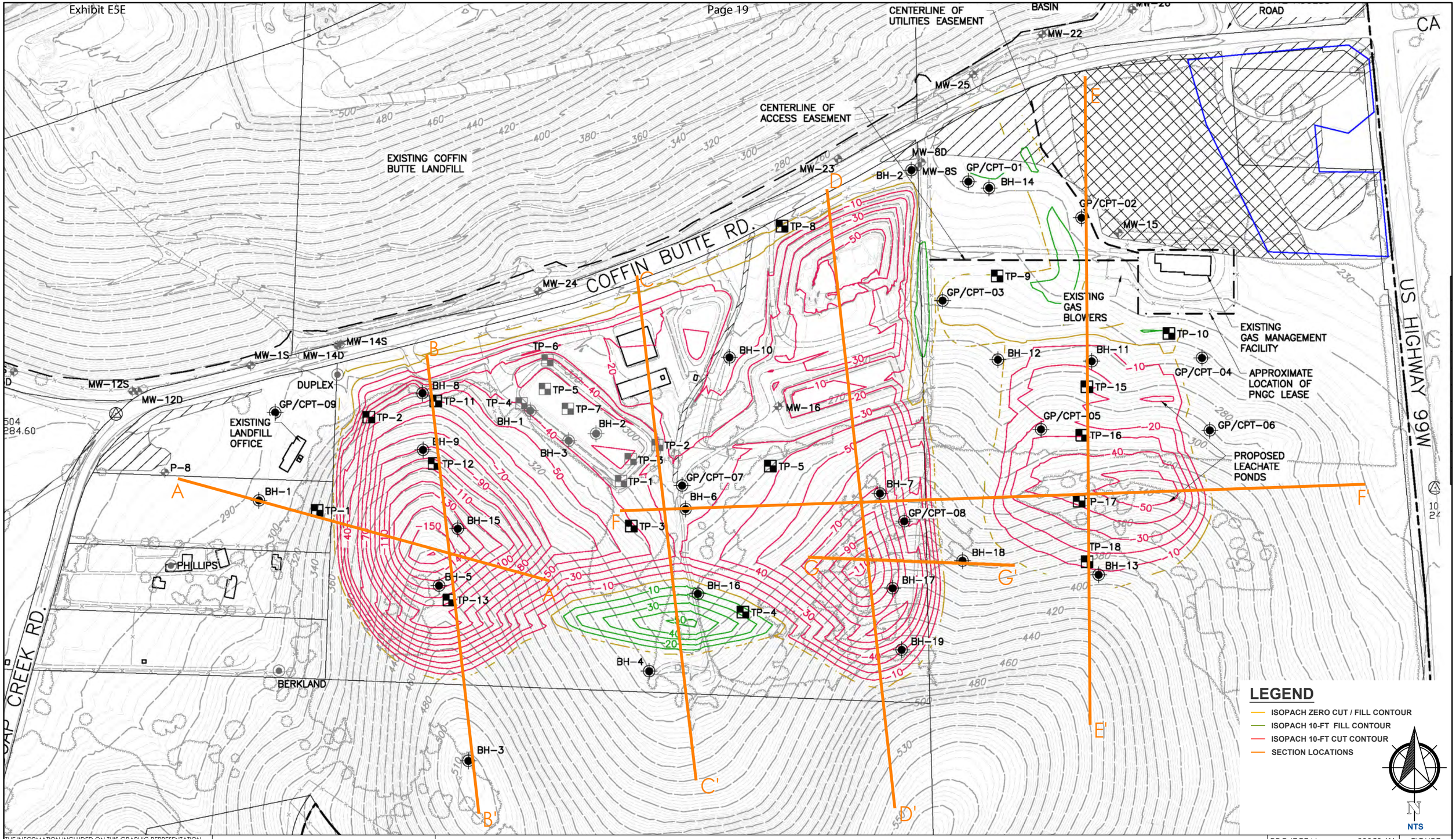
Hoek, E., and Bray, J.W., (1981). *Rockslope Engineering*. Institution of Mining and Metallurgy, 357 p.

Orr, E.L. and Orr, W.N., 2012. *Oregon Geology, 6th Edition*. Corvallis: Oregon State University Press

Pierson, L., Gullixson, C., and Chassie, R., (2001). *Rockfall Catchment Area Design Guide*, ODOT and FHWA, Report No. FHWA-OR-RD-02-04m.

Wyllie, D.C., 2018. Rock Slope Engineering, Section 11.6.2, 306-307pp. CRC Press.

Appendix A: Site Grading Plan and Cross Sections Provided by the Wallace Group



LEGEND

- ISOPACH ZERO CUT / FILL CONTOUR
- ISOPACH 10-FT FILL CONTOUR
- ISOPACH 10-FT CUT CONTOUR
- SECTION LOCATIONS

N

NTS

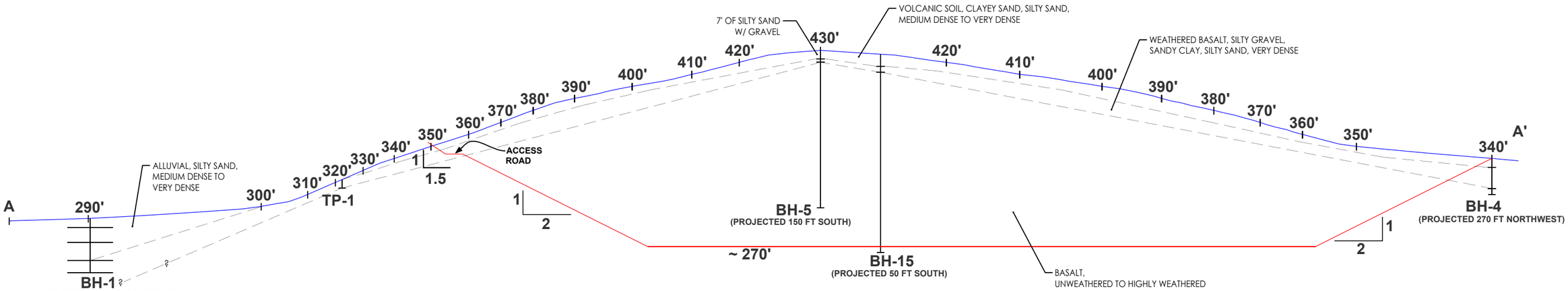
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

SECTION LOCATION MAP
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	July 31, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_8.DWG

FIGURE 8



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE

GRAPHIC SCALE

0 21.25 42.5 85 170

(IN FEET)

1 inch = 85 ft.

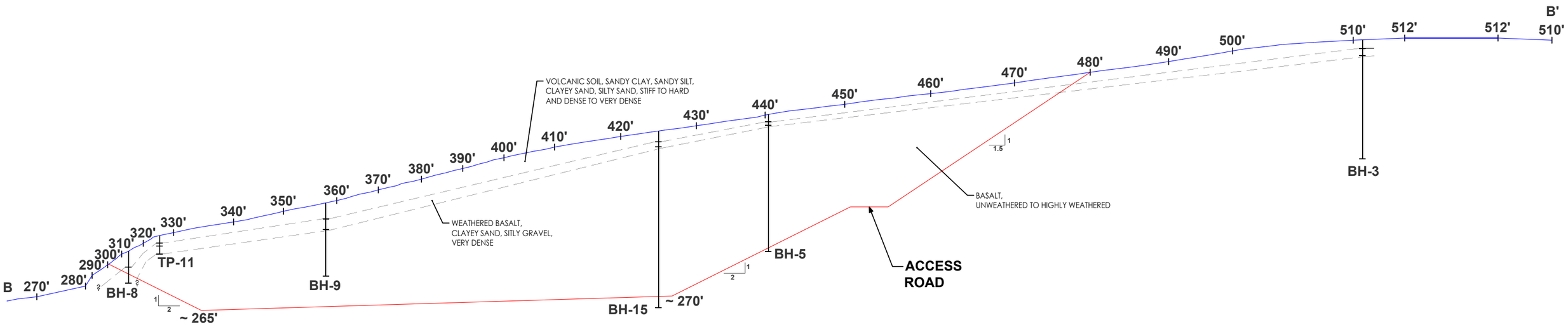
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION A-A'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	April 1, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_1.DWG

FIGURE 1



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE

GRAPHIC SCALE

0 22.5 45 90 180

(IN FEET)

1 inch = 90 ft.

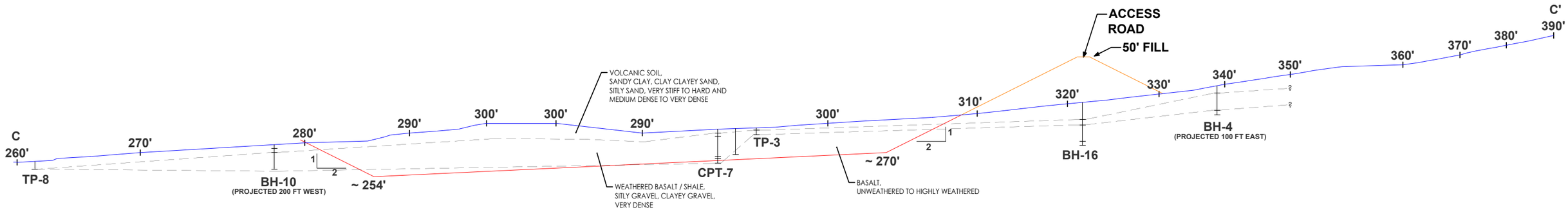
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION B-B'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	April 1, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_2.DWG

FIGURE 2



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE
- ISOPACH ZERO CUT/ FILL LINE

GRAPHIC SCALE

0 25 50 100 200

(IN FEET)

1 inch = 100 ft.

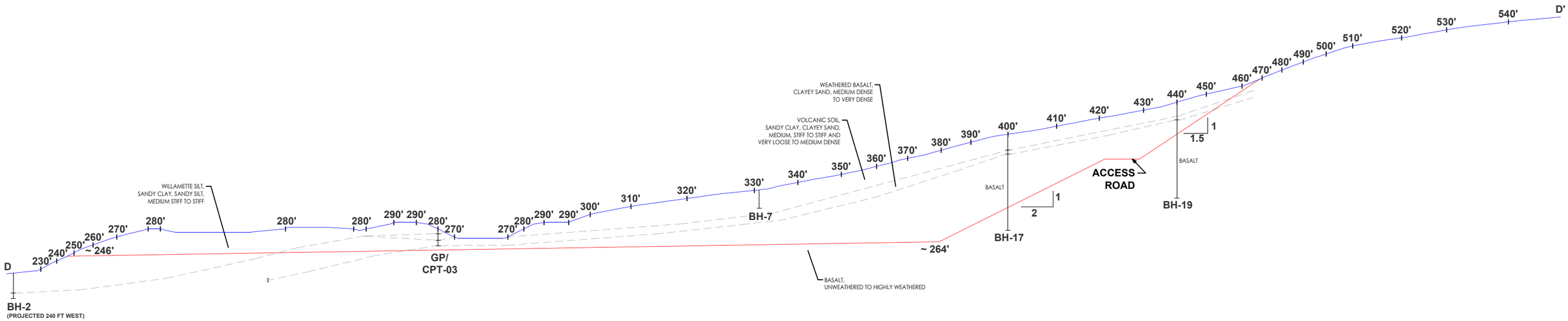
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION C-C'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	April 1, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_3.DWG

FIGURE 3



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE

GRAPHIC SCALE

0 30 60 120 240

(IN FEET)

1 inch = 120 ft.

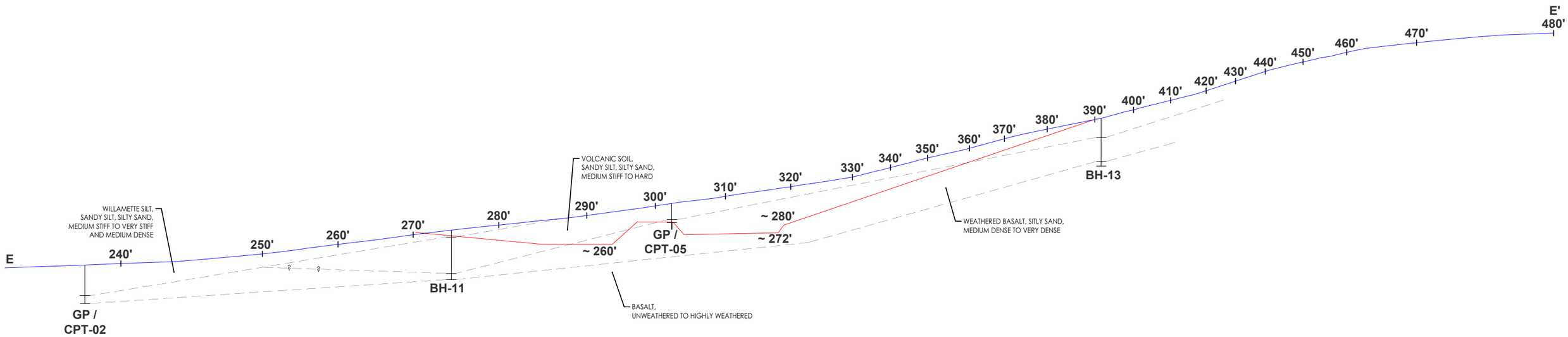
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION D-D'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	June 5, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_4.DWG

FIGURE 4



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE

GRAPHIC SCALE

0 25 50 100 200

(IN FEET)

1 inch = 100 ft.

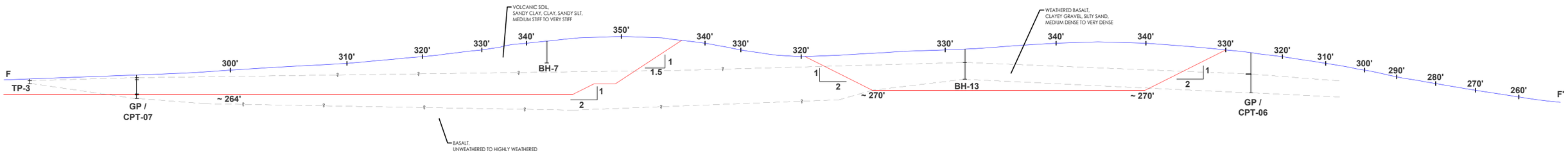
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A LAND SURVEY PRODUCT NOR IS IT DESIGNED OR INTENDED AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION E-E'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	June 5, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_5.DWG

FIGURE 5



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE

GRAPHIC SCALE

0 36.25 72.5 145 290

(IN FEET)

1 inch = 145 ft.

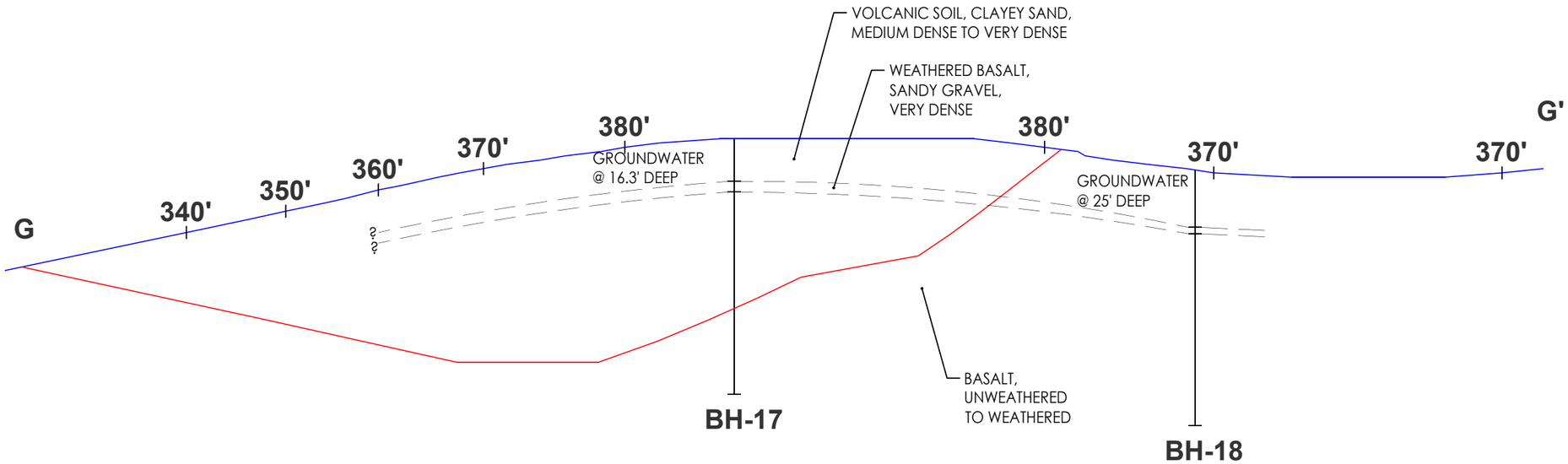
THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION F-F'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	April 1, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_6.DWG

FIGURE 6



LEGEND

- EXISTING 10-FT CONTOUR
- ISOPACH 10-FT CUT LINE

GRAPHIC SCALE

0 15 30 60 120

(IN FEET)

1 inch = 60 ft.

THE INFORMATION INCLUDED ON THIS GRAPHIC REPRESENTATION HAS BEEN COMPILED FROM A VARIETY OF SOURCES AND IS SUBJECT TO CHANGE WITHOUT NOTICE. WALLACE GROUP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, AS TO ACCURACY, COMPLETENESS, TIMELINESS, OR RIGHTS TO THE USE OF SUCH INFORMATION. THIS DOCUMENT IS NOT INTENDED FOR USE AS A CONSTRUCTION DESIGN DOCUMENT. THE USE OR MISUSE OF THE INFORMATION CONTAINED ON THIS GRAPHIC REPRESENTATION IS AT THE SOLE RISK OF THE PARTY USING OR MISUSING THE INFORMATION.

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

CROSS-SECTION G-G'
VALLEY LANDFILL INC.
COFFIN BUTTE LANDFILL
CORVALLIS, OREGON

PROJECT No.:	23050 (1)
DRAWN:	July 10, 2023
DRAWN BY:	DTJ
CHECKED BY:	LS
FILE NAME:	23050 (1)_FIGURE_7.DWG

FIGURE 7

Appendix B: Point Load Testing Results

SUMMARY OF POINT LOAD TEST

PROJECT: Coffin Butte
PROJECT NO.: 6309.0
PROJECT LOCATION: Corvallis, Oregon
SAMPLED BY:
DATE SAMPLED:

LAB SAMPLE NO.: NA
SAMPLE NO.: NA
SAMPLE DESCRIP.: NA
DATE PLT TESTED: 11/15/2021
PLT TESTED BY: J. Siemens, J. Schick

TEST NOTES: All tests were diametral unless noted.
All samples were not moisture controlled.

Borehole ID	Depth (ft)	Test Number	Rock Type**	Depth or Diameter, D (mm)	D' (mm)	ΔD/D, penetration ratio (%)	Failure Load, P (kN)	Failure Load, P (N)	De^2 (mm^2)	Equivalent Diameter, De (mm)	Uncorrected Point Load Strength Index, I_s (Mpa)	Uncorrected Point Load Strength Index, I_s (PSI)	Size Correction Factor, F	Corrected Point Load Strength Index, $I_{s(50)}$ (Mpa)	Corrected Point Load Strength Index, $I_{s(50)}$ (PSI)	Estimated Uniaxial Compressive Strength, UCS (Mpa)*	Estimated Uniaxial Compressive Strength, UCS (PSI)*	Test Validation (Valid/Invalid)	Comments
9	57.0	1	Basalt	59.5	57.5	3	13.00	13000	3421	58.5	4	551	1.07	4.1	591	97.9	14194	Invalid	Followed Fractures on core axis
9	69.0	2	Breccia	59.5	56.0	6	0.95	950	3332	57.7	0	41	1.07	0.3	44	7.3	1059	Invalid	Fracture through matrix
9	43.5	3	Breccia	59.0	57.0	3	0.57	570	3363	58.0	0	25	1.07	0.2	26	4.3	631	Invalid	Fracture through matrix
9	45.5	4	Breccia	59.5	58.0	3	1.30	1300	3451	58.7	0	55	1.08	0.4	59	9.7	1410	Invalid	Fracture through matrix
9	35.0	5	Siltstone	58.5	55.0	6	0.42	420	3218	56.7	0	19	1.06	0.1	20	3.3	481	Valid	
9	26.0	6	Breccia	60.5	56.5	7	0.32	320	3418	58.5	0	14	1.07	0.1	15	2.4	350	Invalid	Followed Fractures on core axis
5	11.0	7	Breccia	59.0	57.0	3	0.84	840	3363	58.0	0	36	1.07	0.3	39	6.4	929	Invalid	Fracture through matrix
5	30.0	8	Breccia	59.5	57.0	4	0.93	930	3392	58.2	0	40	1.07	0.3	43	7.0	1022	Invalid	Fracture through matrix
5	47.0	9	Basalt	45.0	39.5	12	2.94	2940	1778	42.2	2	240	0.93	1.5	222	36.8	5332	Invalid	Clast, non-diametral
5	61.0	10	Breccia	59.5	57.0	4	0.30	295	3392	58.2	0	13	1.07	0.1	14	2.2	324	Invalid	Fracture through matrix
5	90.0	11	Basalt	59.5	57.5	3	16.50	16500	3421	58.5	5	699	1.07	5.2	751	124.2	18016	Valid	
5	105.0	12	Breccia	59.5	57.0	4	0.34	340	3392	58.2	0	15	1.07	0.1	16	2.6	374	Invalid	Fracture through matrix
5	119.5	13	Siltstone	59.5	57.5	3	0.97	970	3421	58.5	0	41	1.07	0.3	44	7.3	1059	Valid	
5	125.0	14	Breccia	59.5	58.0	3	1.41	1410	3451	58.7	0	59	1.08	0.4	64	10.5	1529	Valid	
5	127.0	15	Breccia	59.5	58.0	3	1.11	1110	3451	58.7	0	47	1.08	0.3	50	8.3	1204	Valid	
9	57.0	16	Basalt	38.0	35.5	7	3.40	3400	1349	36.7	3	366	0.87	2.2	318	52.6	7636	Invalid	Clast, non-diametral
3	21.5	17	Siltstone	59.0	56.5	4	0.56	560	3334	57.7	0	24	1.07	0.2	26	4.3	624	Valid	
3	28.5	18	Breccia	59.0	57.0	3	4.86	4860	3363	58.0	1	210	1.07	1.5	224	37.1	5377	Valid	Fracture through clast
3	32.5	19	Breccia	59.5	57.0	4	2.09	2090	3392	58.2	1	89	1.07	0.7	96	15.8	2297	Valid	Fracture through clast
3	36.5	20	Siltstone	59.5	55.5	7	0.24	235	3302	57.5	0	10	1.06	0.1	11	1.8	264	Invalid	
3	47.5	21	Siltstone	59.5	58.0	3	0.41	405	3451	58.7	0	17	1.08	0.1	18	3.0	439	Invalid	
3	60.0	22	Basalt	59.5	58.5	2	0.23	230	3481	59.0	0	10	1.08	0.1	10	1.7	248	Invalid	Followed Fractures on core axis
3	67.0	23	Breccia	59.5	52.5	12	2.10	2100	3124	55.9	1	98	1.05	0.7	103	17.0	2460	Invalid	Fracture through clast
3	73.0	24	Siltstone	59.0	57.5	3	0.43	430	3393	58.2	0	18	1.07	0.1	20	3.3	473	Valid	
3	85.0	25	Breccia	59.5	57.5	3	0.62	620	3421	58.5	0	26	1.07	0.2	28	4.7	677	Invalid	
3	79.0	26	Siltstone	59.0	57.5	3	0.43	430	3393	58.2	0	18	1.07	0.1	20	3.3	473	Valid	
3	87.0	27	Siltstone	59.0	52.5	11	0.83	830	3098	55.7	0	39	1.05	0.3	41	6.7	979	Valid	
3	105.0	28	Breccia	59.0	54.5	8	2.83	2830	3216	56.7	1	128	1.06	0.9	135	22.4	3242	Invalid	No fracture, penetration
3	105.0	29	Breccia	59.5	56.5	5	2.95	2950	3362	58.0	1	127	1.07	0.9	136	22.5	3265	Valid	
3	103.0	30	Siltstone	59.0	56.5	4	0.20	200	3334	57.7	0	9	1.07	0.1	9	1.5	223	Valid	
3	108.0	31	Breccia	59.5	58.0	3	0.59	590	3451	58.7	0	25	1.08	0.2	27	4.4	640	Valid	
																Assumed C*	24.0		

Notes: * Estmated UCS was calculated using an estimated correlation factor (C) of 24

Number of total breaks:	31
Number of basalt breaks	5
Number of breccia breaks	17
Number of siltstone breaks	9

McMILLEN JACOBS ASSOCIATES

CALCULATIONS (ASTM D5731)

Uncorrected Point Load Strength *

$I_s = P / De^2$

I_s = Point load strength index, Mpa
P = failure load, N
$De^2 = D^2$, for diametral core tests without platen penetration, mm^2
$De^2 = 4A/\pi$ for axial, block, and lump tests, mm^2
*For D = 50mm, if D is not equal to 50 mm, use size corrected point load index below.

D' = final separation of the loading points with significant platen penetration, mm
De = equivalent core diameter, mm
$De^2 = 4/\pi$ W x D' for block, and lump shapes with platen penetration, mm^2
De^2 = D x D' for cores with platen penetration, mm^2

Where:
A = WD = minimum cross-sectional area of a plane through the platen contact points

Size Corrected Point Load Index

$I_{s(50)} = k_{PLT} \times I_s$

$k_{PLT} = (De / 50)^{0.45}$

$I_{s(50)}$ = size-corrected point load strength index
k_{PLT} = size correction factor

C Value

$\sigma_c = C \times I_{s(50)}$

σ_c = uniaxial compressive strength (UCS)
C = C-value, correlation value

The uniaxial compressive strength, σ_c, is related to the point load index, $_{s(50)}$, by what is commonly referred to as the C-Value, which is a site specific value
The C-Value relating to a site is found by plotting the LAB Unconfined Compressive strengths (UCS) vs. the corrected Point Load ($I_{s(50)}$) data.
If no correlation, a generalized C-value can be used, C = 24.
This procedure is only used to correct FIELD point load test data. Laboratory data will already provide UCS values. However, the lab UCS and PLT data is used to find the C-Value.

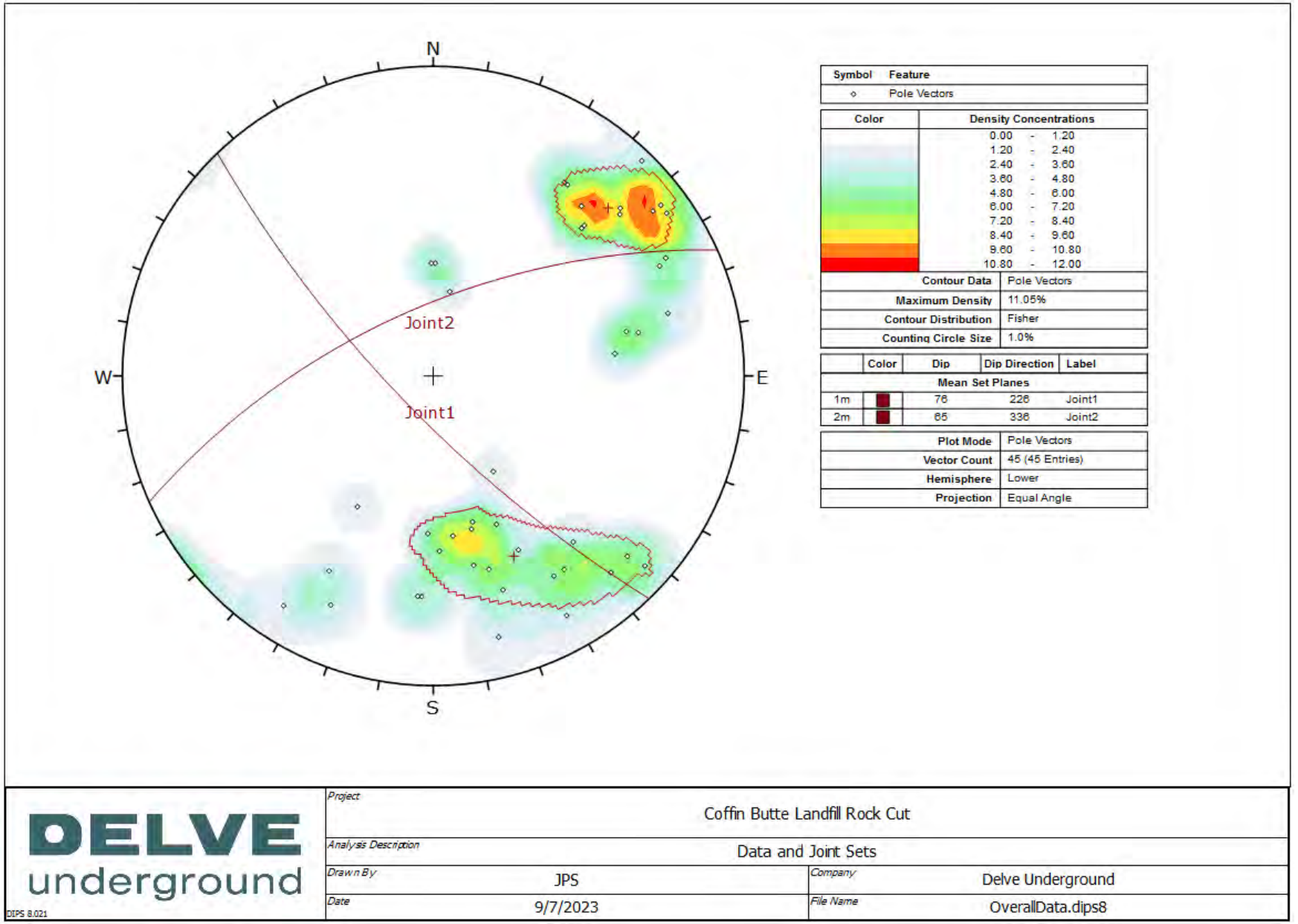
Reducing data

Find the minimum and maximum values and delete. ASTM calls for 2 lowest and 2 highest values to be deleted (data set choice).
Average the rest of the values for the set to get Is(50) and UCS.

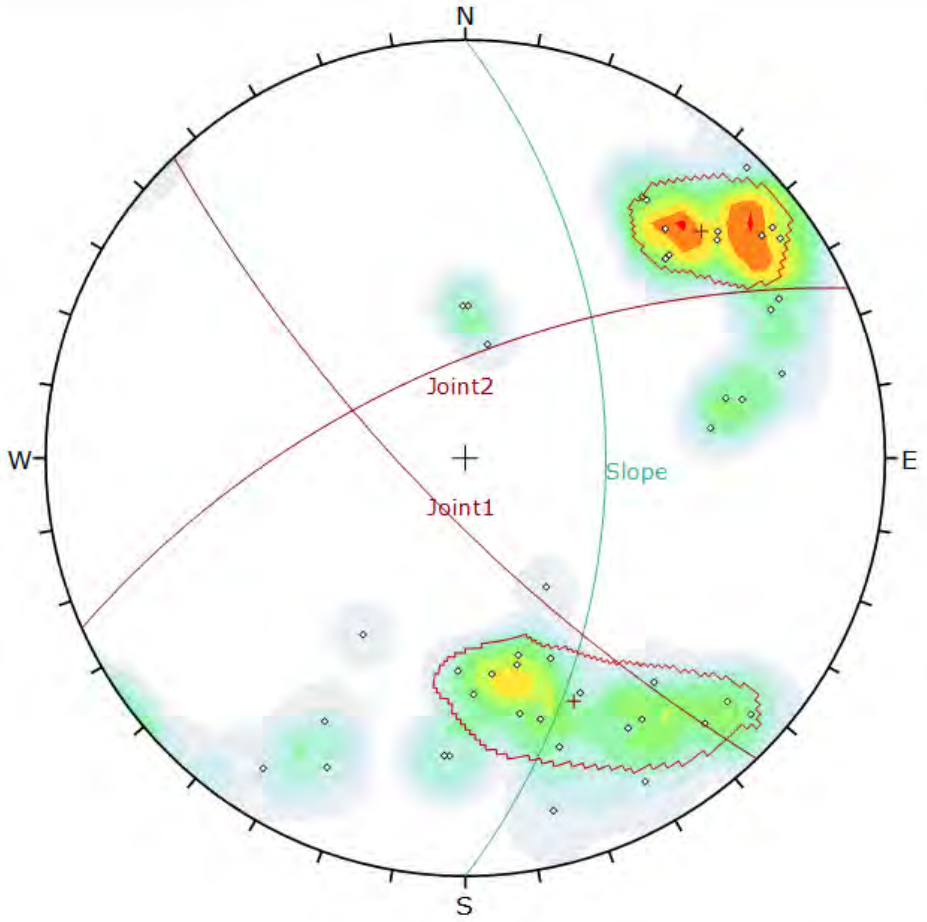
Calculations further explained in FHWA-IF-02-034 and ISRM RTH 325-89.

Appendix C: Stereonet and Kinematic Results

Overall Stereonet



Slope: 53/090 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	90	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

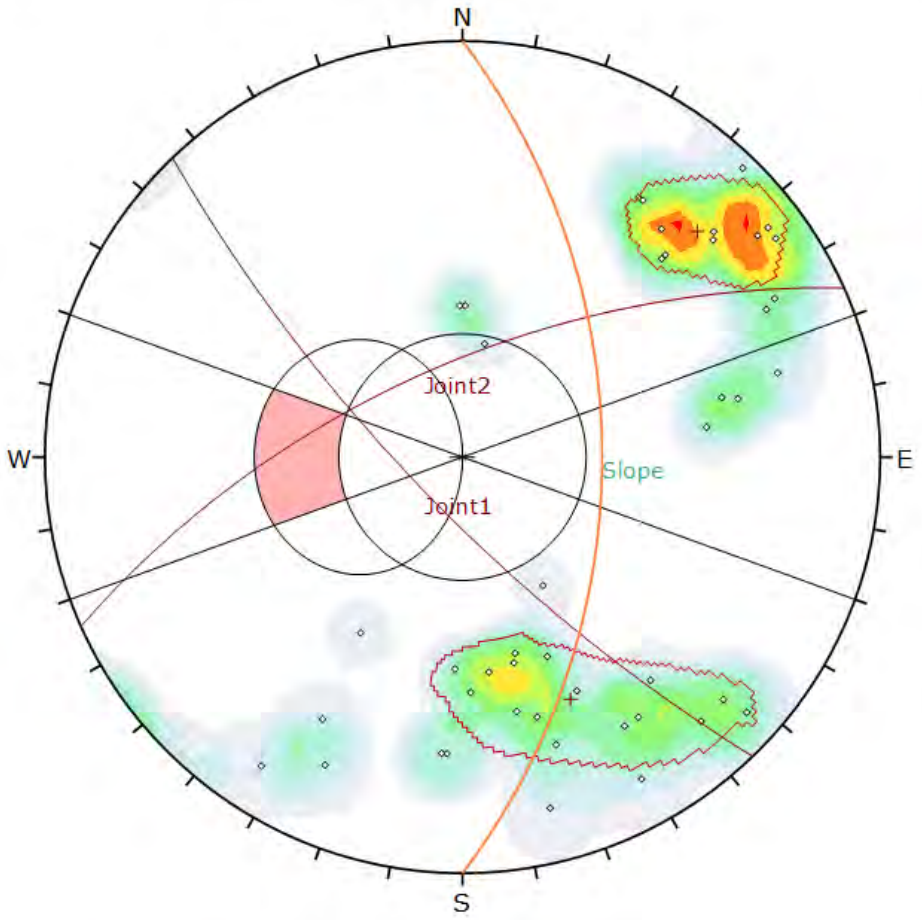
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/090		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-090.dips8

Slope: 53/090 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	90
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	90	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

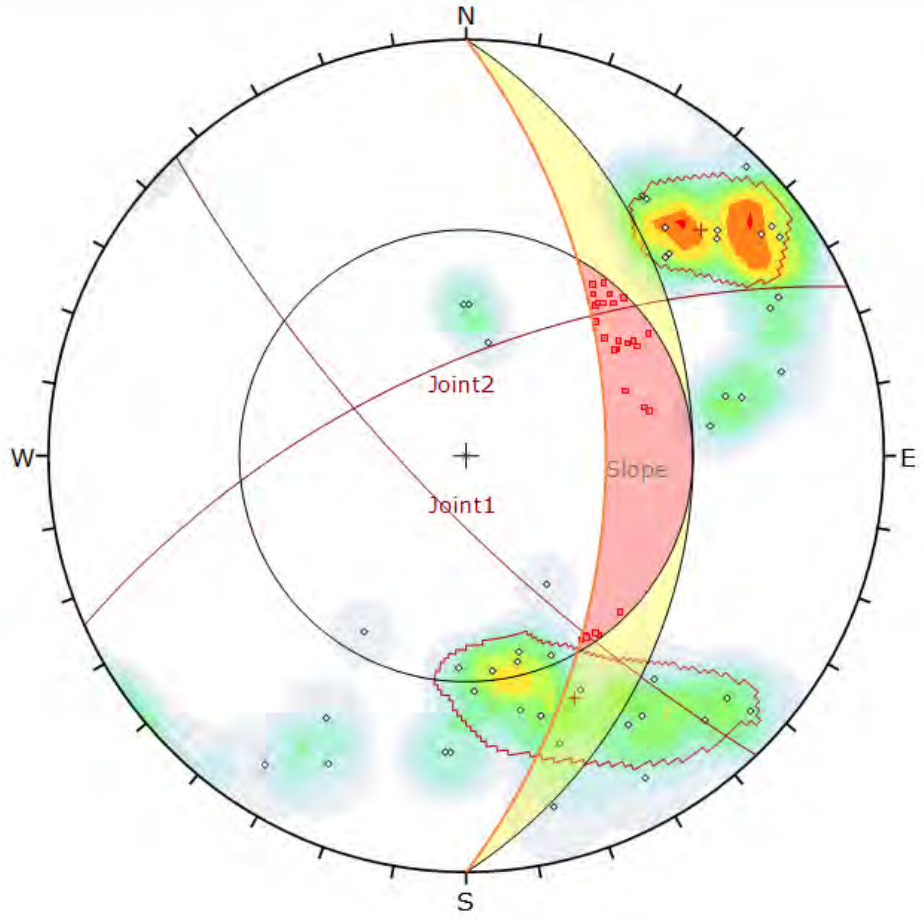
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/090 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-090_Planar.dips8

Slope: 53/090 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	53		
Slope Dip Direction	90		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	31	990	3.13%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	90	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

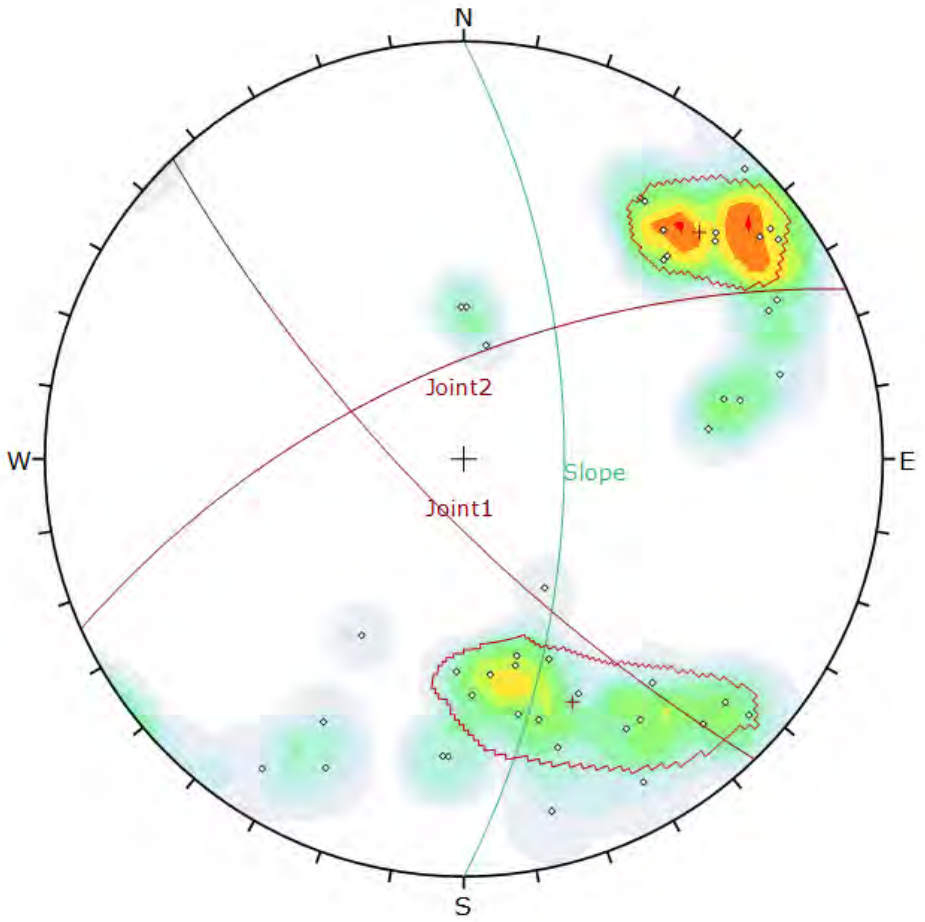
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/090 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-090_Wedge.dips8

Slope: 63/090 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	90	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

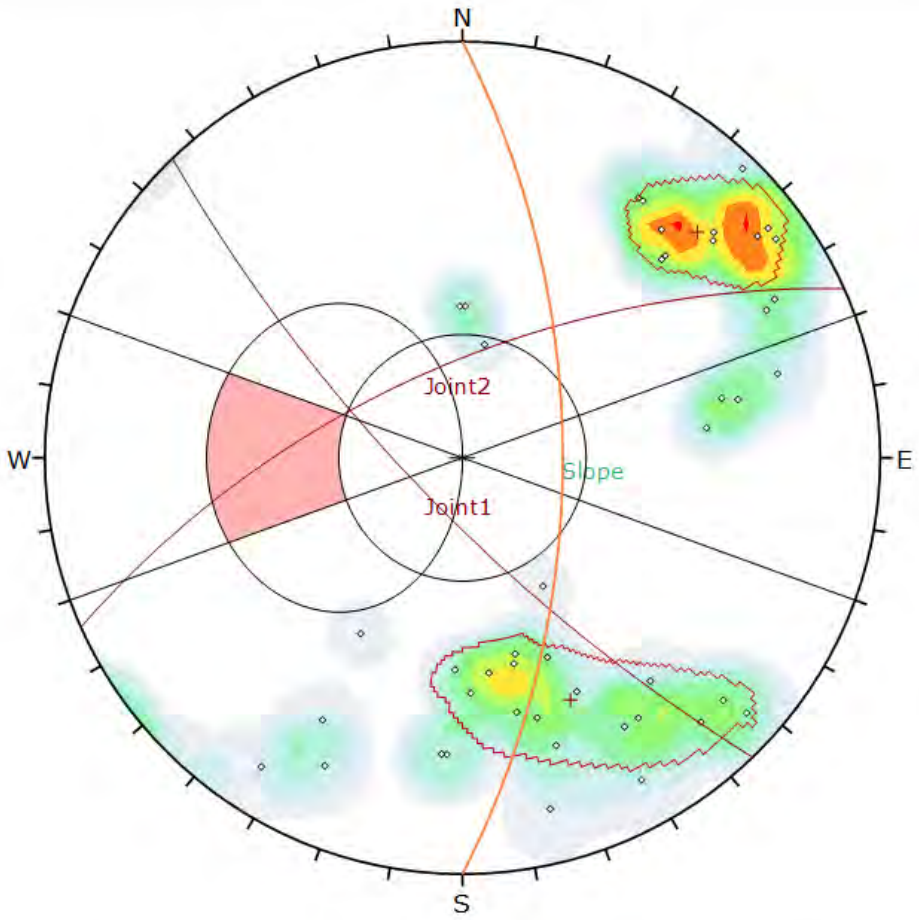
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/090		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-090.dips8

Slope: 63/090 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	63
Slope Dip Direction	90
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	90	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

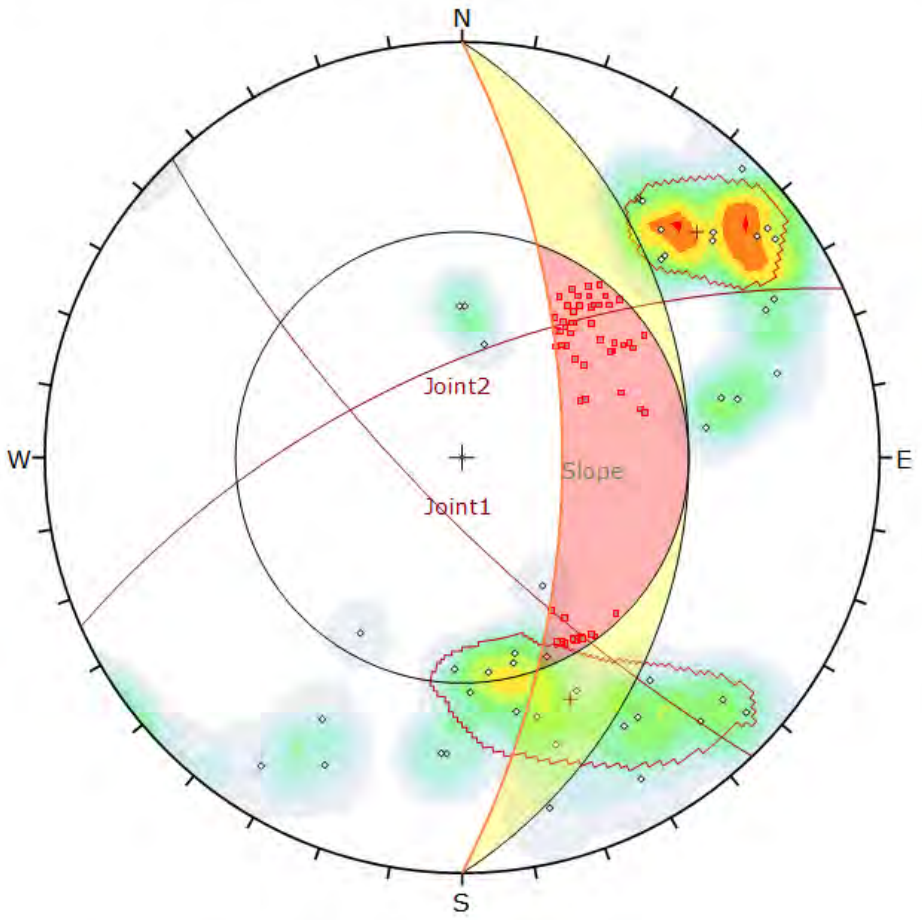
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/090 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-090_Planar.dips8

Slope: 63/090 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	63		
Slope Dip Direction	90		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	66	990	6.67%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	90	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

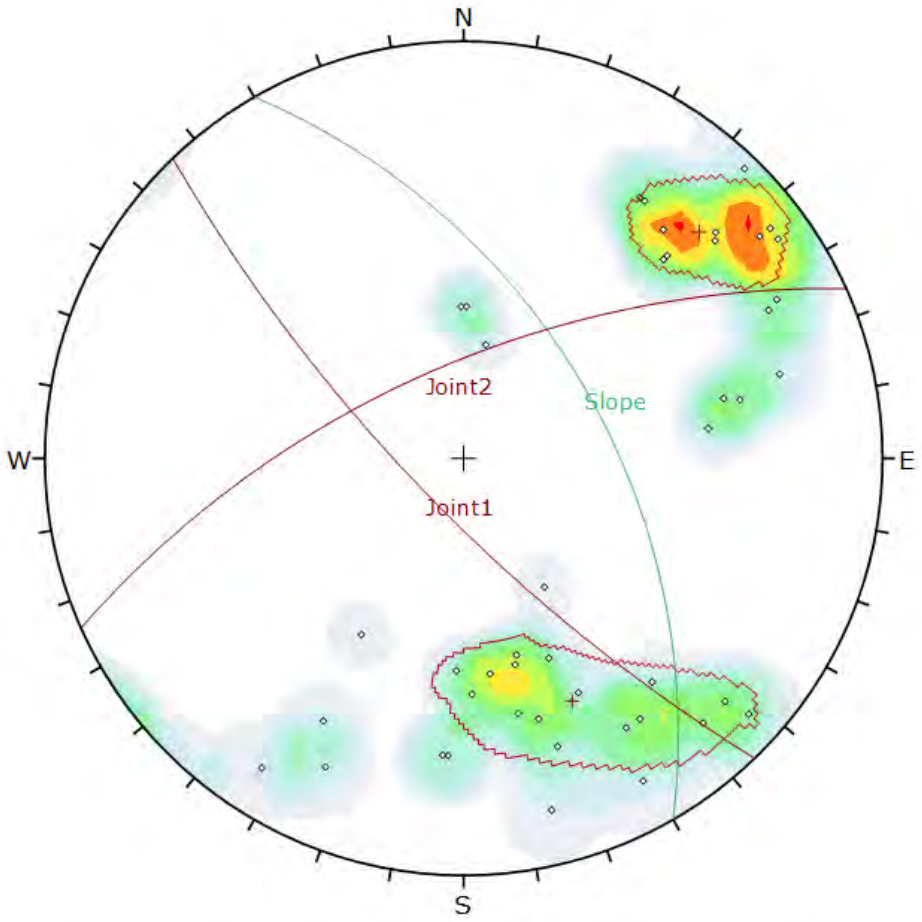
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/090 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-090_Wedge.dips8

Slope: 53/060 – Stereonet



Symbol	Feature
○	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	60	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

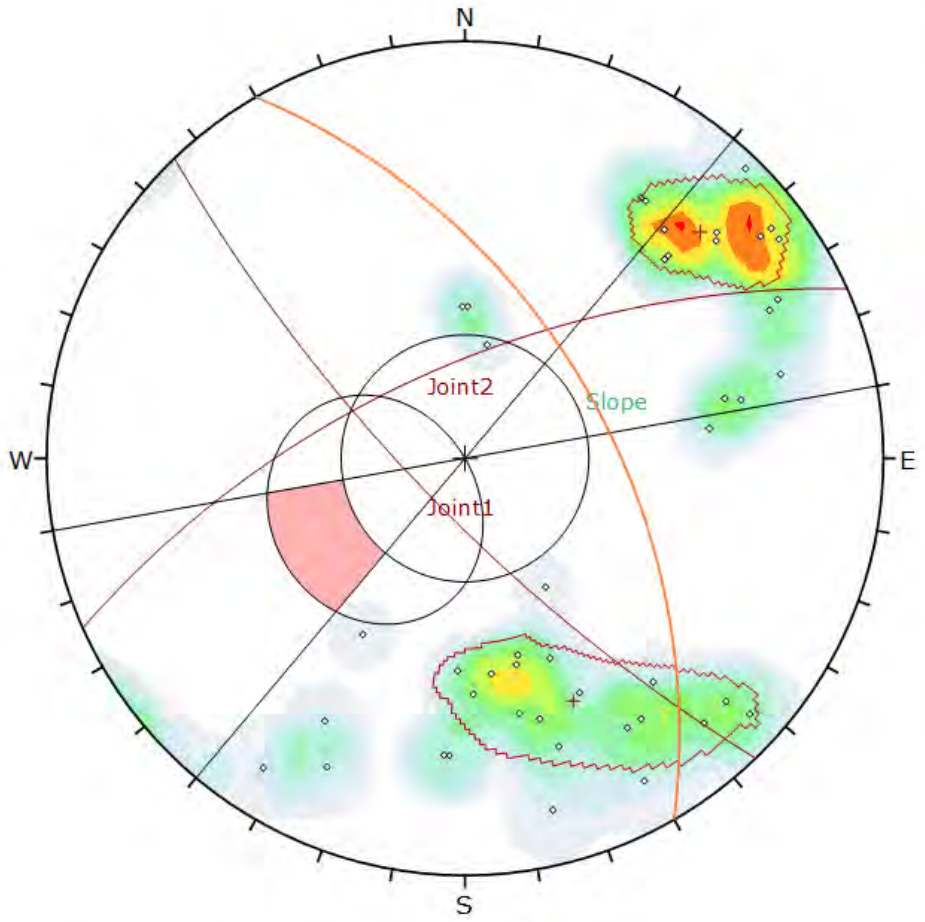
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/060		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-060.dips8

Slope: 53/060 – Planar Failure



Symbol	Feature
◦	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	60
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	60	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

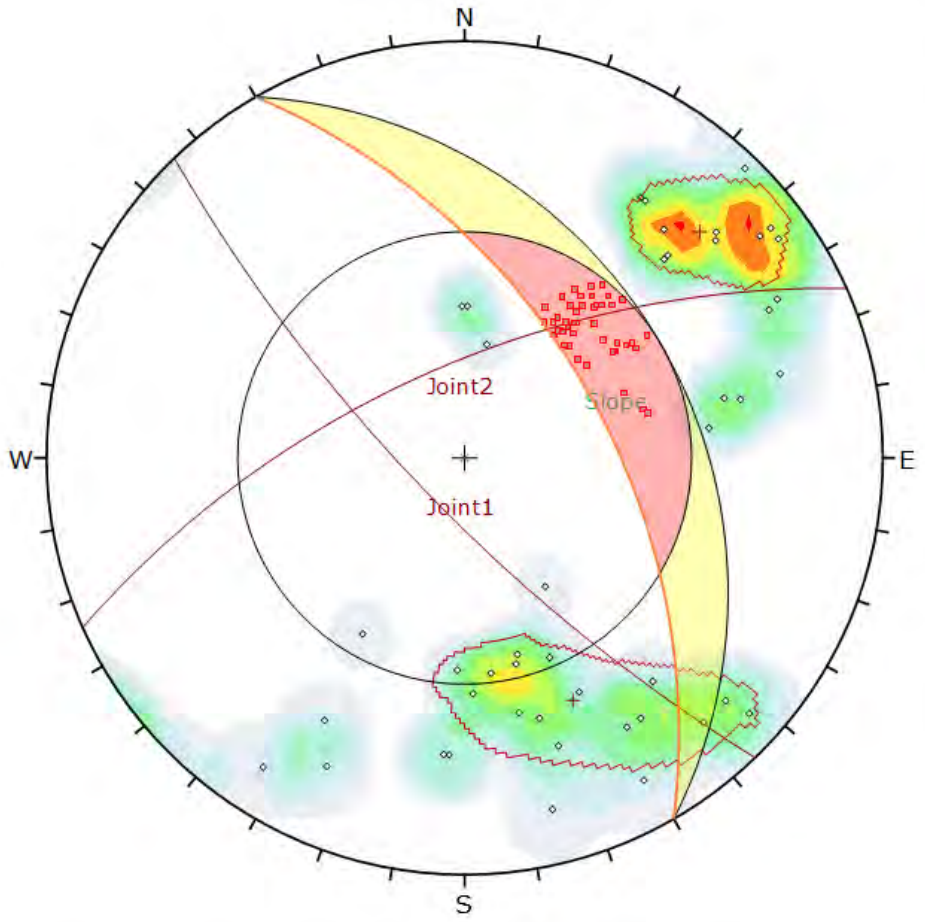
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/060 - PLanar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-060_Planar.dips8

Slope: 53/060 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	53		
Slope Dip Direction	60		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	45	990	4.55%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	60	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

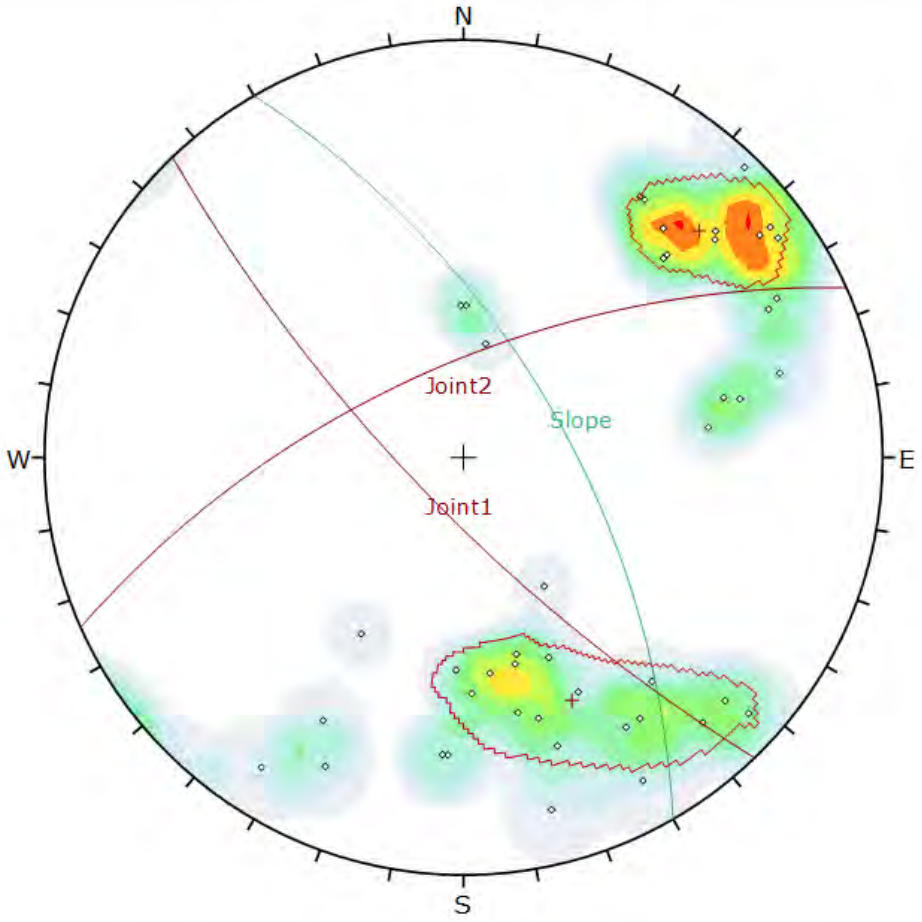
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/060 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-060_Wedge.dips8

Slope: 63/060 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	60	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

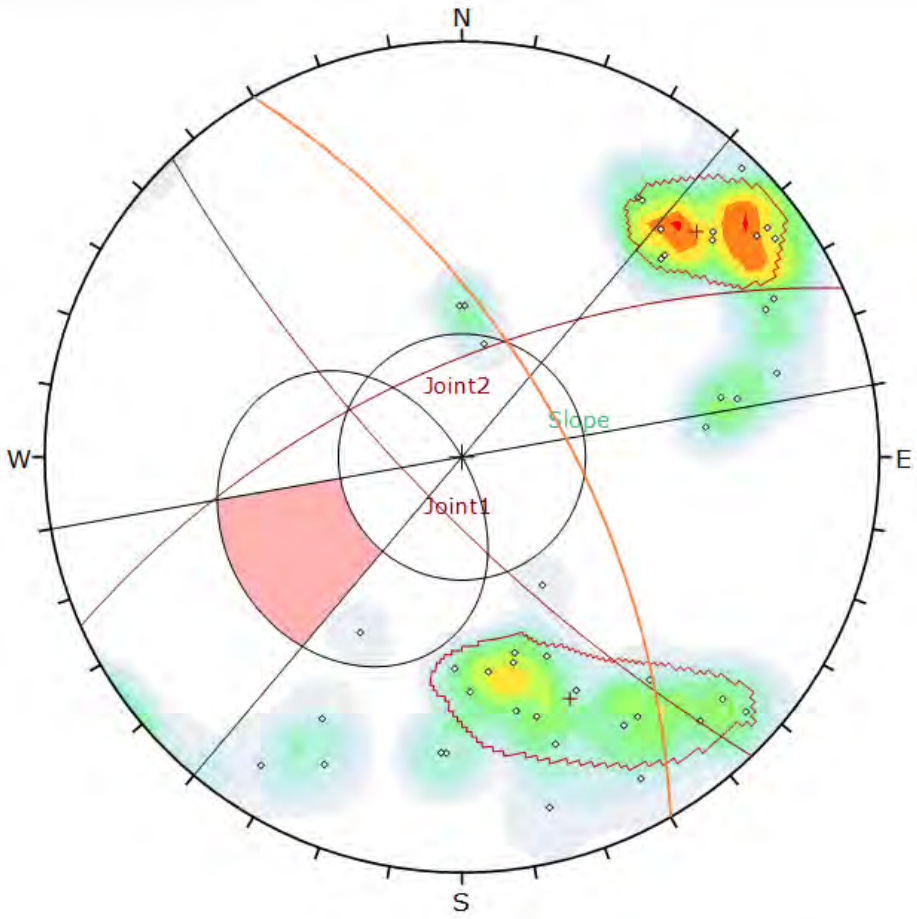
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/060		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-060.dips8

Slope: 63/060 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	63
Slope Dip Direction	60
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	60	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

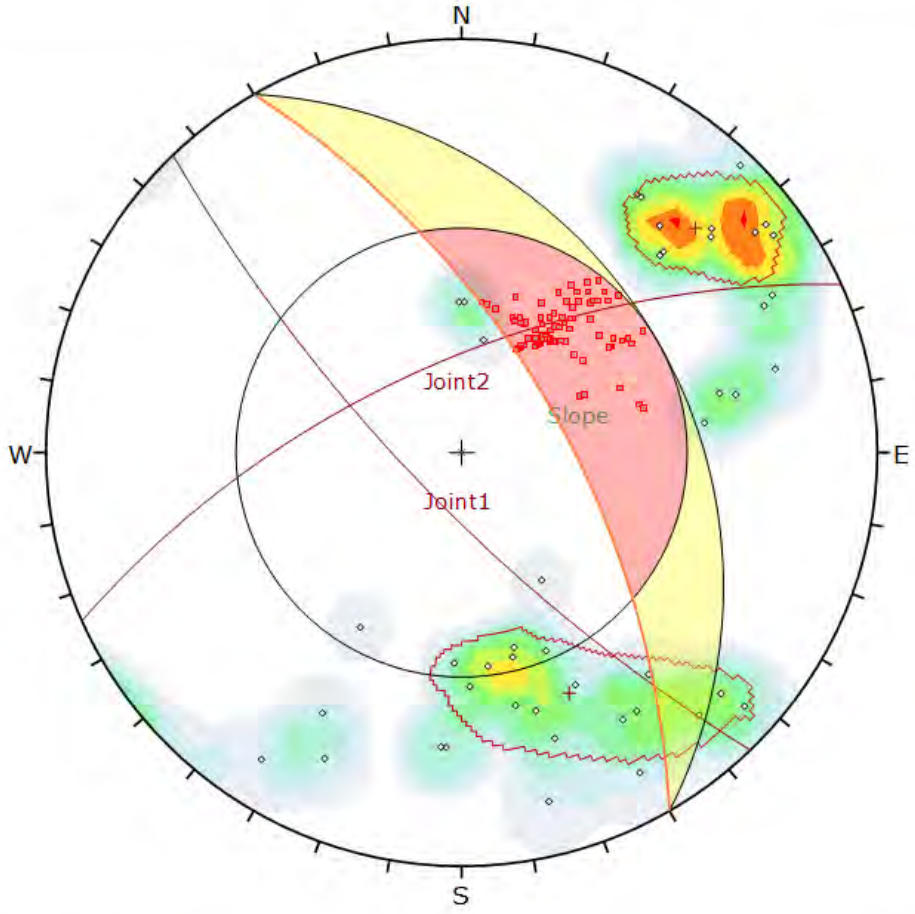
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/060 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-060-Planar.dips8

Slope: 63/060 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	63
Slope Dip Direction	60
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	87	990	8.79%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	60	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

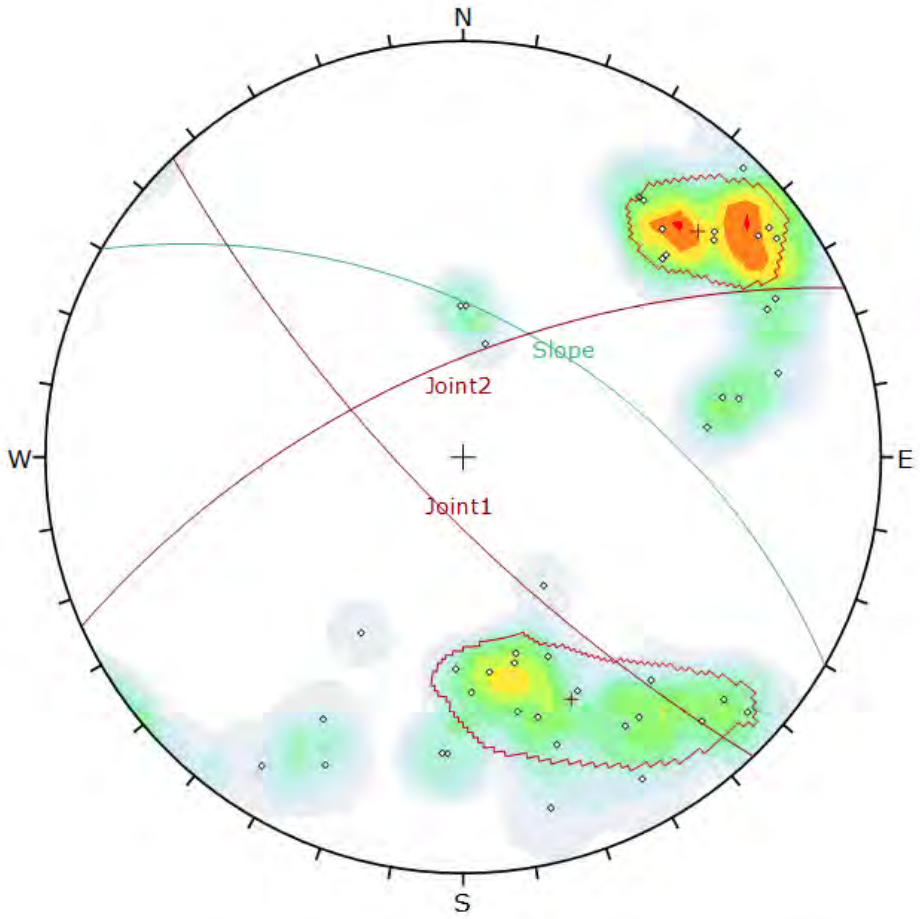
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/060 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-060-Wedge.dips8

Slope: 53/030 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	30	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

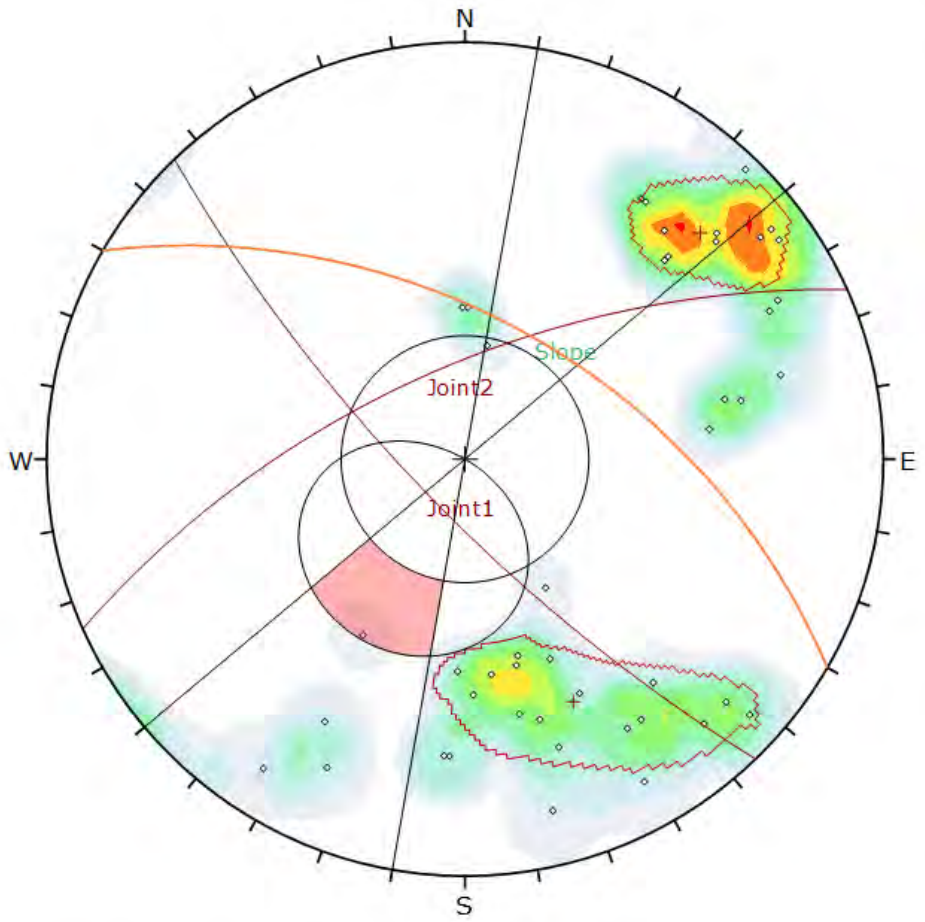
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/030		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-030.dips8

Slope: 53/030 – Planar Failure



Symbol	Feature
◦	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	30
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	1	45	2.22%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	30	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

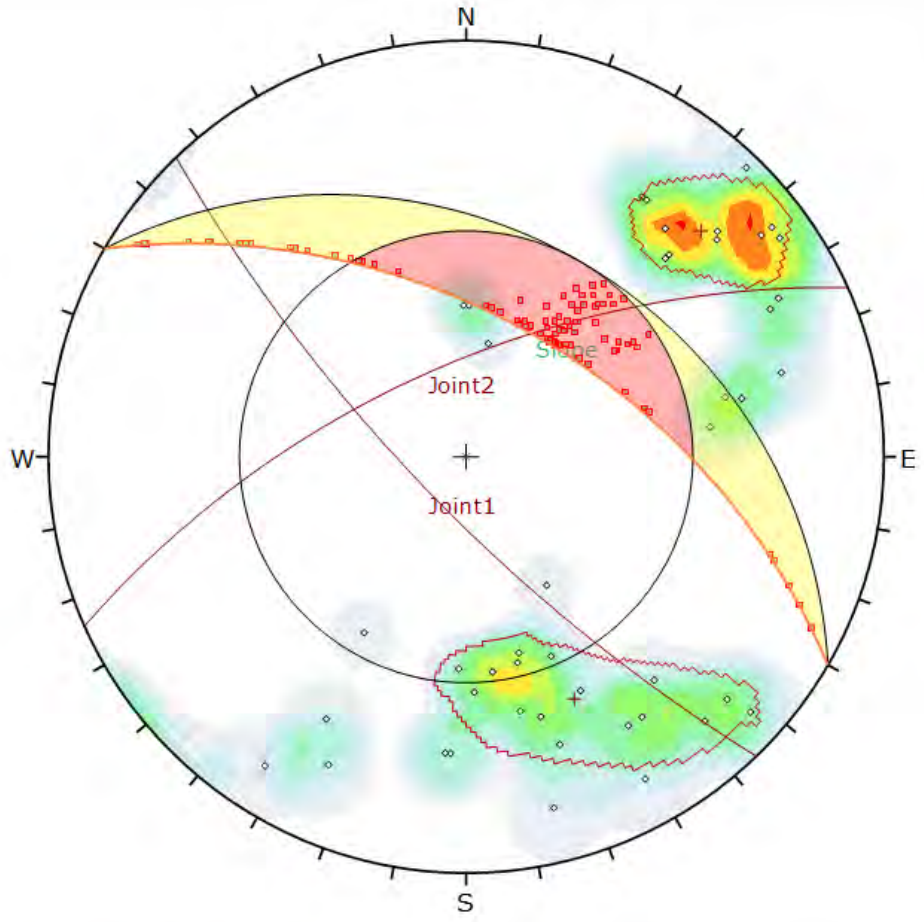
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/030 - Planar Failure		
Drawn By	JPS	*Company*	Delve Underground
Date	9/7/2023	*File Name*	CoffinButte_53-030-Planar.dips8

Slope: 53/030 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	53		
Slope Dip Direction	30		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	92	990	9.29%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	30	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

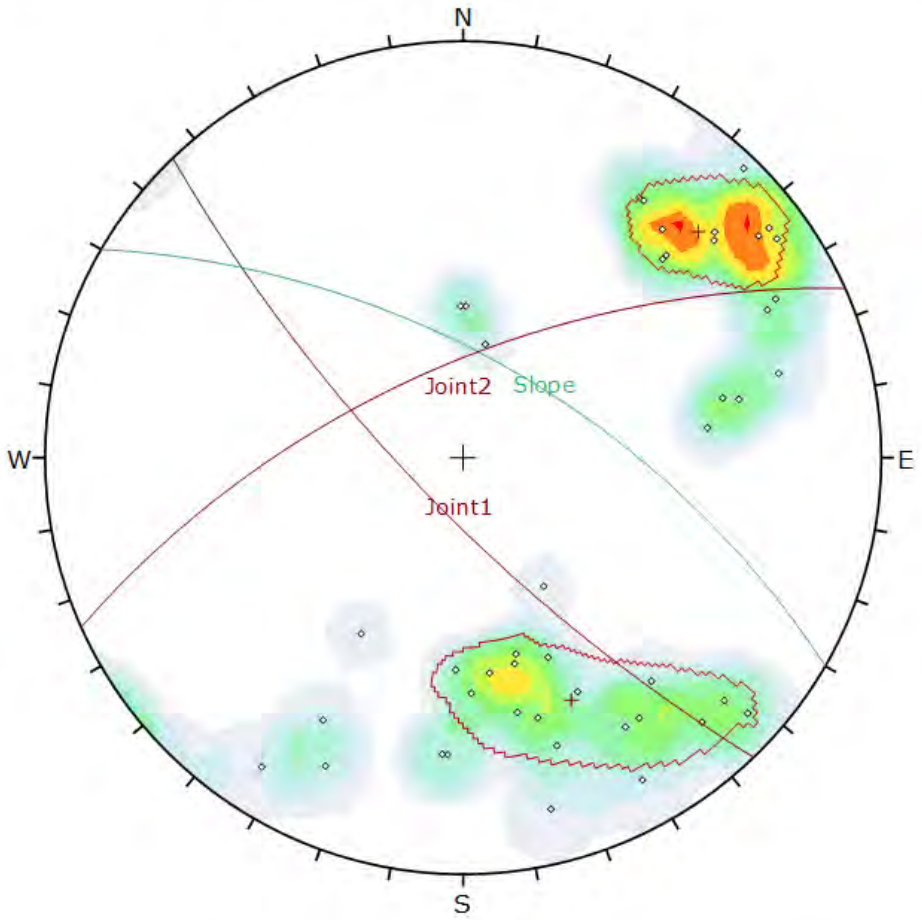
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/030 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-030-Wedge.dips8

Slope: 63/030 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	30	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

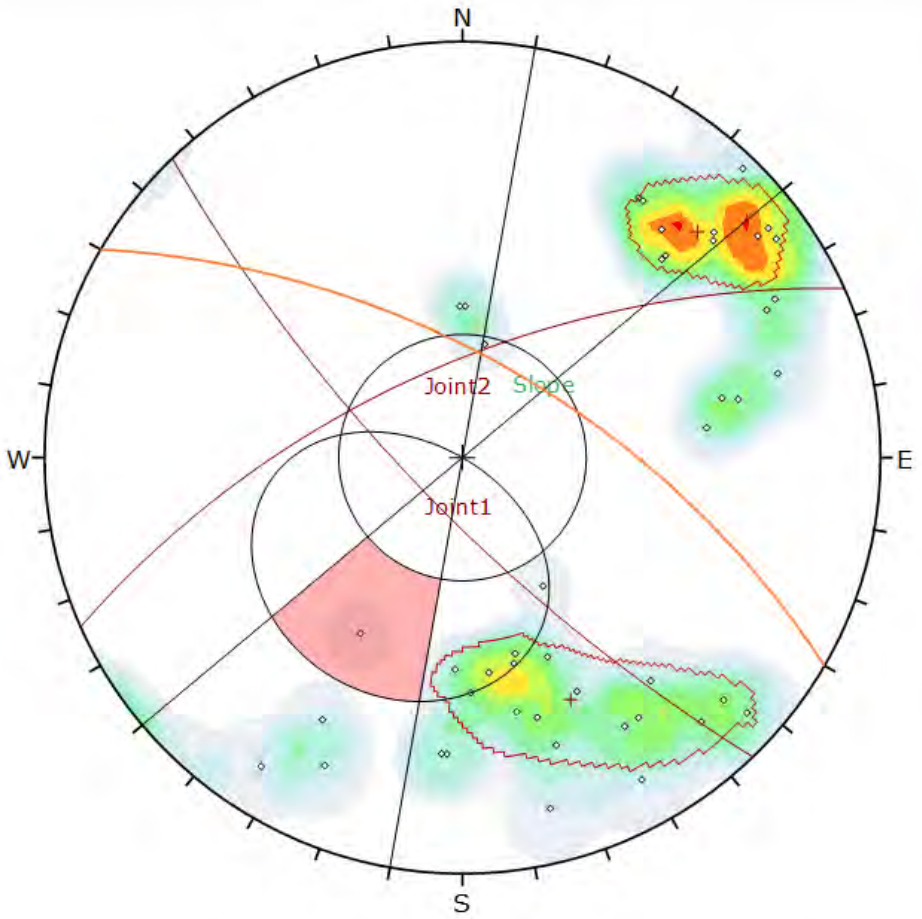
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/030		
Drawn By	JPS	*Company*	Delve Underground
Date	9/7/2023	*File Name*	CoffinButte_63-030.dips8

Slope: 63/030 – Planar Failure



Symbol	Feature
◦	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	63
Slope Dip Direction	30
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	1	45	2.22%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	30	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

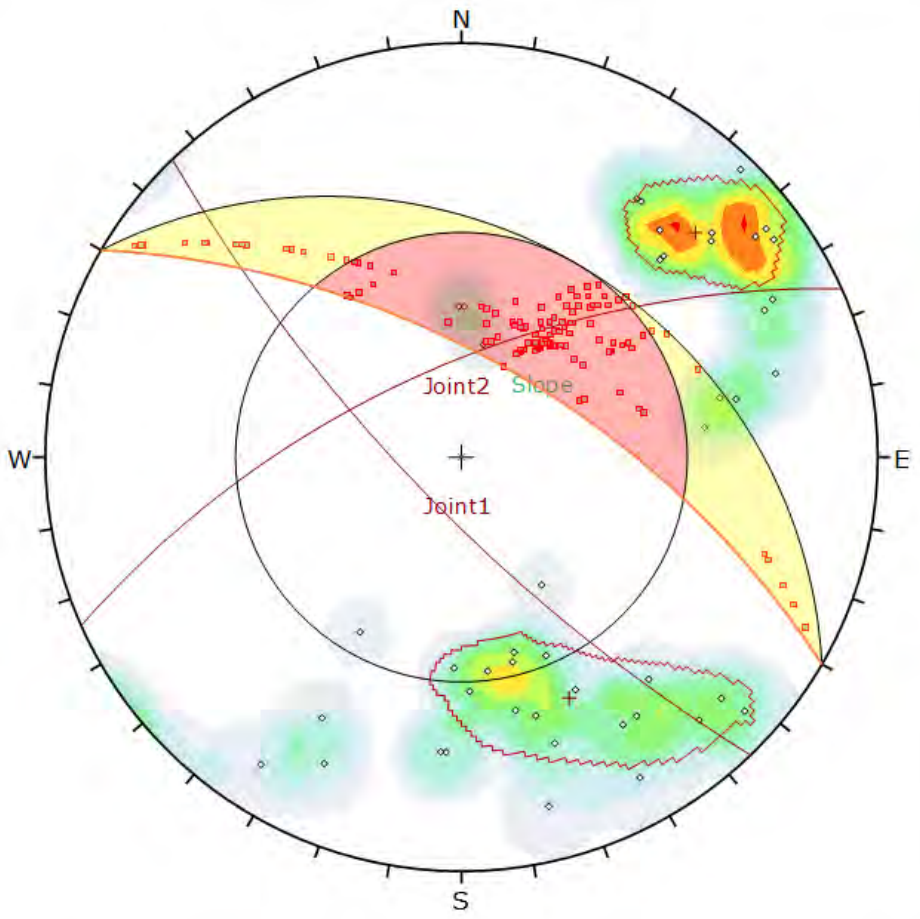
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/030 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-030-Planar.dips8

Slope: 63/030 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
■	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	63
Slope Dip Direction	30
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	128	990	12.93%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	30	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

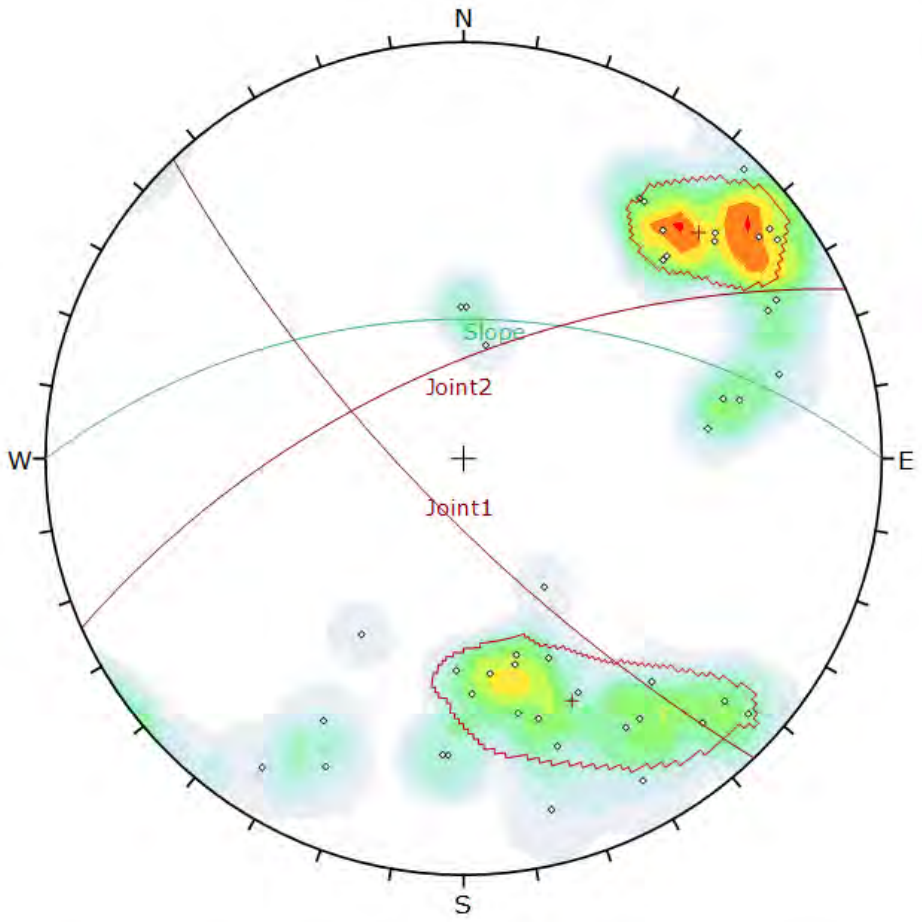
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/030 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-030-Wedge.dips8

Slope: 53/000 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	360	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

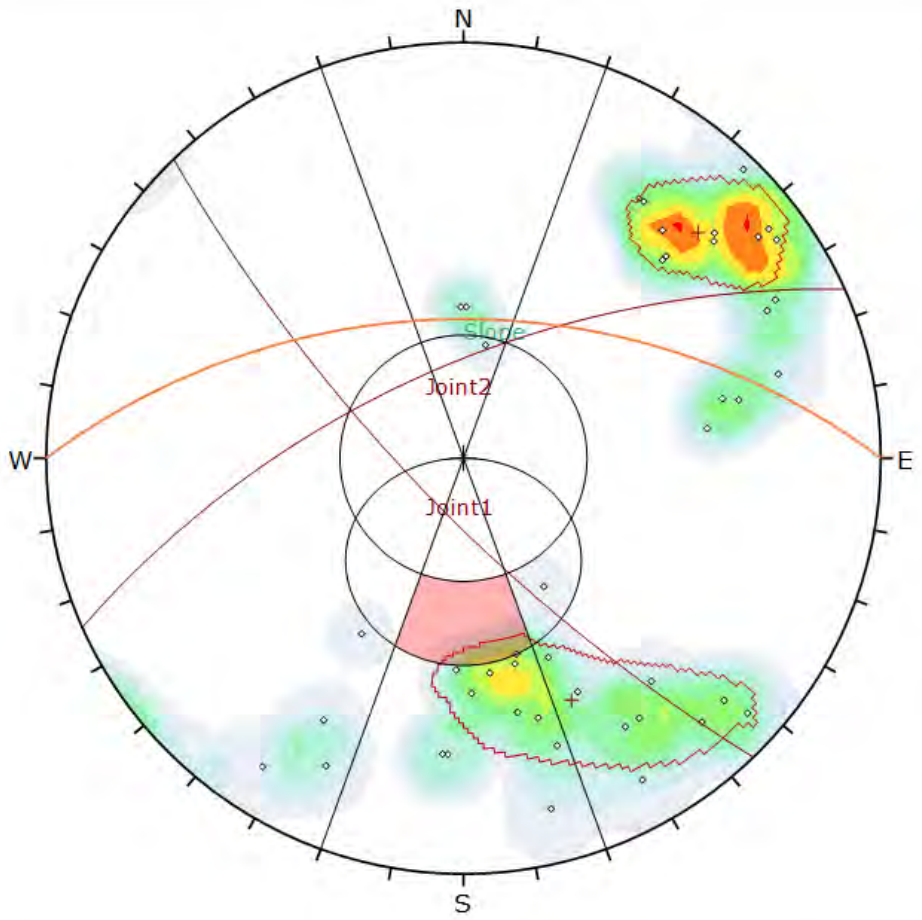
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/000		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-000.dips8

Slope: 53/000 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	0
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	1	45	2.22%
Planar Sliding (Set 2: Joint2)	1	16	6.25%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	360	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

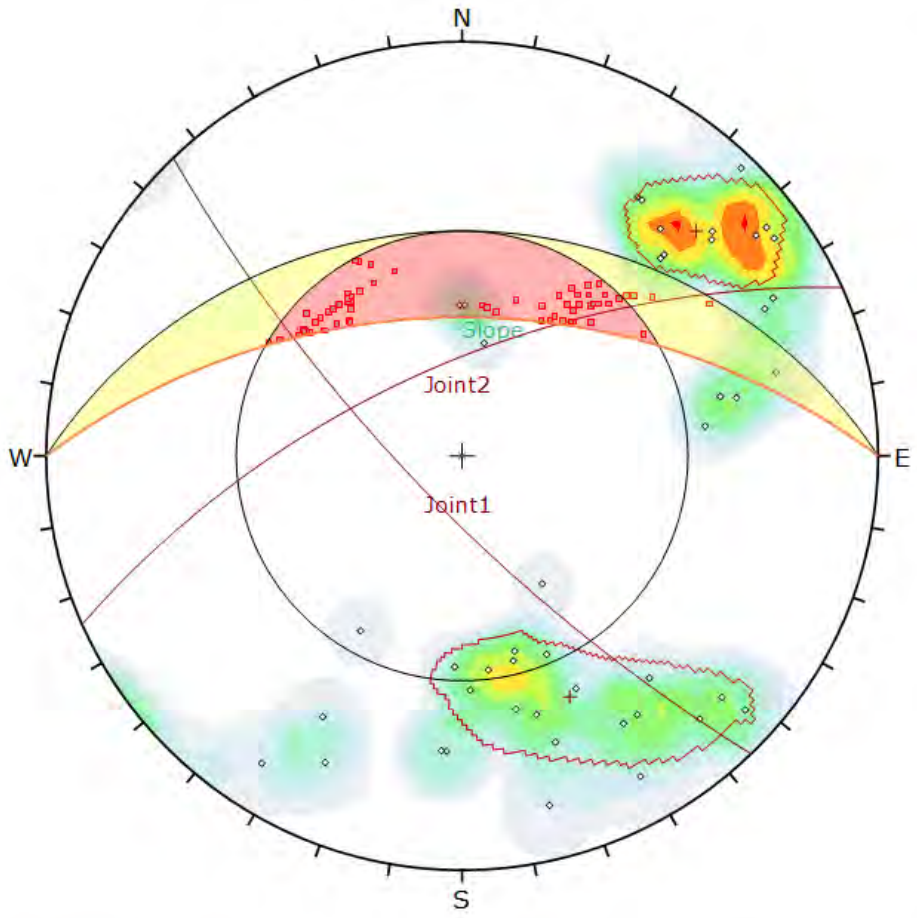
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/000 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-000-Planar.dips8

Slope: 53/000 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	53
Slope Dip Direction	0
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	67	990	6.77%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	360	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

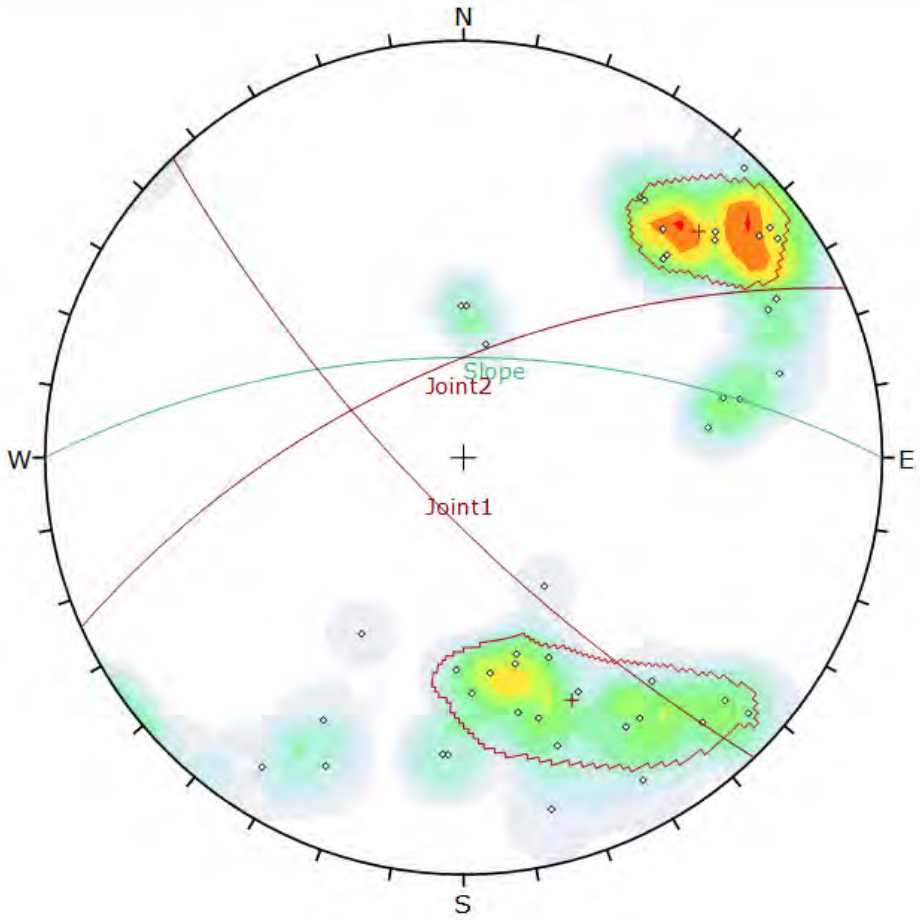
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/000 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-000-Wedge.dips8

Slope: 63/000 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	360	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

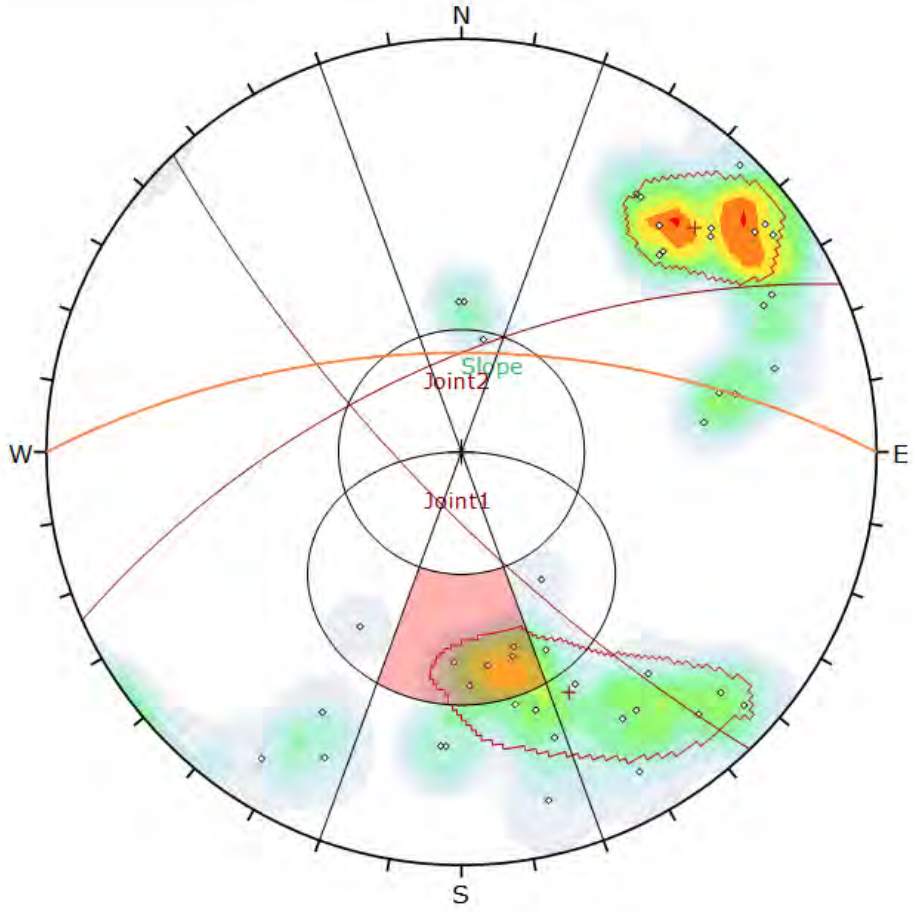
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/000		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-000.dips8

Slope: 63/000 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	63
Slope Dip Direction	0
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	5	45	11.11%
Planar Sliding (Set 2: Joint2)	5	16	31.25%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	360	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		66	336	Joint2

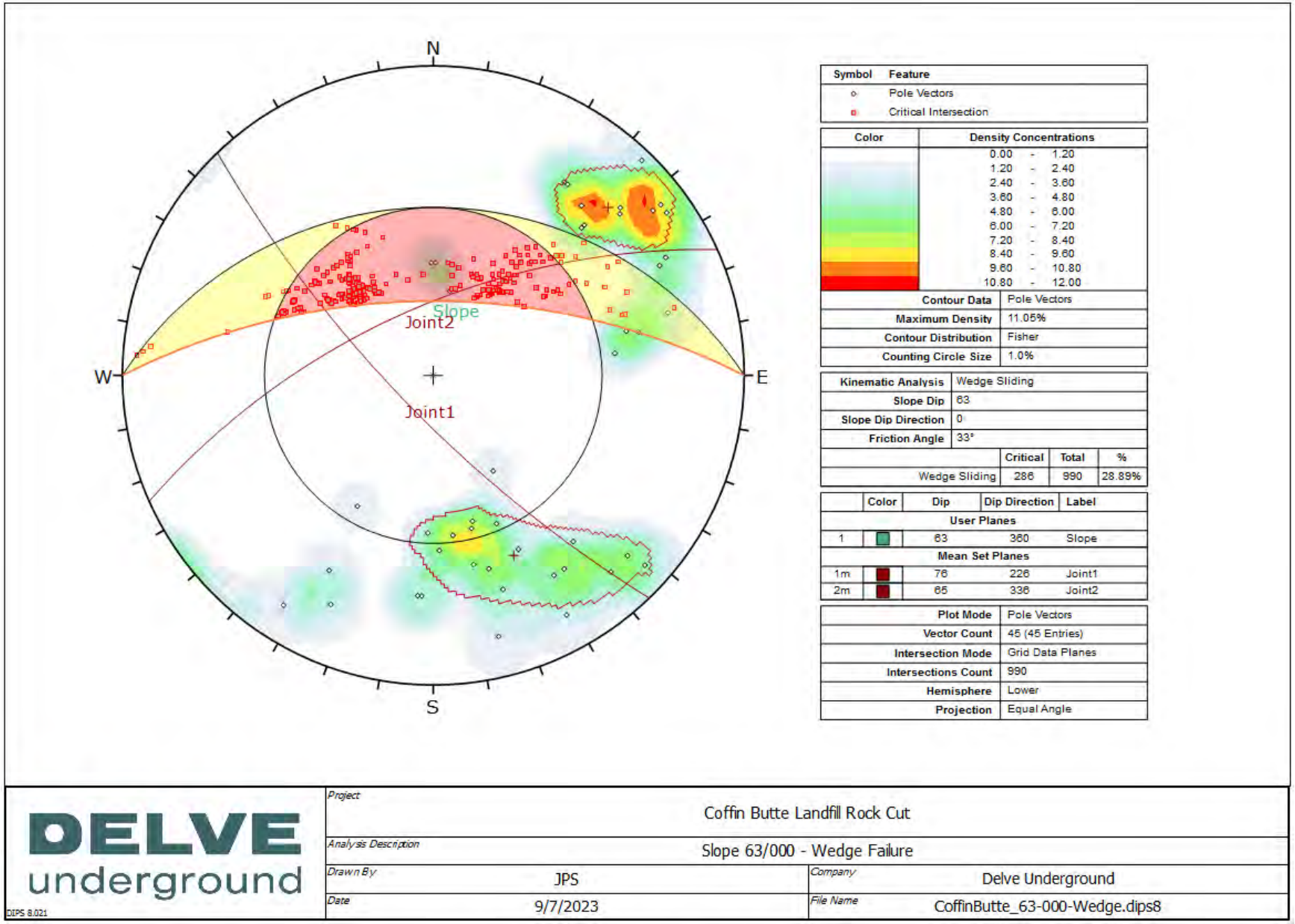
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/000 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-000-Planar.dips8

Slope: 63/000 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	63
Slope Dip Direction	0
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	286	990	28.89%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	360	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

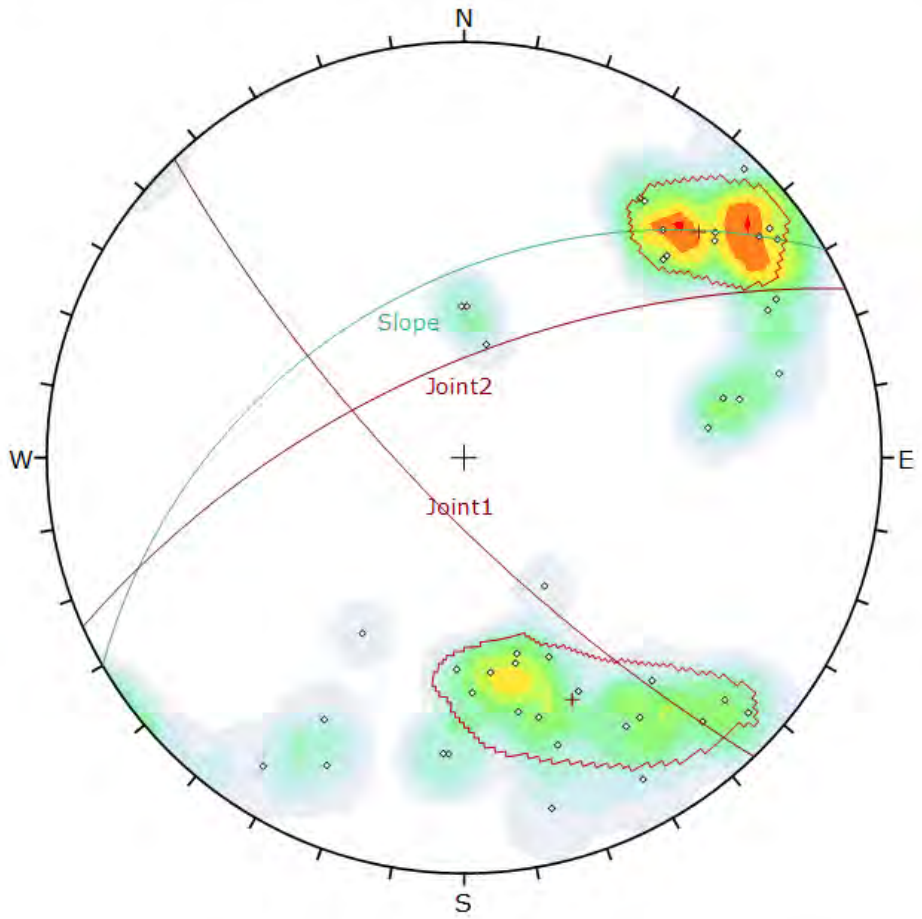
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/000 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-000-Wedge.dips8

Slope: 45/330 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

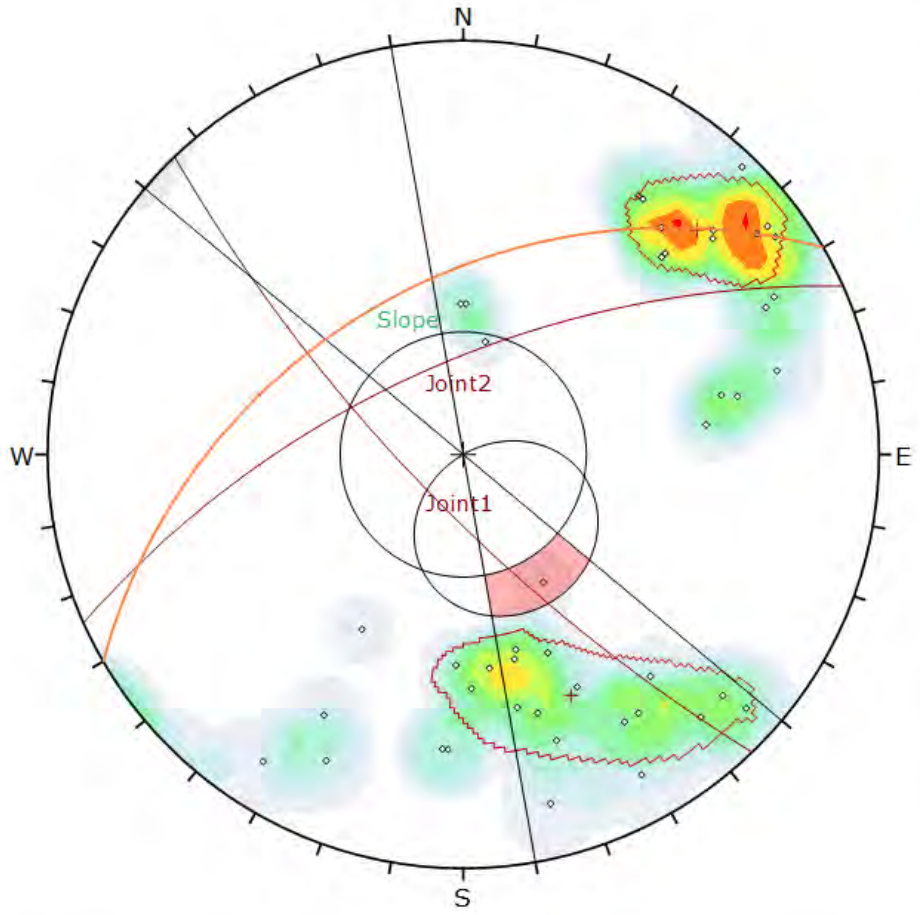
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/330		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-330.dips8

Slope: 45/330 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding		
Slope Dip	45		
Slope Dip Direction	330		
Friction Angle	33°		
Lateral Limits	20°		
	Critical	Total	%
Planar Sliding (All)	1	45	2.22%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

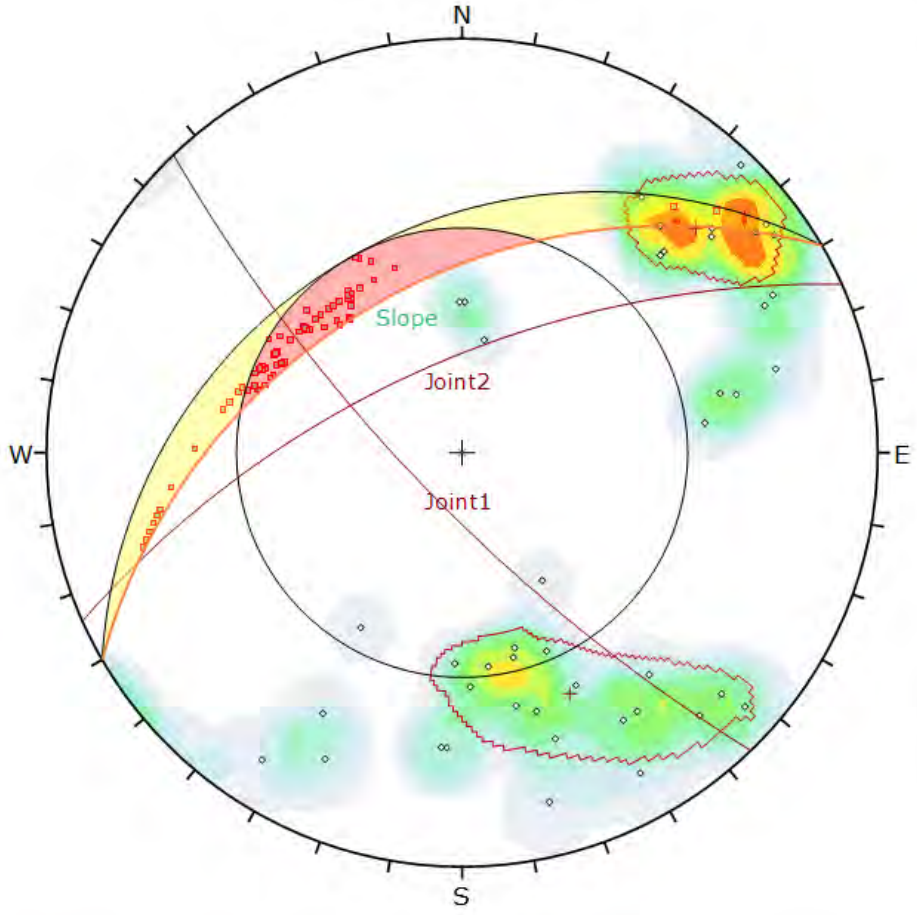
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/330 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-330_Planar.dips8

Slope: 45/330 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	45		
Slope Dip Direction	330		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	77	990	7.78%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		85	336	Joint2

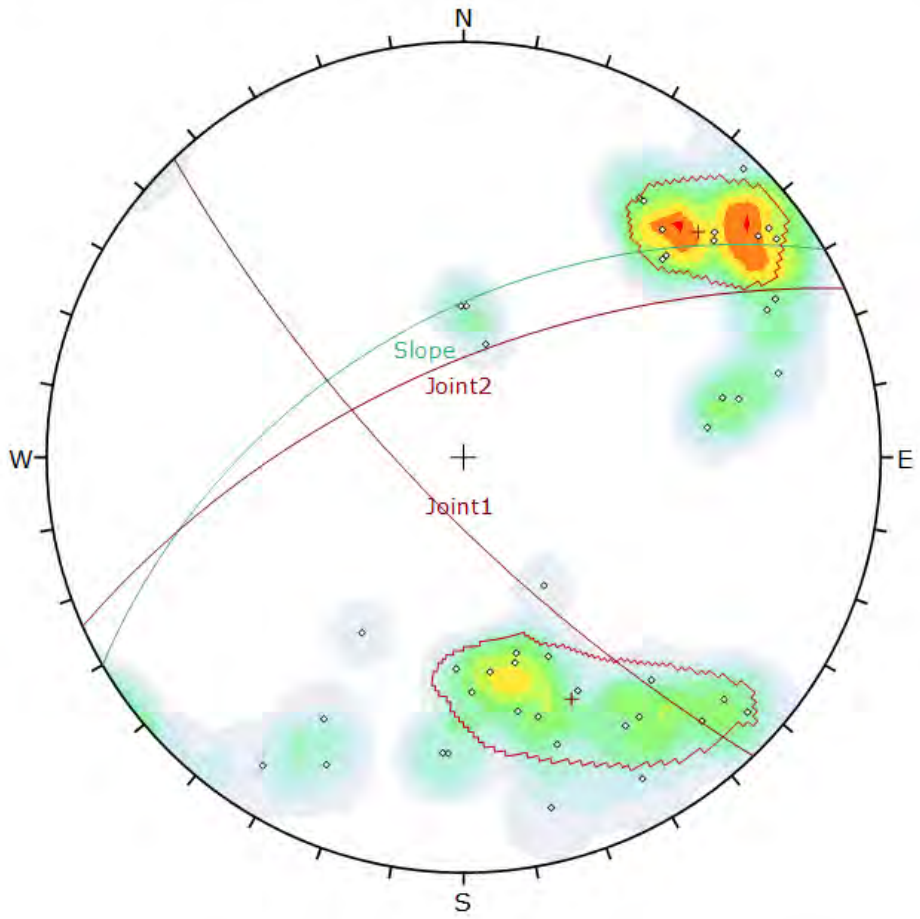
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/330 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-330_Wedge.dips8

Slope: 53/330 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

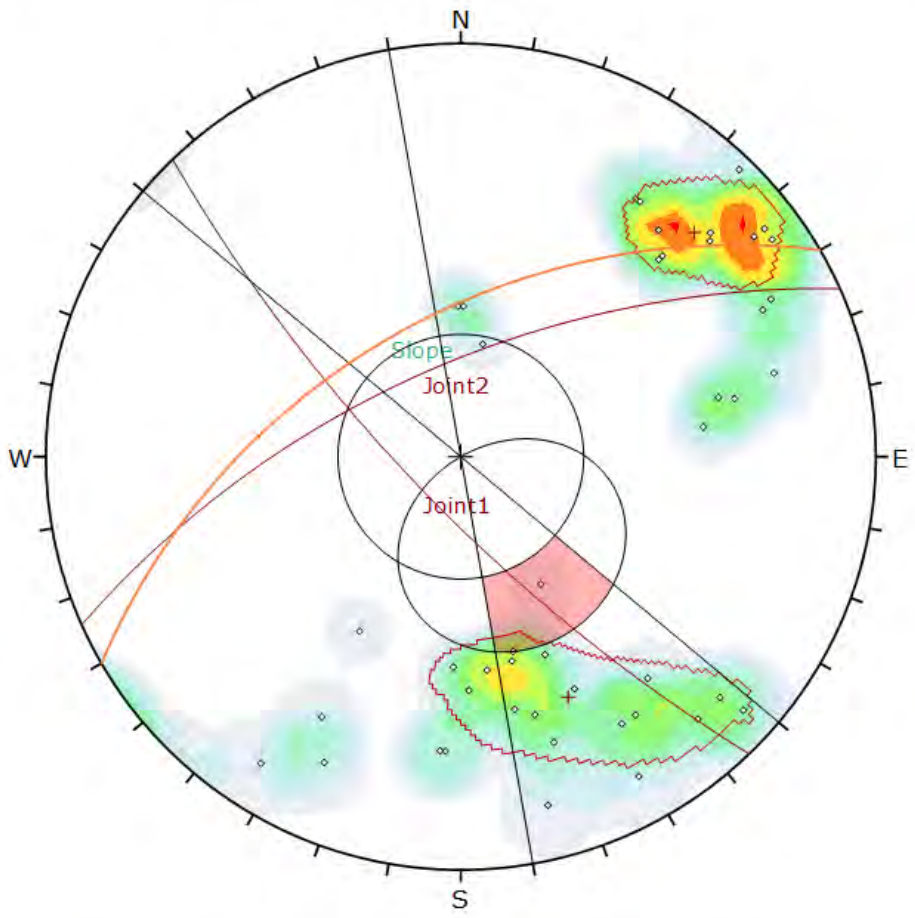
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/330		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-330.dips8

Slope: 53/330 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	330
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	2	45	4.44%
Planar Sliding (Set 2: Joint2)	1	16	6.25%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

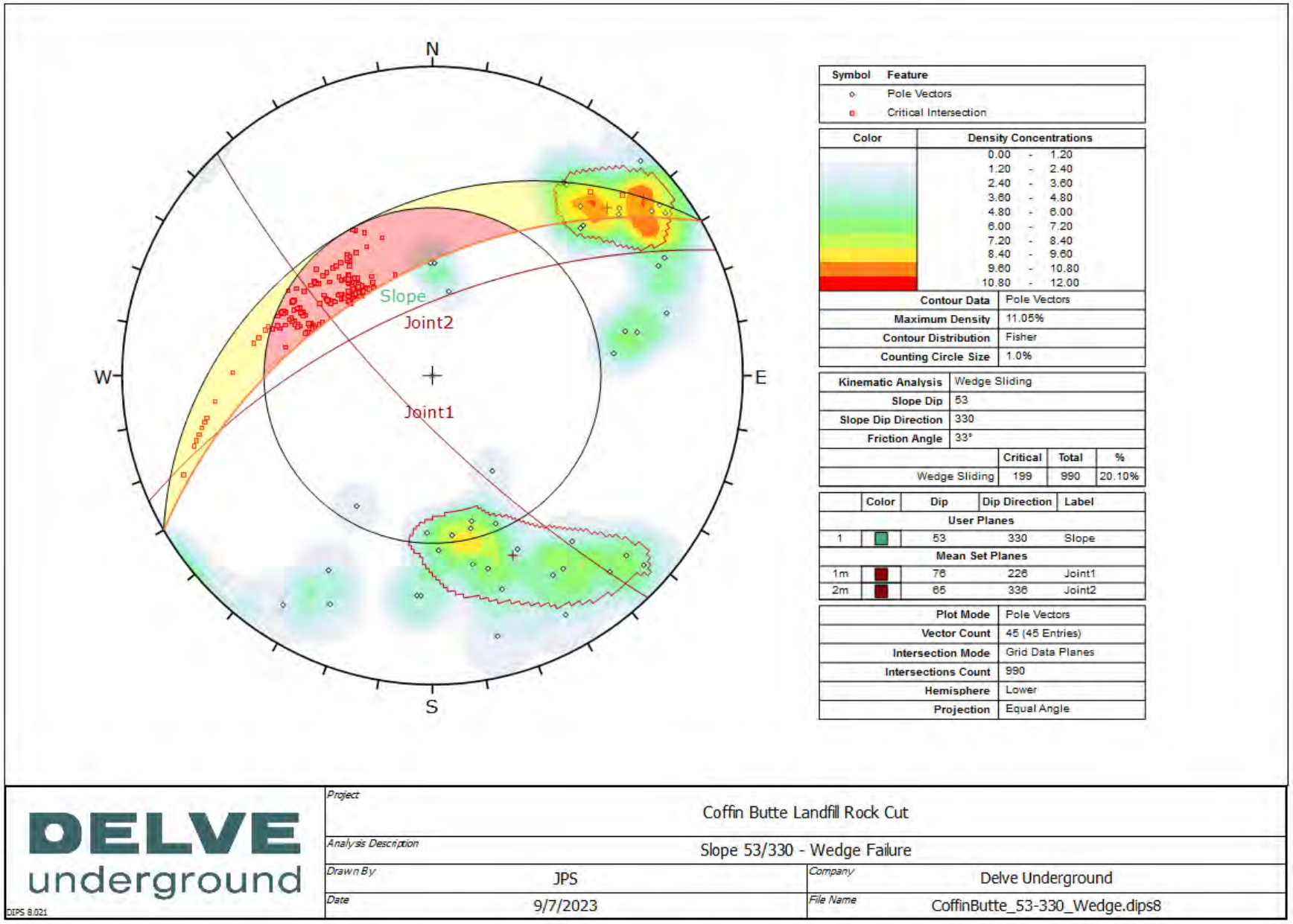
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/330 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-330_Planar.dips8

Slope: 53/330 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	53
Slope Dip Direction	330
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	199	990	20.10%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

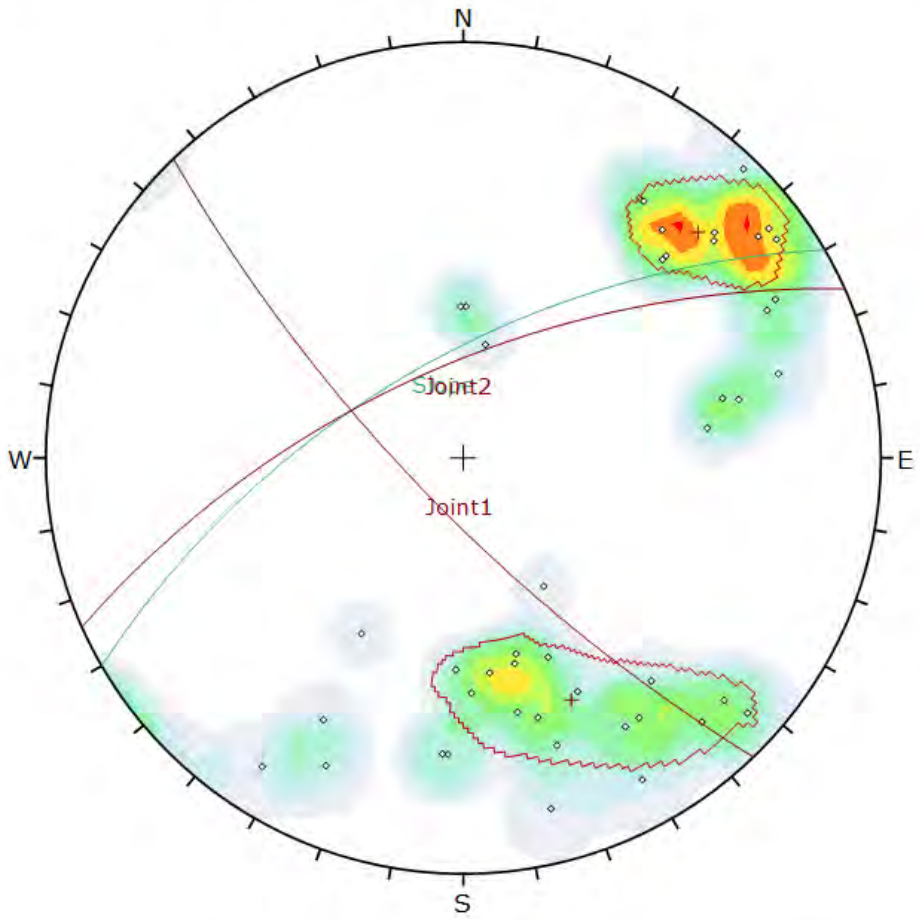
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/330 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-330_Wedge.dips8

Slope: 63/330 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

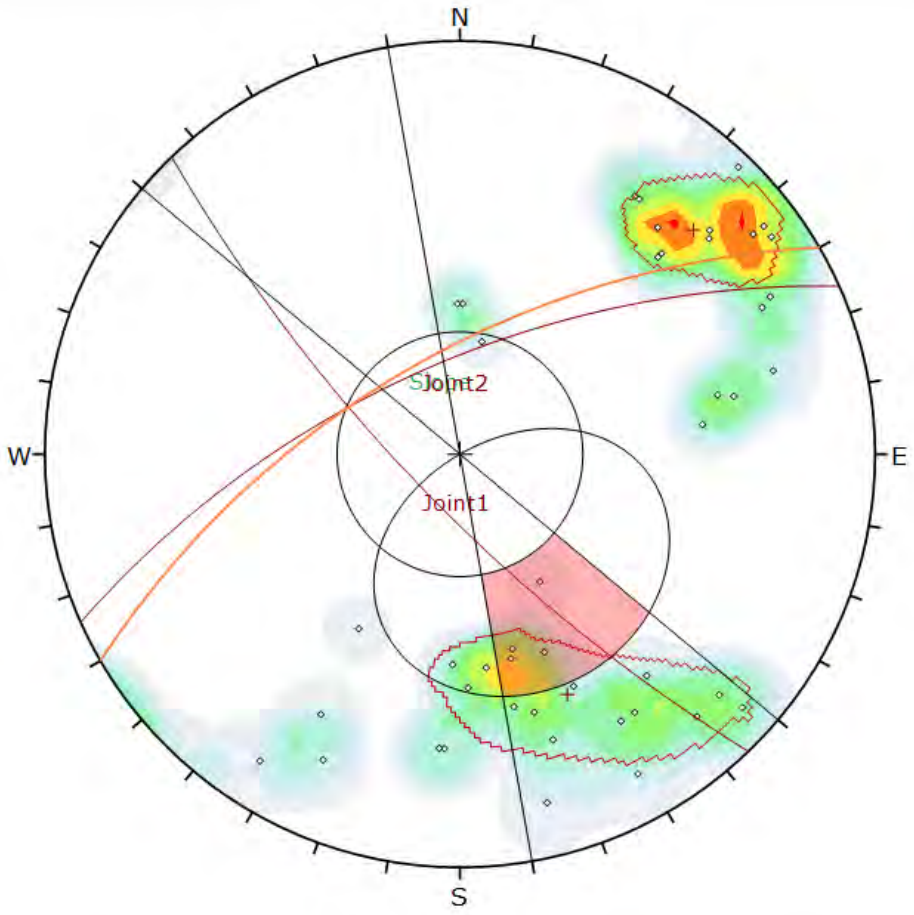
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/330		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-330.dips8

Slope: 63/330 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	63
Slope Dip Direction	330
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	4	45	8.89%
Planar Sliding (Set 2: Joint2)	3	16	18.75%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

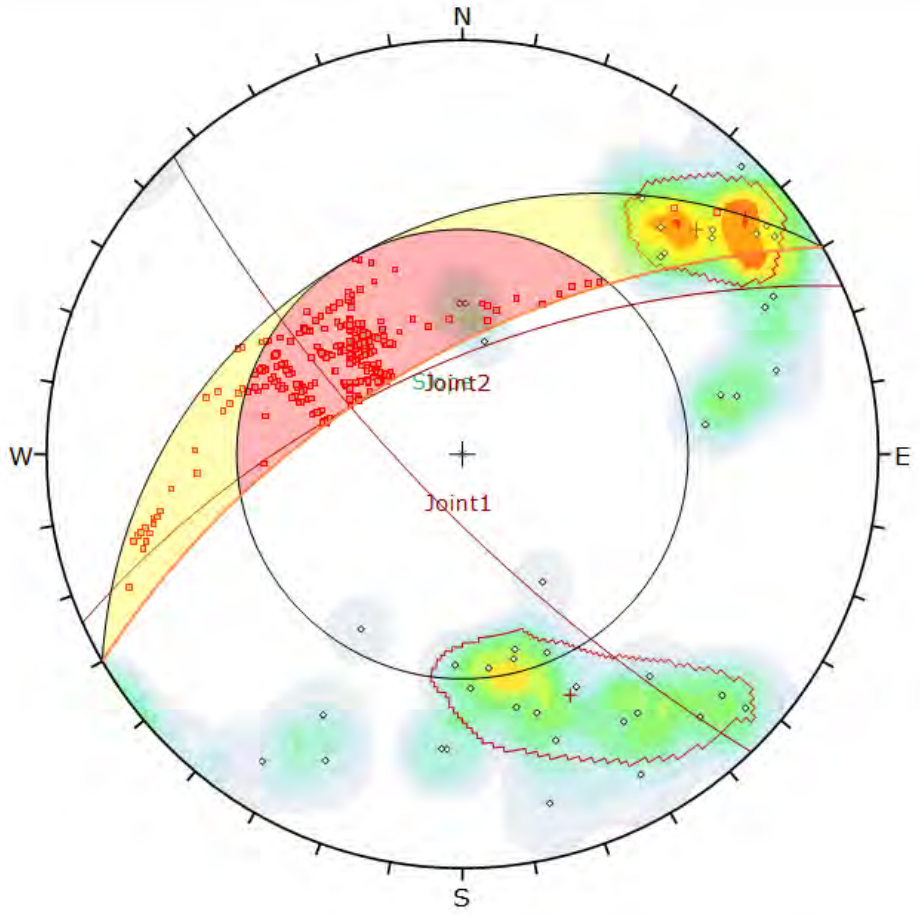
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/330 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-330_Planar.dips8

Slope: 63/330 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	63		
Slope Dip Direction	330		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	333	990	33.64%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	330	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

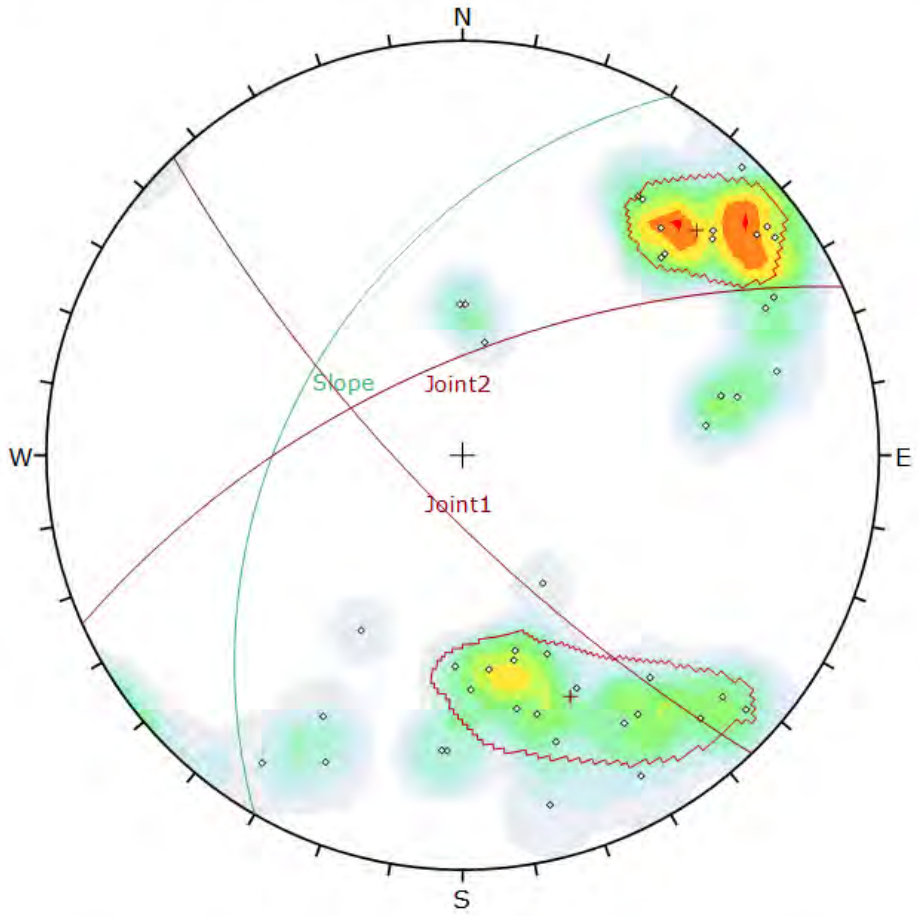
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/330 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-330_Wedge.dips8

Slope: 45/300 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

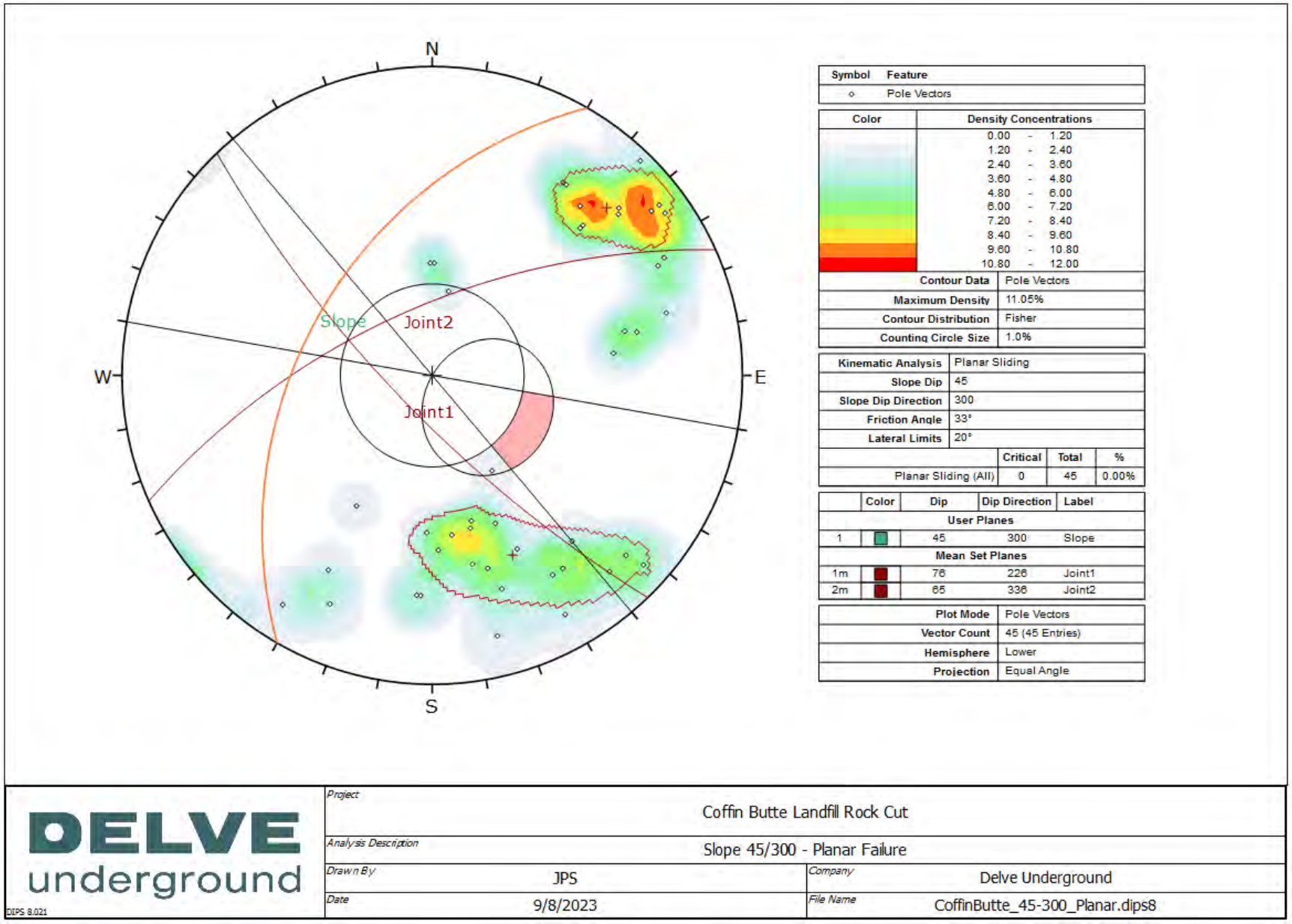
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/300		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-300.dips8

Slope: 45/300 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	45
Slope Dip Direction	300
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

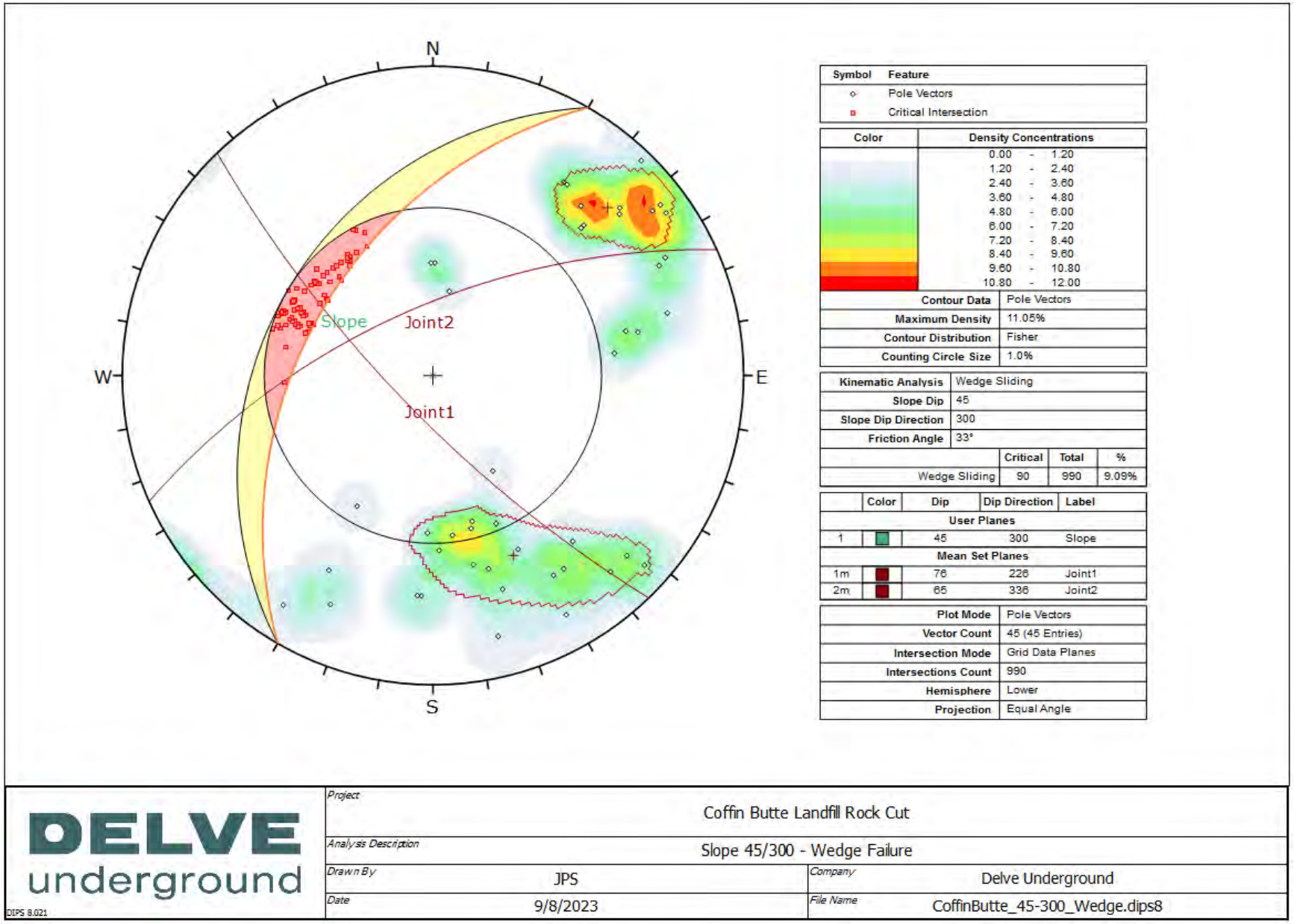
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/300 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-300_Planar.dips8

Slope: 45/300 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	45		
Slope Dip Direction	300		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	90	990	9.09%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

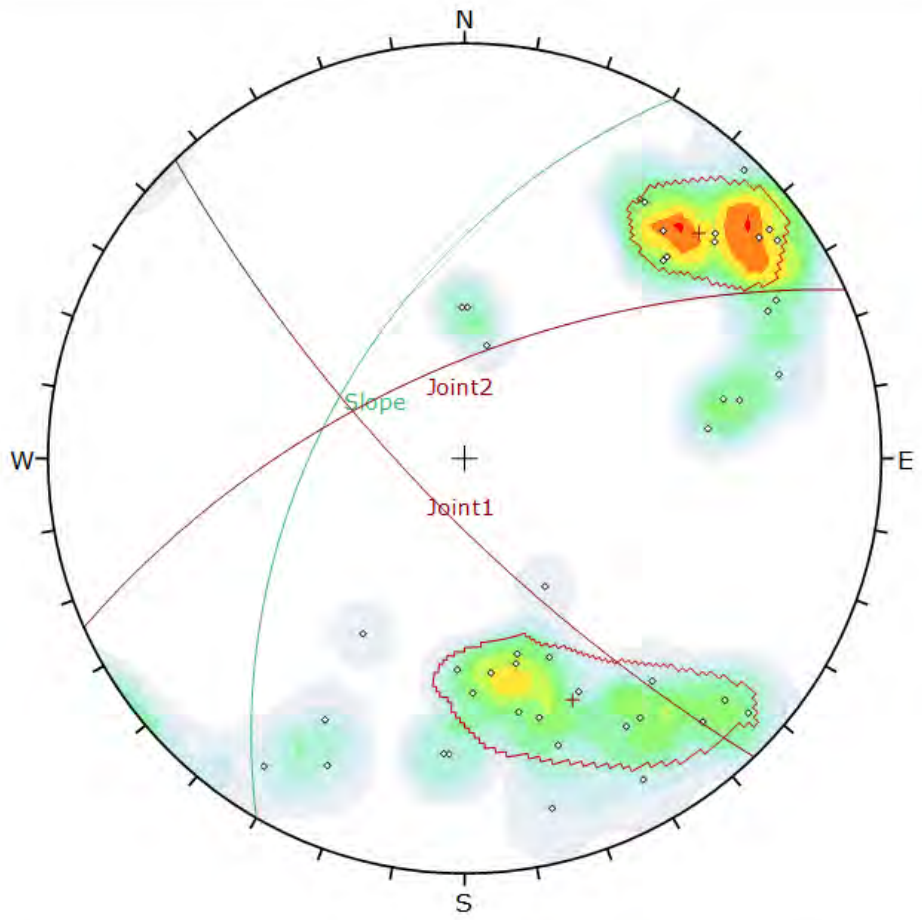
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/300 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-300_Wedge.dips8

Slope: 53/300 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

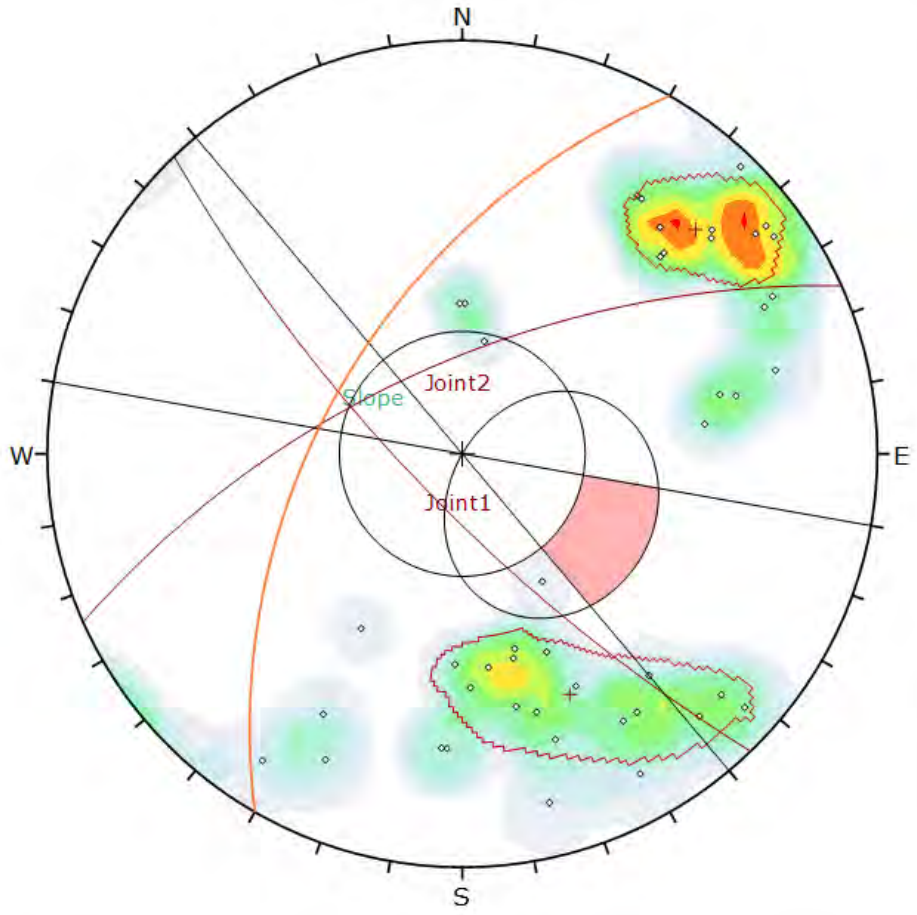
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/300		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-300.dips8

Slope: 53/300 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	300
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

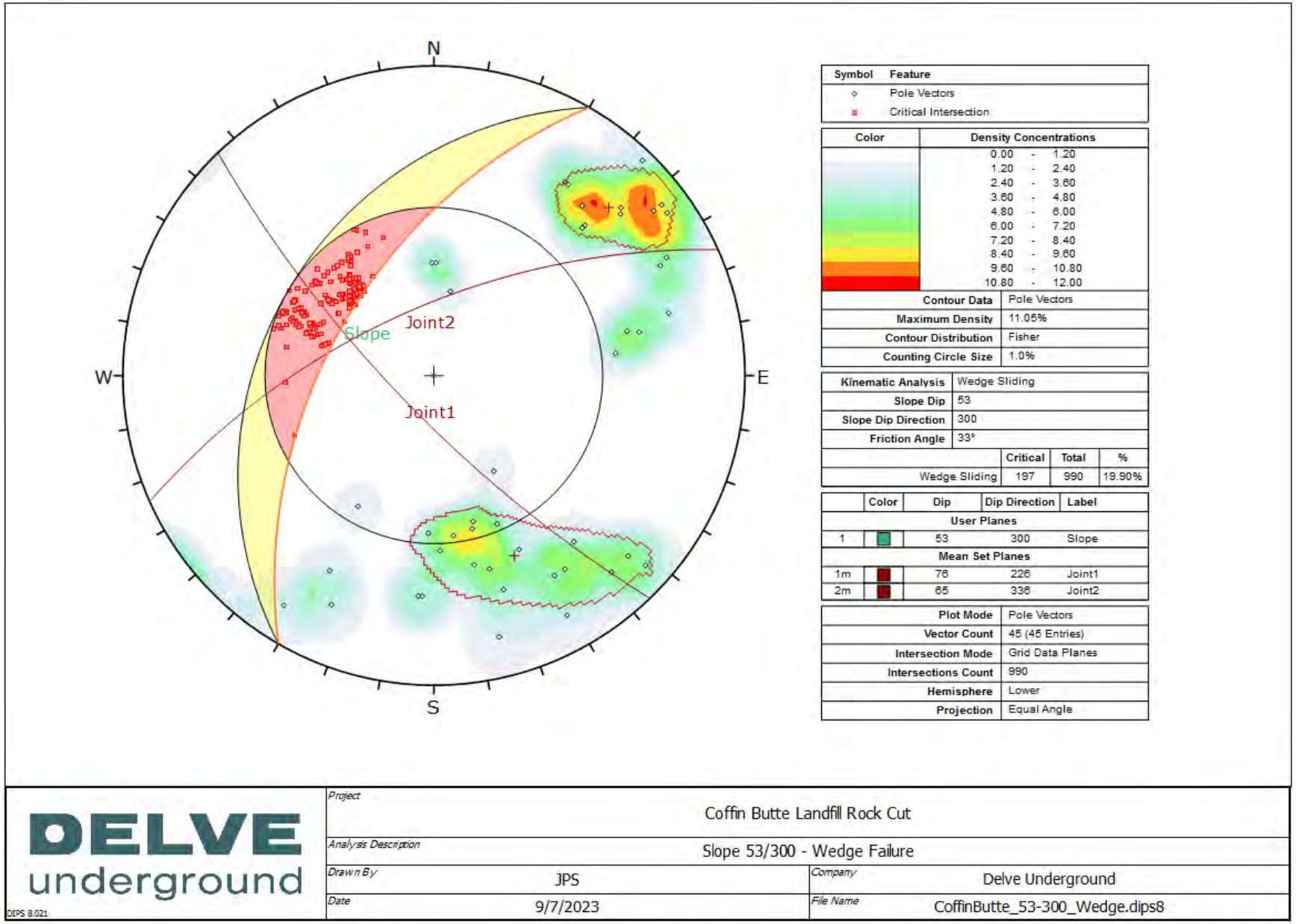
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/300 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-300_Planar.dips8

Slope: 53/300 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
■	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	53
Slope Dip Direction	300
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	197	990	19.90%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

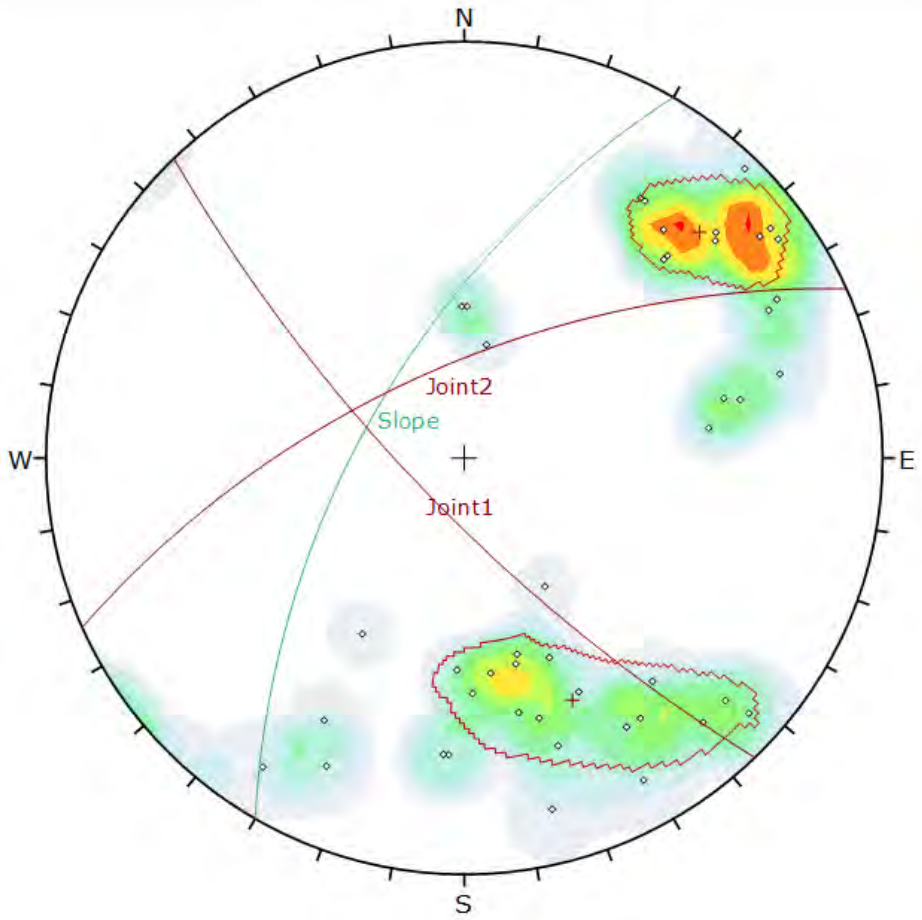
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/300 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_53-300_Wedge.dips8

Slope: 63/300 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

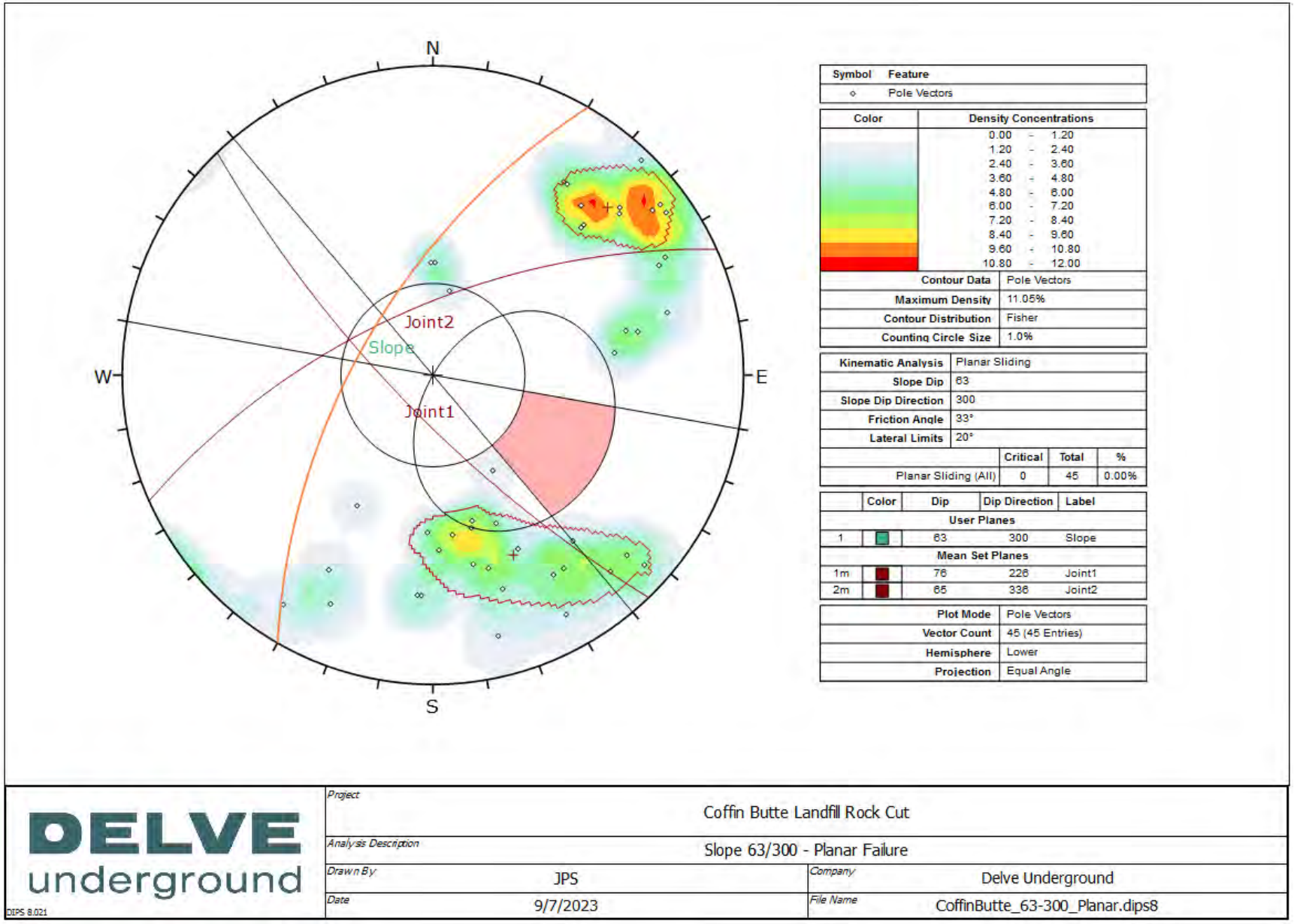
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/300		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-300.dips8

Slope: 63/300 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding		
Slope Dip	63		
Slope Dip Direction	300		
Friction Angle	33°		
Lateral Limits	20°		
	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

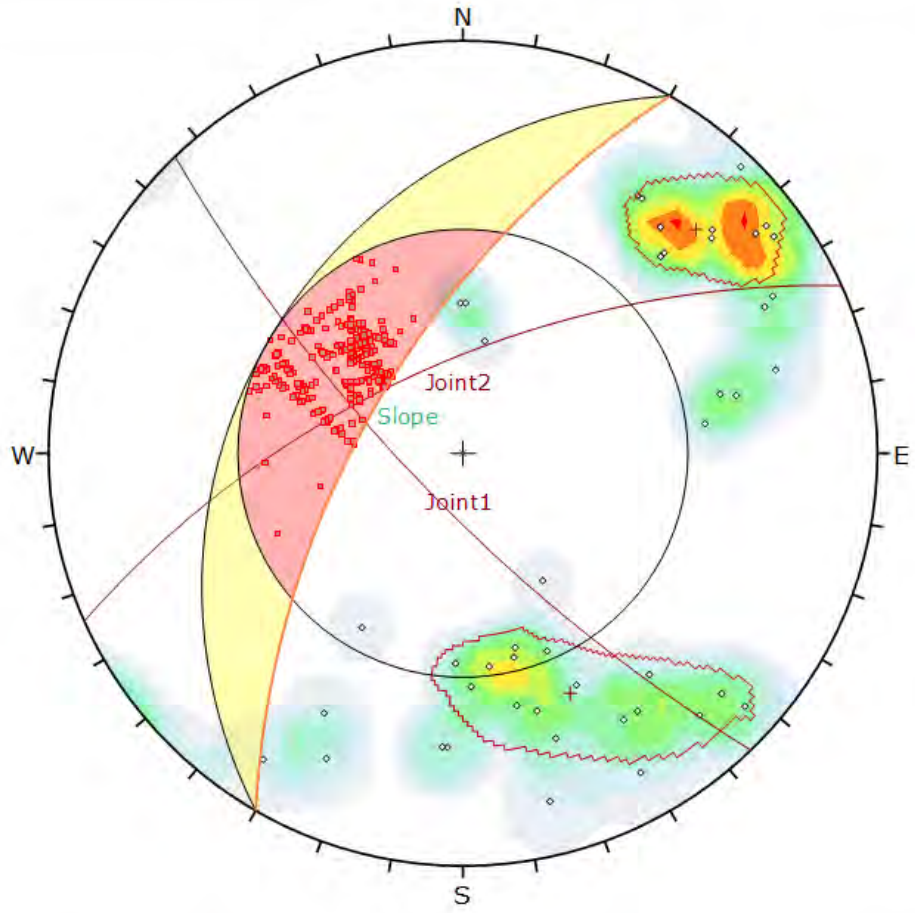
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/300 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-300_Planar.dips8

Slope: 63/300 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
■	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	63
Slope Dip Direction	300
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	317	990	32.02%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	300	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

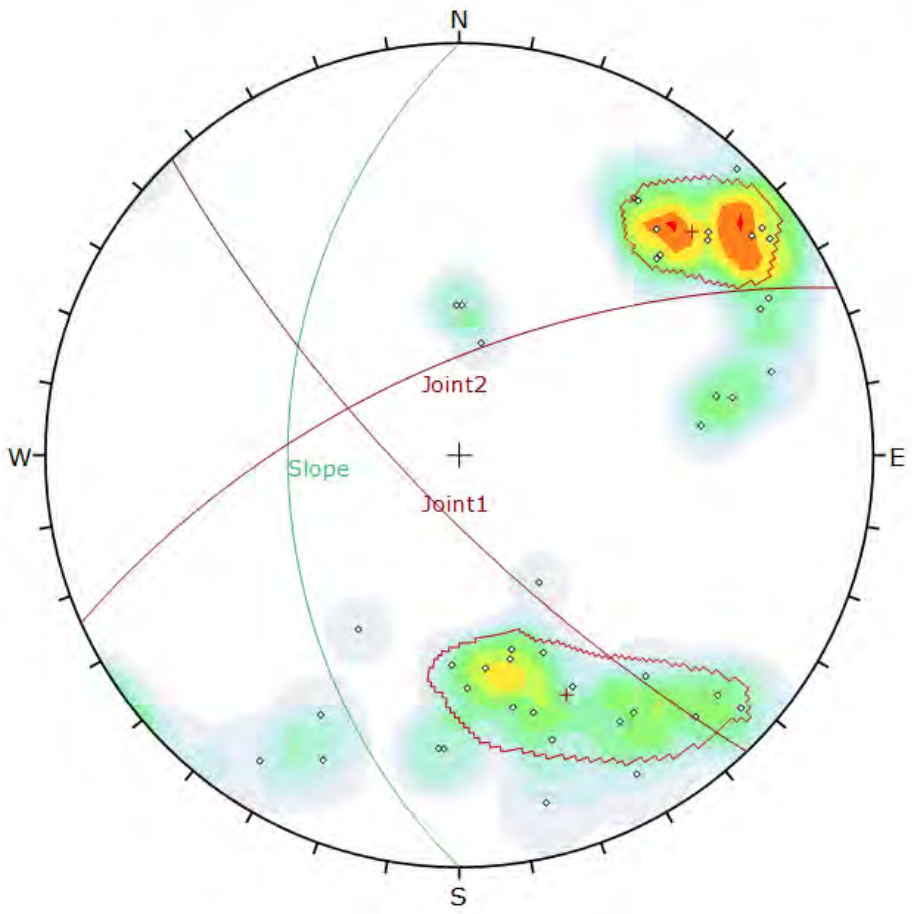
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/300 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/7/2023	File Name	CoffinButte_63-300_Wedge.dips8

Slope: 45/270 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

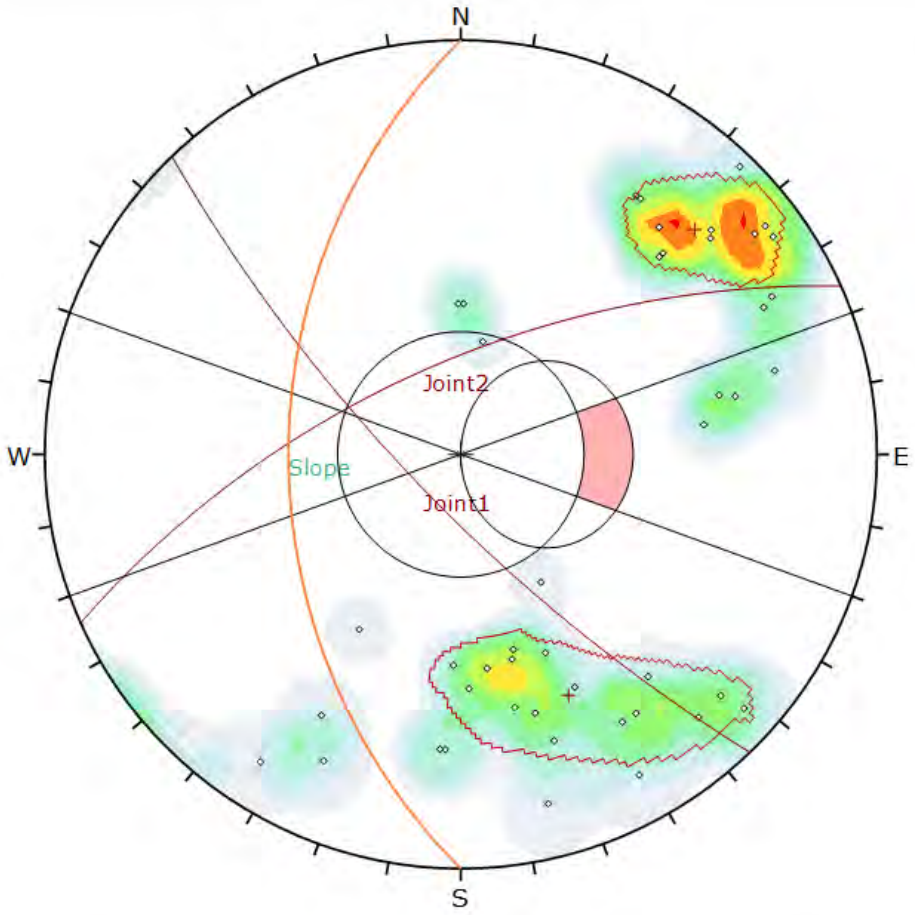
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/270		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-270.dips8

Slope: 45/270 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	45
Slope Dip Direction	270
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

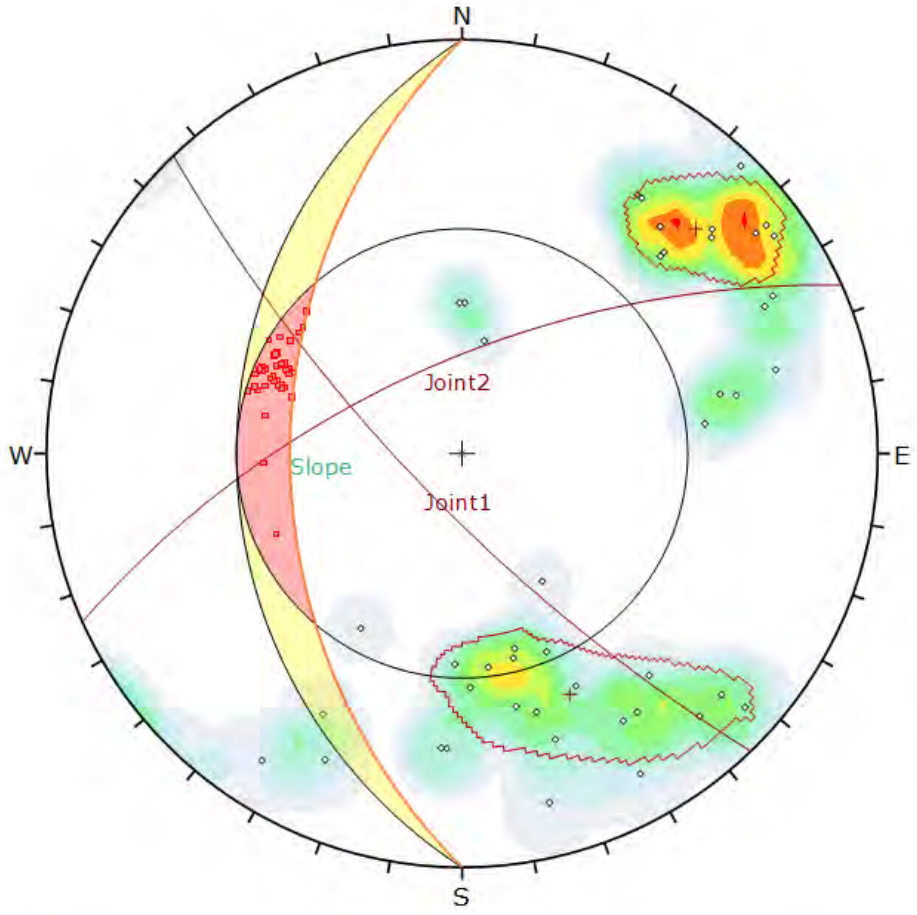
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/270 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-270_Planar.dips8

Slope: 45/270 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	45
Slope Dip Direction	270
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	47	990	4.75%

	Color	Dip	Dip Direction	Label
User Planes				
1		45	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		85	336	Joint2

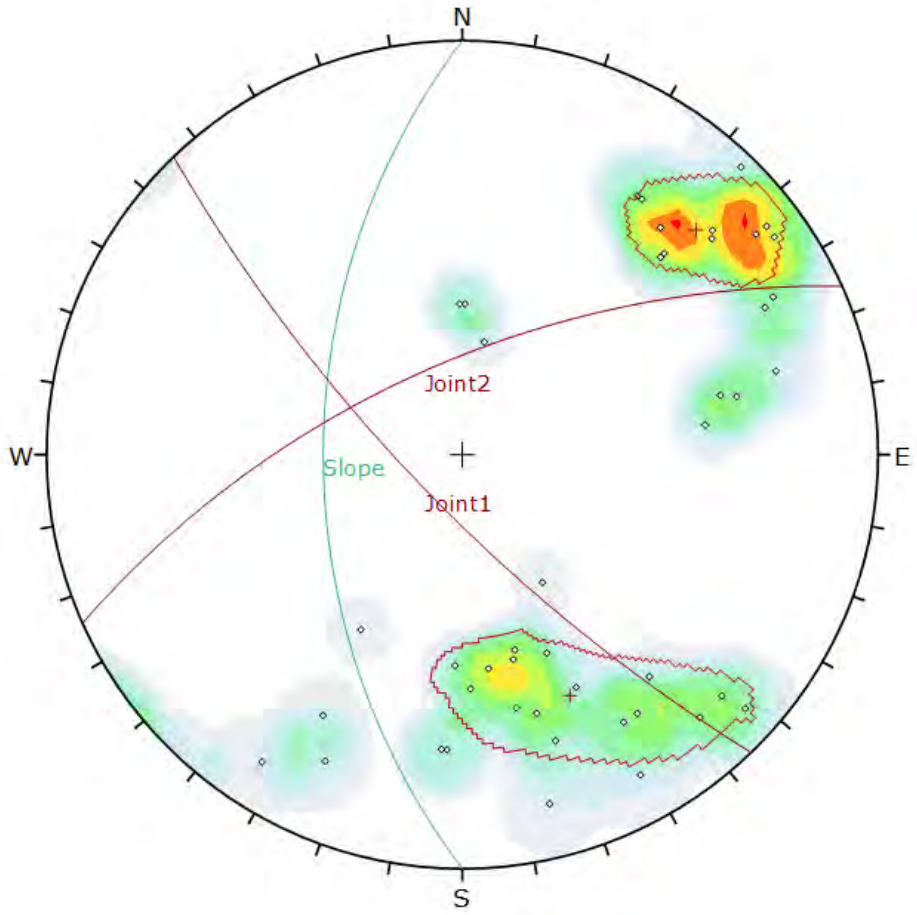
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 45/270 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_45-270_Wedge.dips8

Slope: 53/270 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

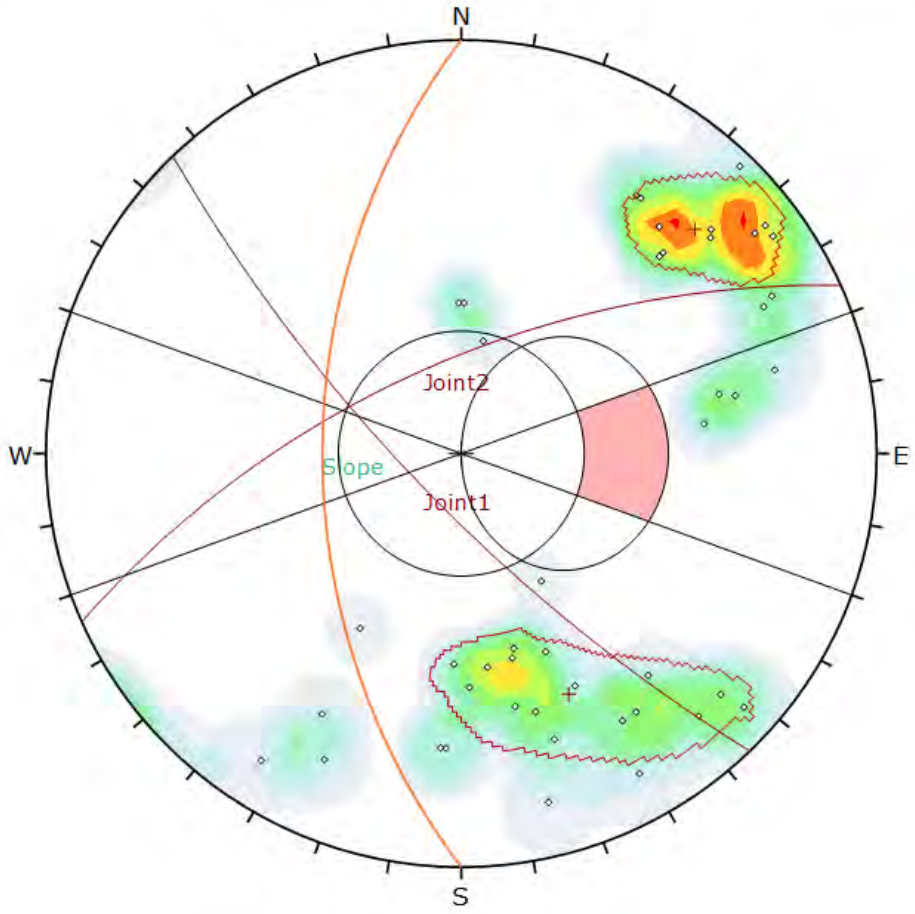
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/270		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_53-270.dips8

Slope: 53/270 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	53
Slope Dip Direction	270
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	0	45	0.00%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

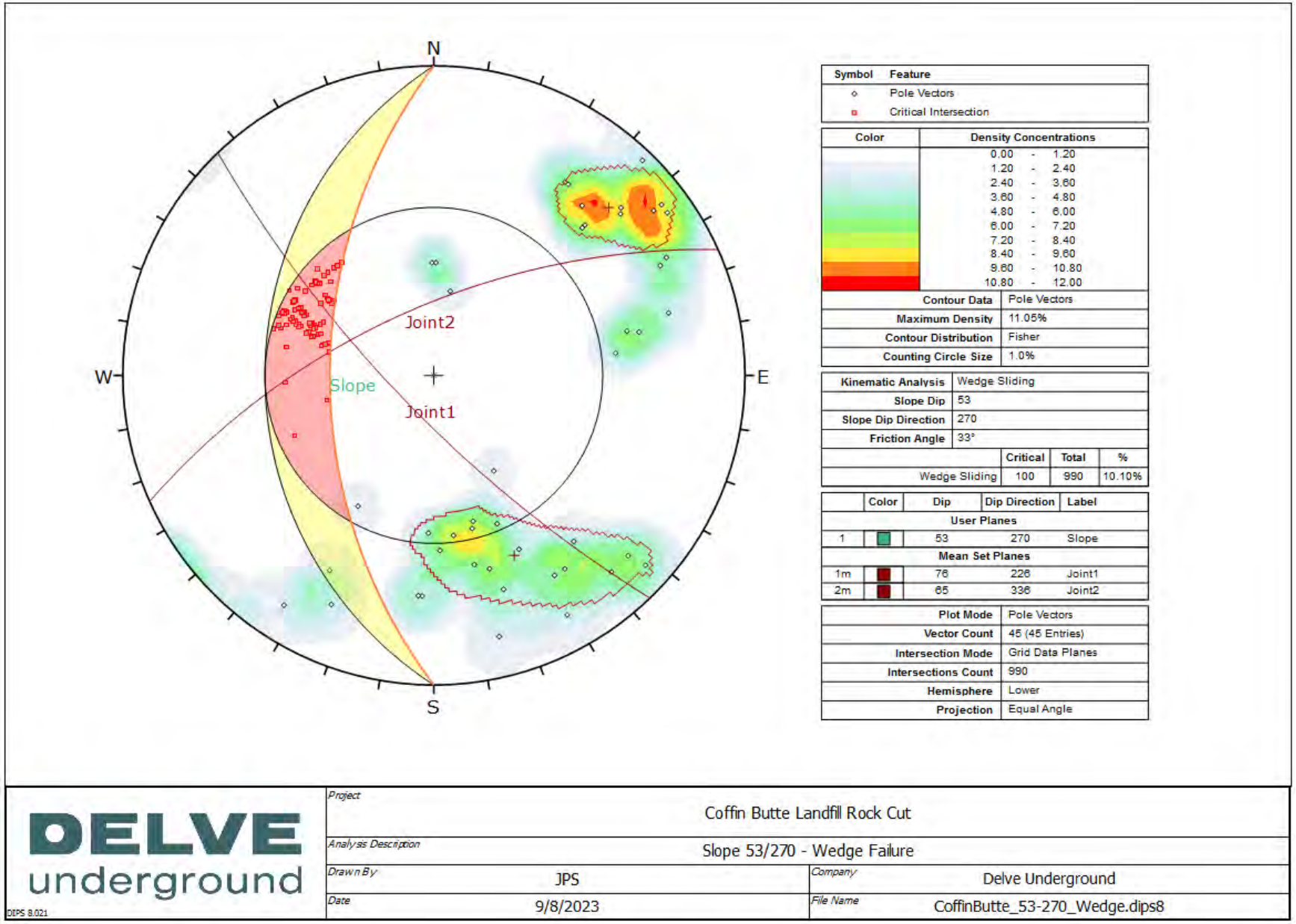
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/270 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_53-270_Planar.dips8

Slope: 53/270 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding		
Slope Dip	53		
Slope Dip Direction	270		
Friction Angle	33°		
	Critical	Total	%
Wedge Sliding	100	990	10.10%

	Color	Dip	Dip Direction	Label
User Planes				
1		53	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

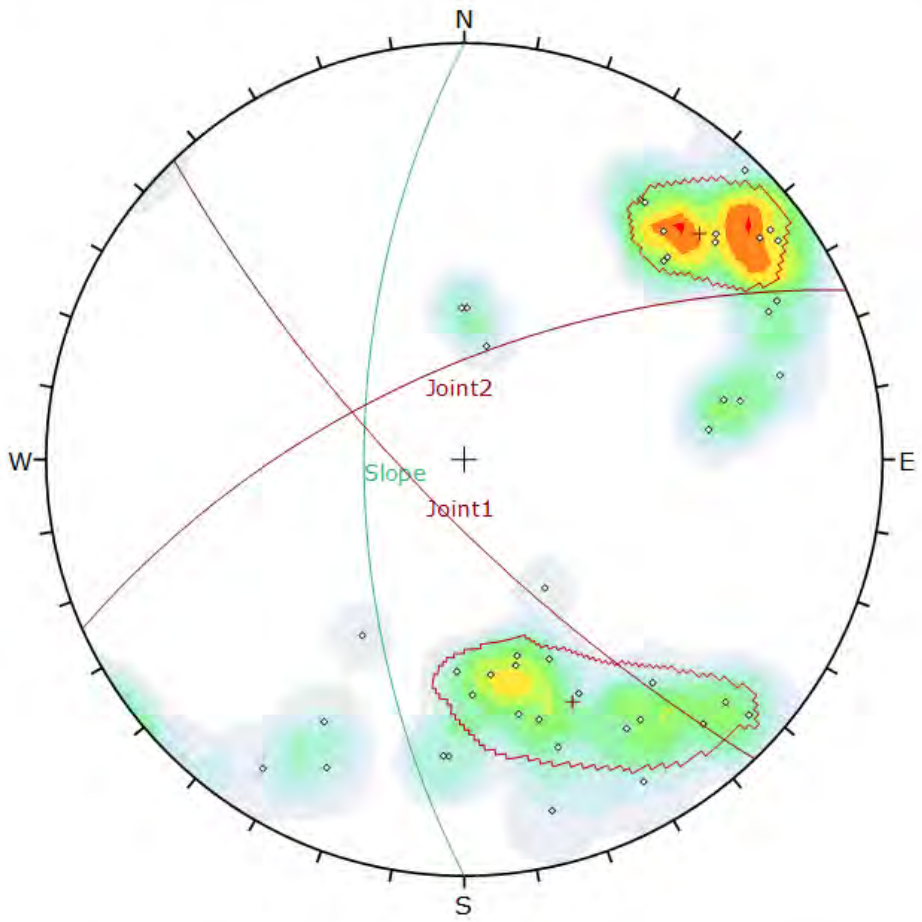
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 53/270 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_53-270_Wedge.dips8

Slope: 63/270 – Stereonet



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

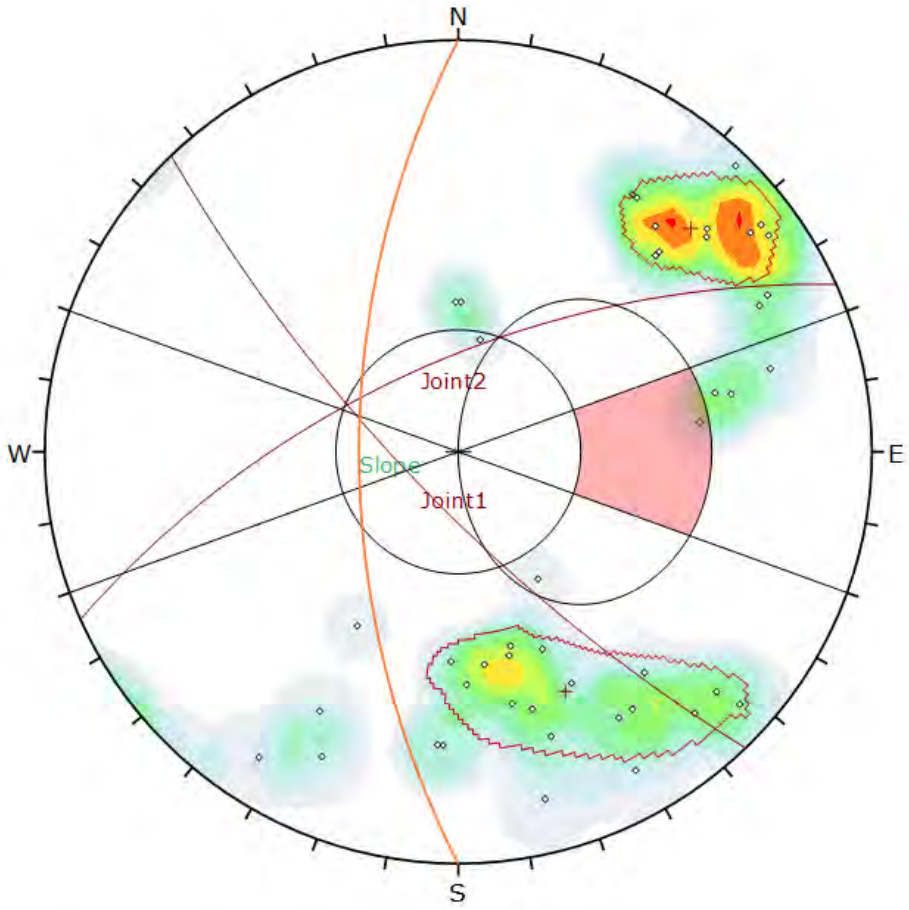
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/270		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_63-270.dips8

Slope: 63/270 – Planar Failure



Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Planar Sliding
Slope Dip	63
Slope Dip Direction	270
Friction Angle	33°
Lateral Limits	20°

	Critical	Total	%
Planar Sliding (All)	1	45	2.22%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

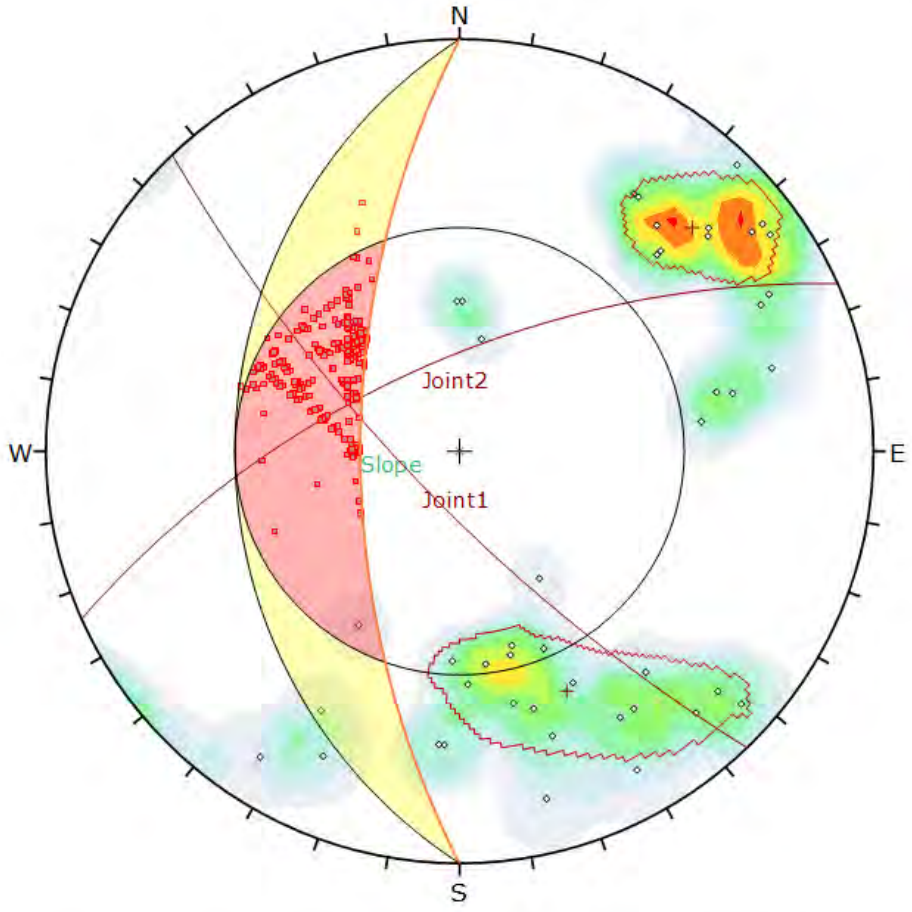
Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/270 - Planar Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_63-270_Planar.dips8

Slope: 63/270 – Wedge Failure



Symbol	Feature
◇	Pole Vectors
▫	Critical Intersection

Color	Density Concentrations
	0.00 - 1.20
	1.20 - 2.40
	2.40 - 3.60
	3.60 - 4.80
	4.80 - 6.00
	6.00 - 7.20
	7.20 - 8.40
	8.40 - 9.60
	9.60 - 10.80
	10.80 - 12.00

Contour Data	Pole Vectors
Maximum Density	11.05%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Kinematic Analysis	Wedge Sliding
Slope Dip	63
Slope Dip Direction	270
Friction Angle	33°

	Critical	Total	%
Wedge Sliding	284	990	28.69%

	Color	Dip	Dip Direction	Label
User Planes				
1		63	270	Slope
Mean Set Planes				
1m		76	226	Joint1
2m		65	336	Joint2

Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Intersection Mode	Grid Data Planes
Intersections Count	990
Hemisphere	Lower
Projection	Equal Angle

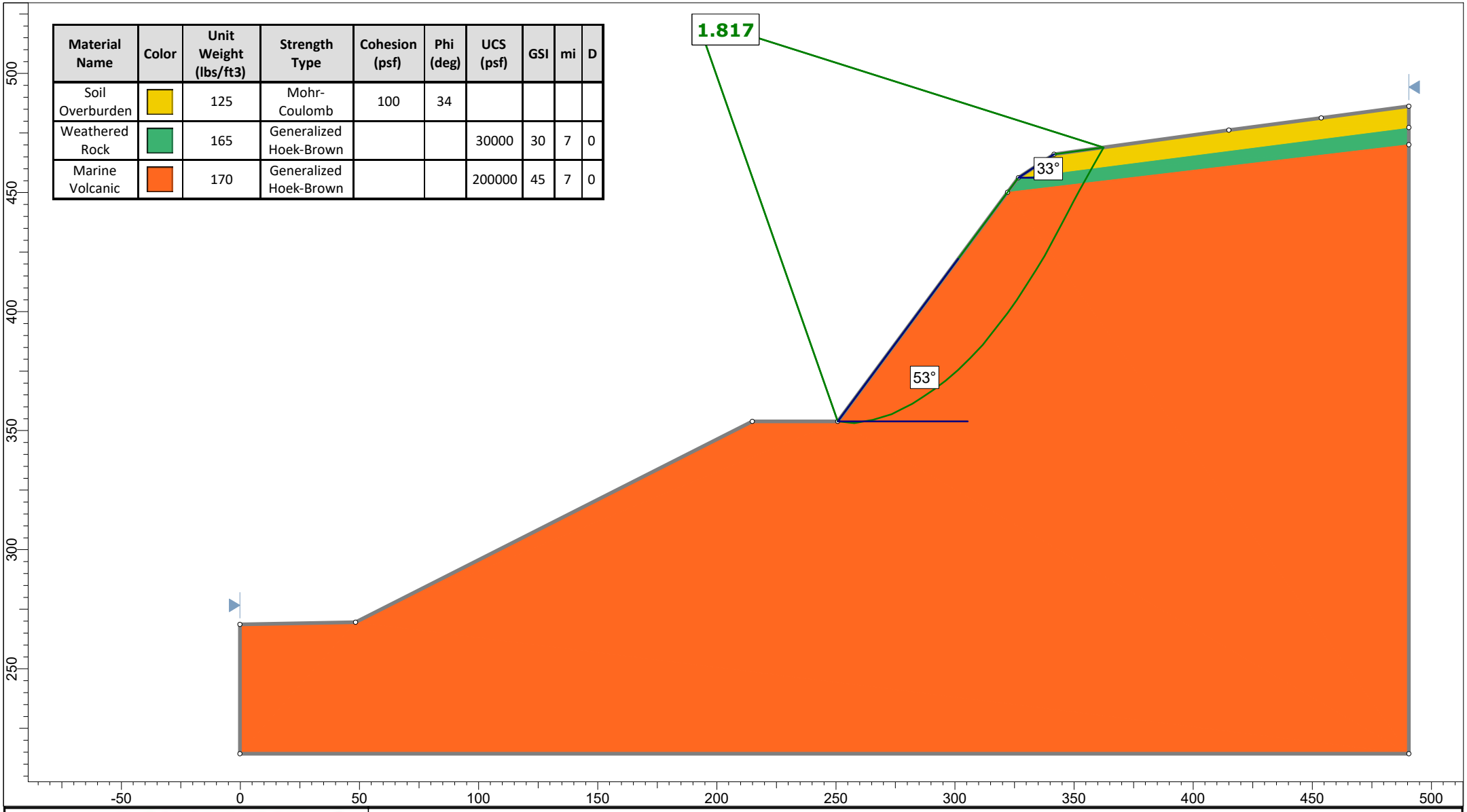
DELVE underground

DIPS 8.021

Project	Coffin Butte Landfill Rock Cut		
Analysis Description	Slope 63/270 - Wedge Failure		
Drawn By	JPS	Company	Delve Underground
Date	9/8/2023	File Name	CoffinButte_63-270_Wedge.dips8

Appendix D: Limit Equilibrium Stability Results

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Soil Overburden		125	Mohr-Coulomb	100	34				
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0
Marine Volcanic		170	Generalized Hoek-Brown			200000	45	7	0

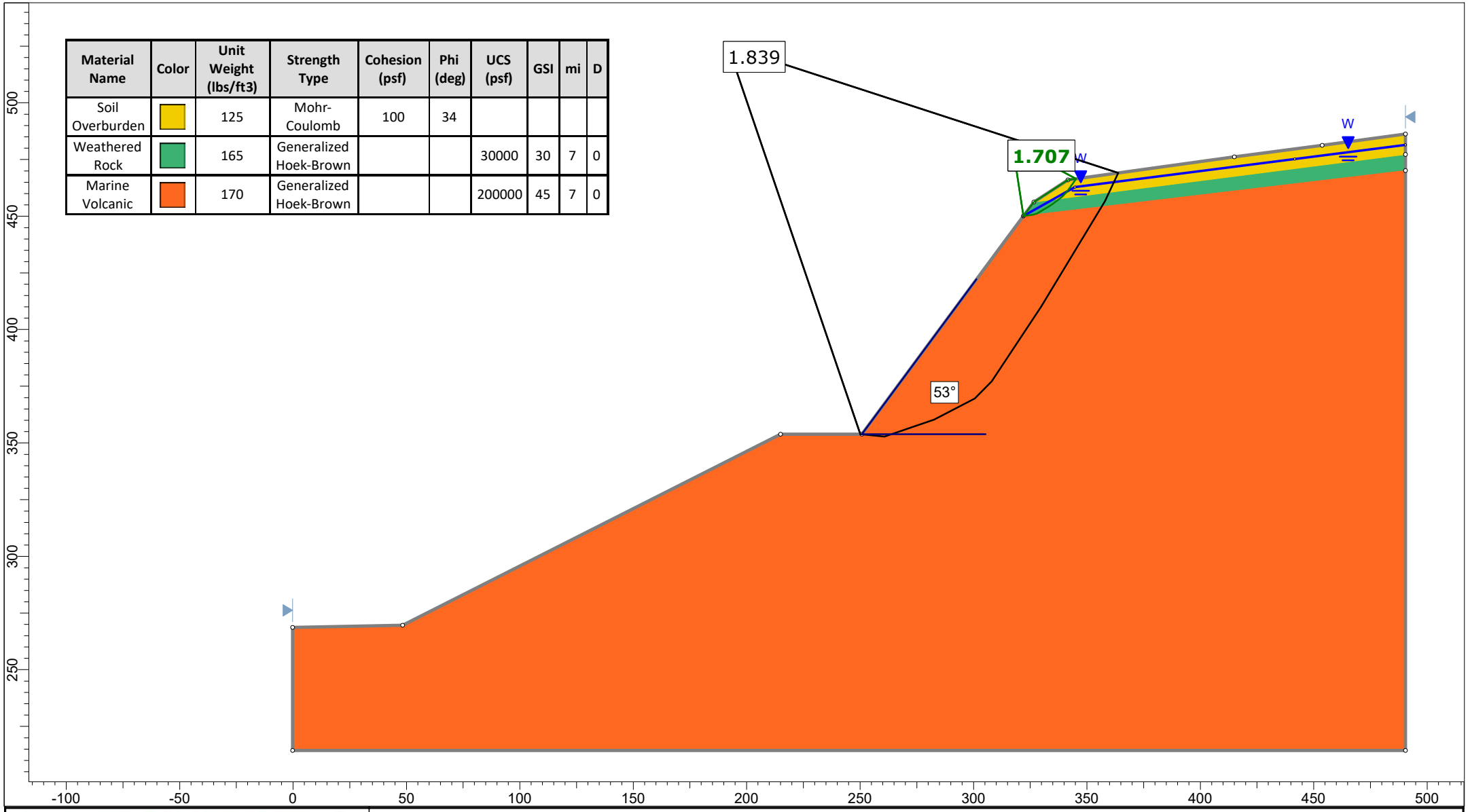


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section B - Dry - 0.75:1, 1.5:1	*Scenario*	Cuckoo
Drawn By	Guzek	*Company*	Delve Underground
Date	9/27/2023, 8:59:34 AM	*File Name*	09-2023_Section-B.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Soil Overburden		125	Mohr-Coulomb	100	34				
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0
Marine Volcanic		170	Generalized Hoek-Brown			200000	45	7	0

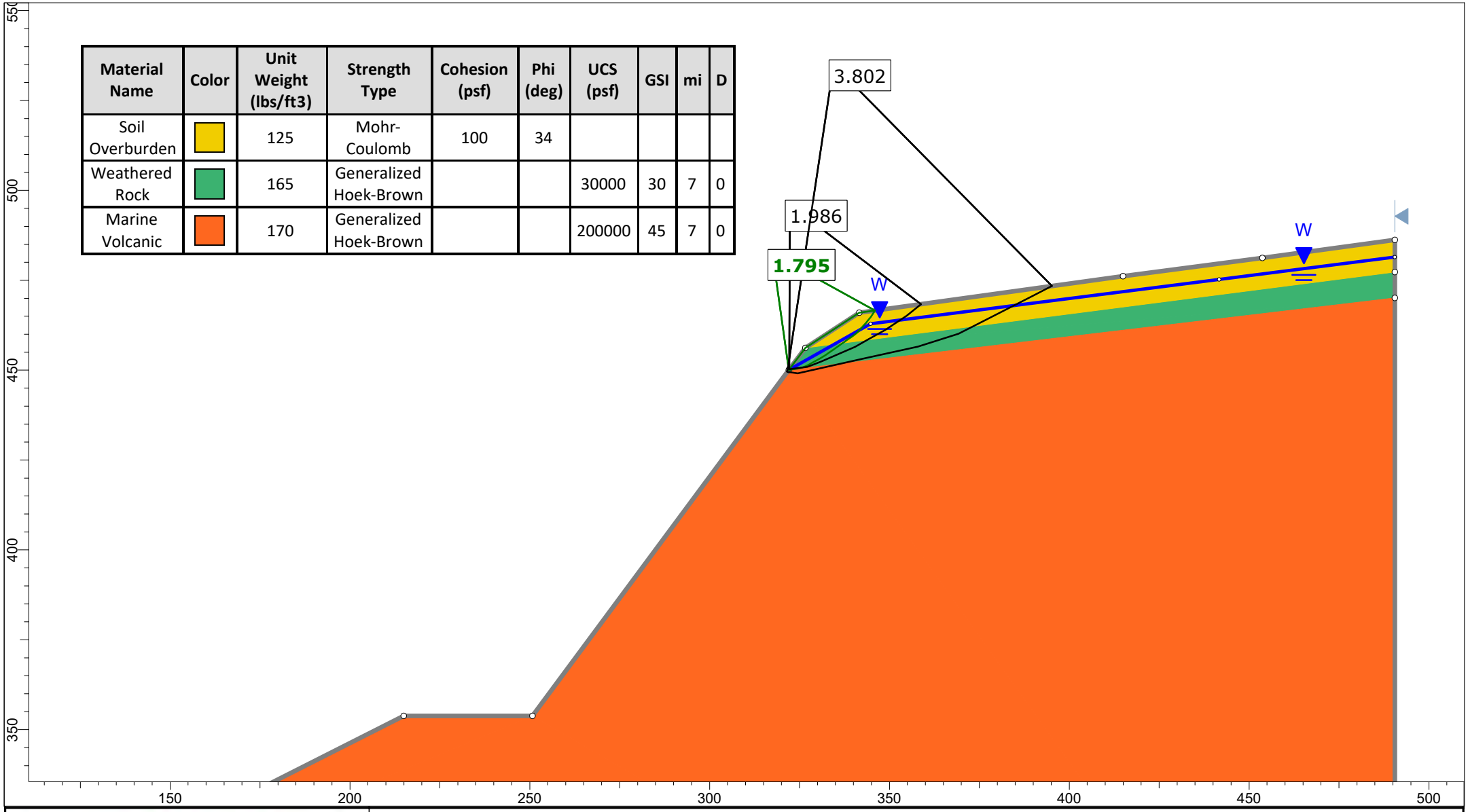


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section B - Wet - 0.75:1, 1.5:1	*Scenario*	Cuckoo
Drawn By	Guzek	*Company*	Delve Underground
Date	9/27/2023, 8:59:34 AM	*File Name*	09-2023_Section-B.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Soil Overburden		125	Mohr-Coulomb	100	34				
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0
Marine Volcanic		170	Generalized Hoek-Brown			200000	45	7	0

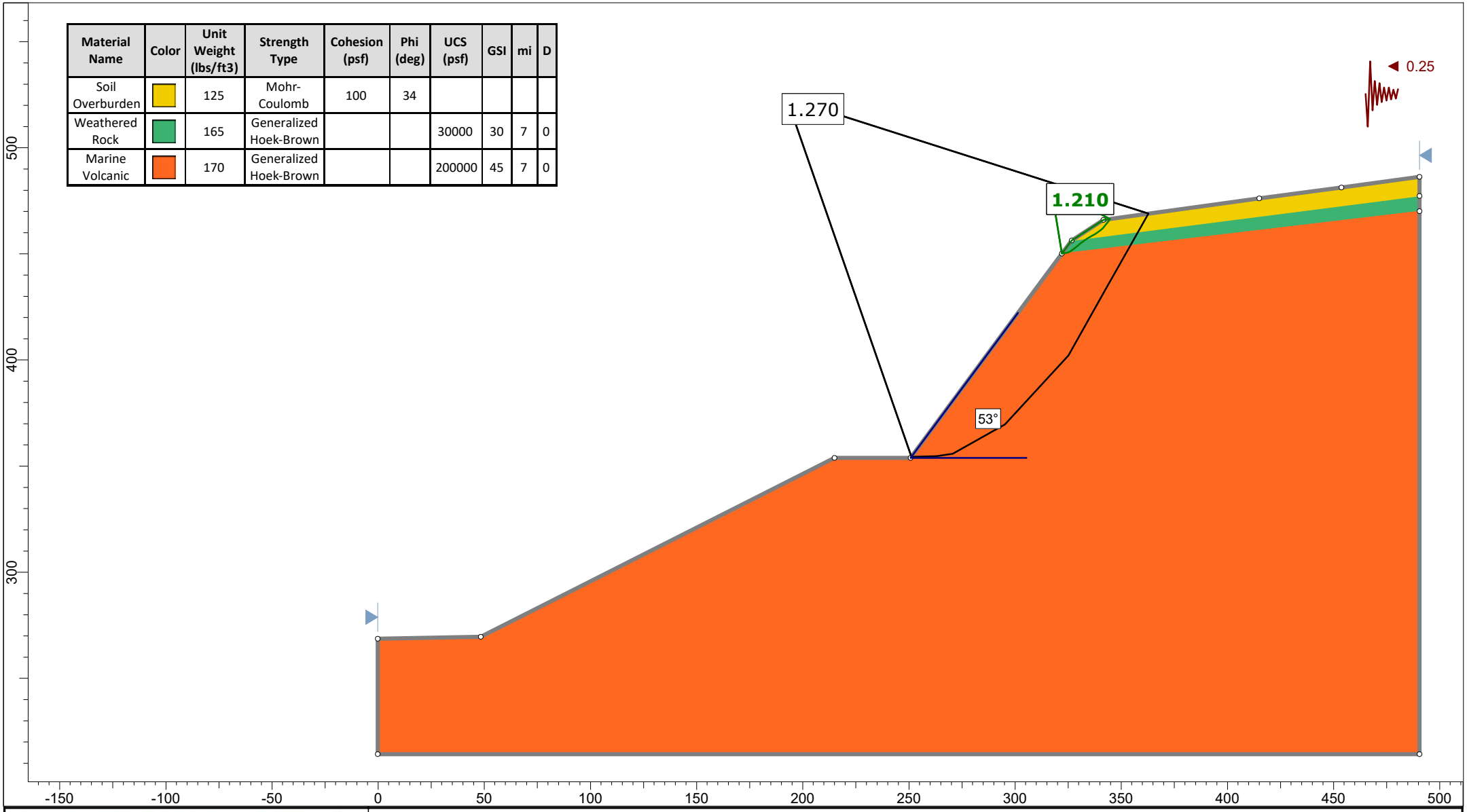


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section B - Fully Saturated - 0.75:1, 1.5:1	*Scenario*	Cuckoo
Drawn By	Guzek	*Company*	Delve Underground
Date	9/27/2023, 8:59:34 AM	*File Name*	09-2023_Section-B.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Soil Overburden		125	Mohr-Coulomb	100	34				
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0
Marine Volcanic		170	Generalized Hoek-Brown			200000	45	7	0

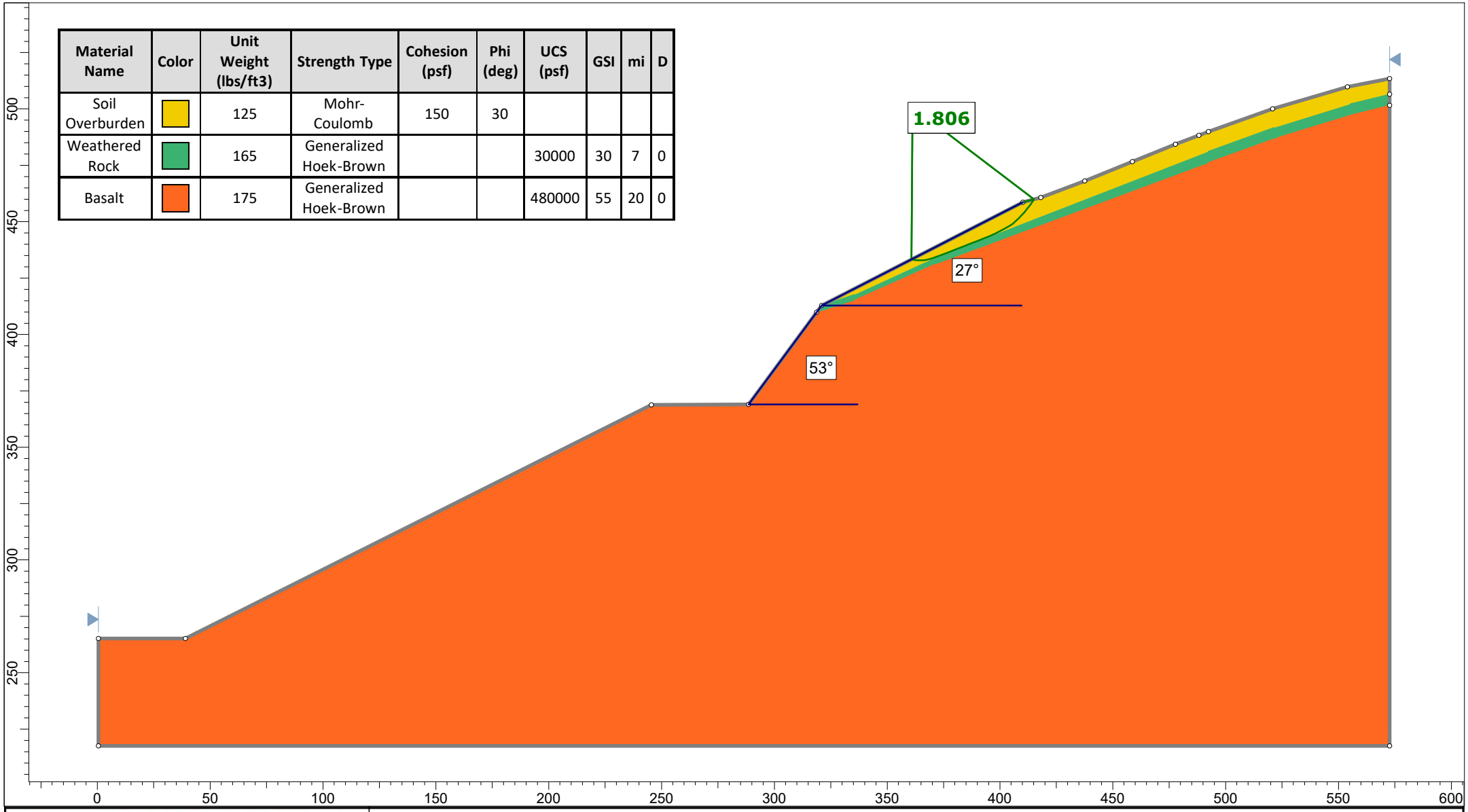


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section B - Seismic - 0.75:1, 1.5:1	*Scenario*	Cuckoo
Drawn By	Guzek	*Company*	Delve Underground
Date	9/27/2023, 8:59:34 AM	*File Name*	09-2023_Section-B.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Soil Overburden		125	Mohr-Coulomb	150	30				
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0
Basalt		175	Generalized Hoek-Brown			480000	55	20	0

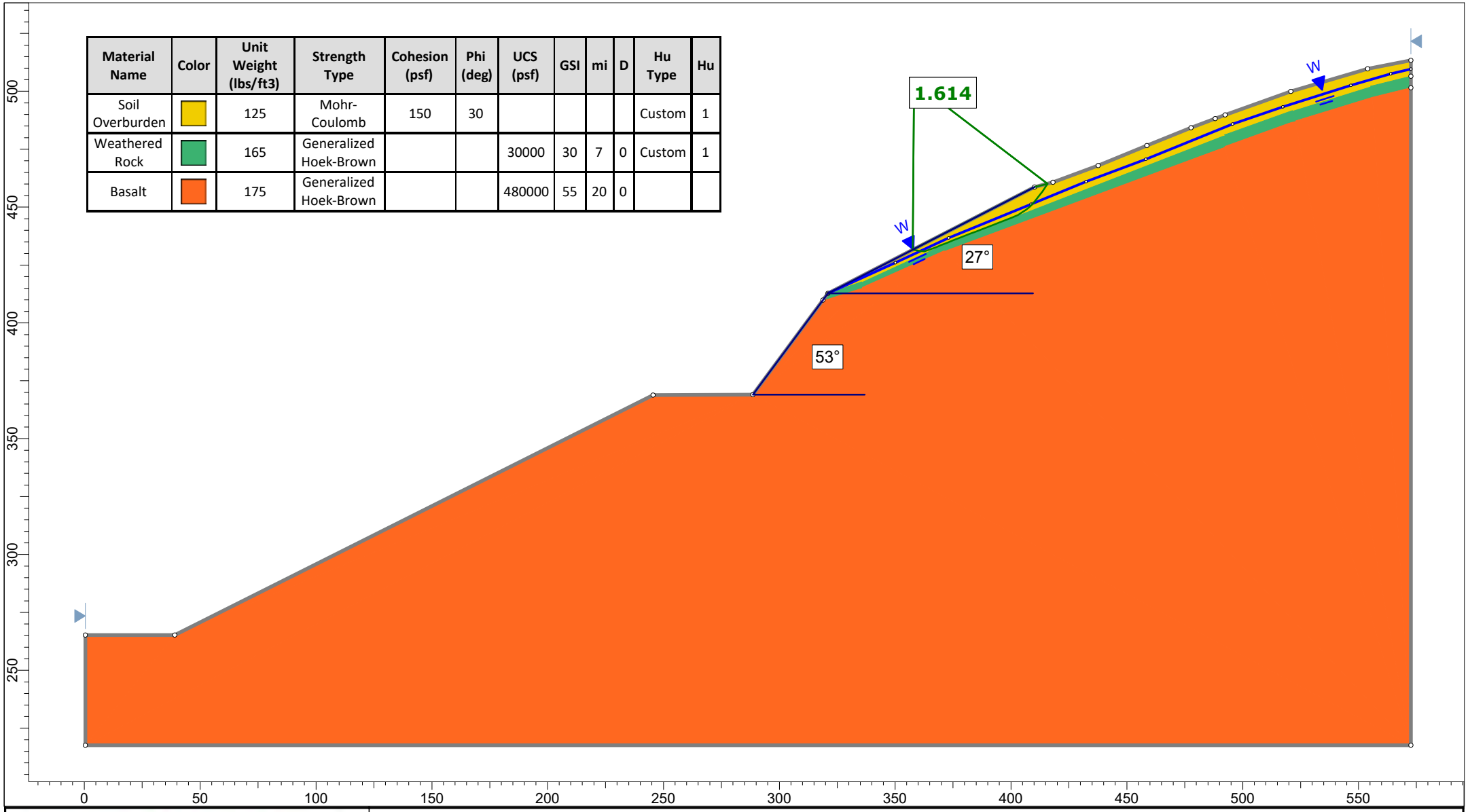


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section D - Dry - 0.75:1, 2:1	*Scenario*	Cuckoo
Drawn By	Guzek	*Company*	Delve Underground
Date	9/27/2023, 8:59:34 AM	*File Name*	09-2023_Section-D.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D	Hu Type	Hu
Soil Overburden		125	Mohr-Coulomb	150	30					Custom	1
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0	Custom	1
Basalt		175	Generalized Hoek-Brown			480000	55	20	0		

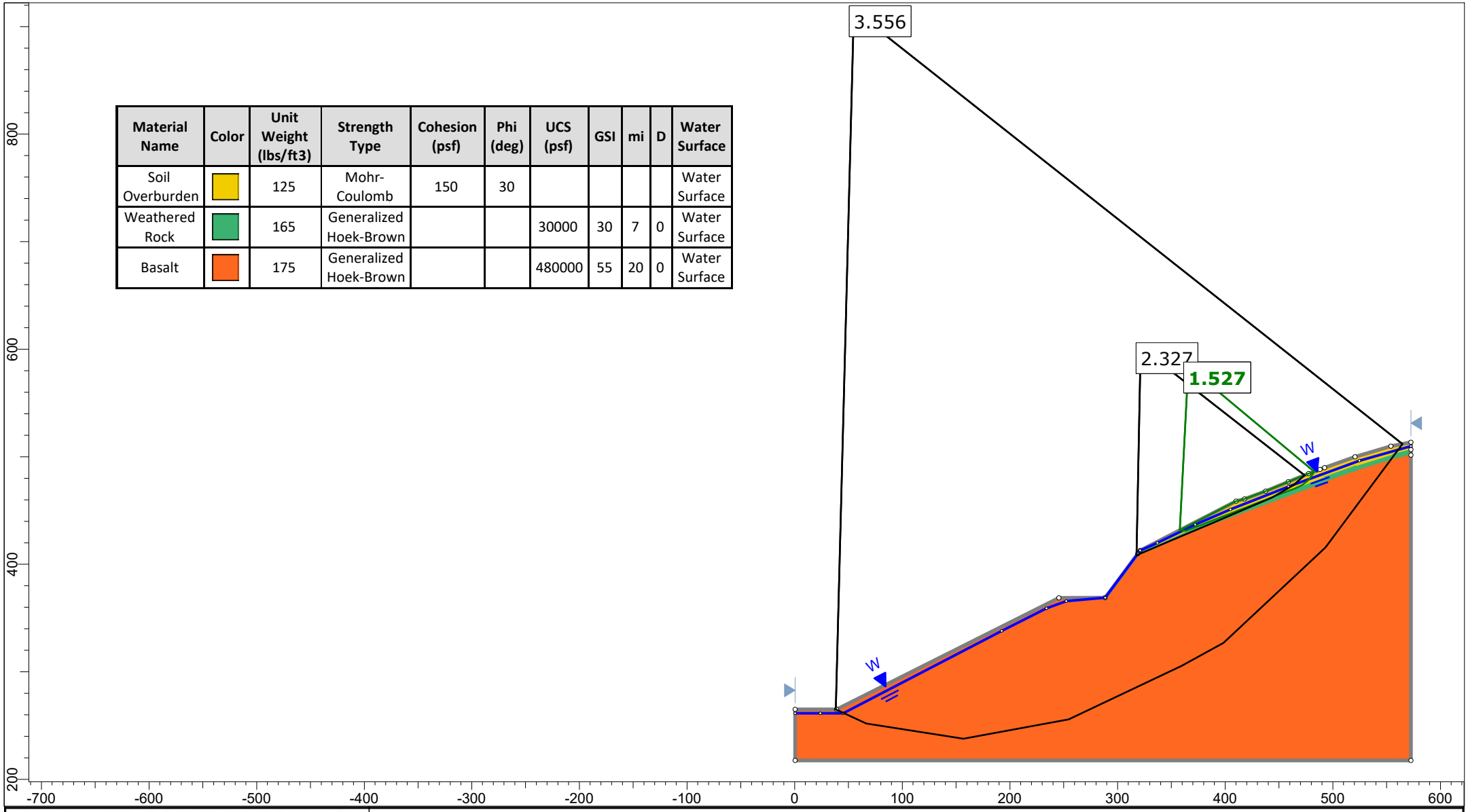


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section D - Wet - 0.75:1, 2:1	Scenario	Cuckoo
Drawn By	Guzek	Company	Delve Underground
Date	9/27/2023, 8:59:34 AM	File Name	09-2023_Section-D.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D	Water Surface
Soil Overburden		125	Mohr-Coulomb	150	30					Water Surface
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0	Water Surface
Basalt		175	Generalized Hoek-Brown			480000	55	20	0	Water Surface

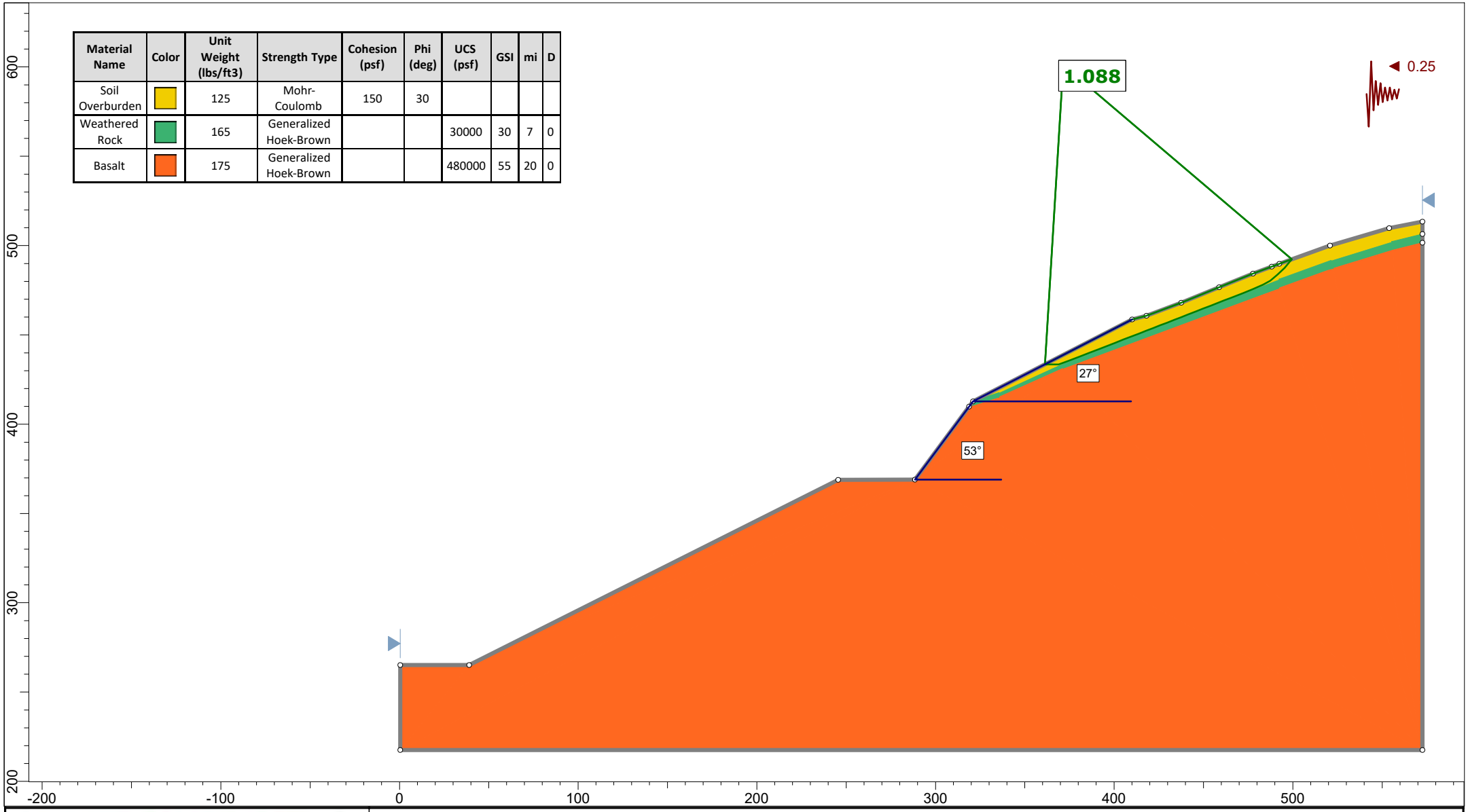


DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section D - Fully Saturated - 0.75:1, 2:1	Scenario	Cuckoo
Drawn By	Guzek	Company	Delve Underground
Date	9/27/2023, 8:59:34 AM	File Name	09-2023_Section-D.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Soil Overburden		125	Mohr-Coulomb	150	30				
Weathered Rock		165	Generalized Hoek-Brown			30000	30	7	0
Basalt		175	Generalized Hoek-Brown			480000	55	20	0



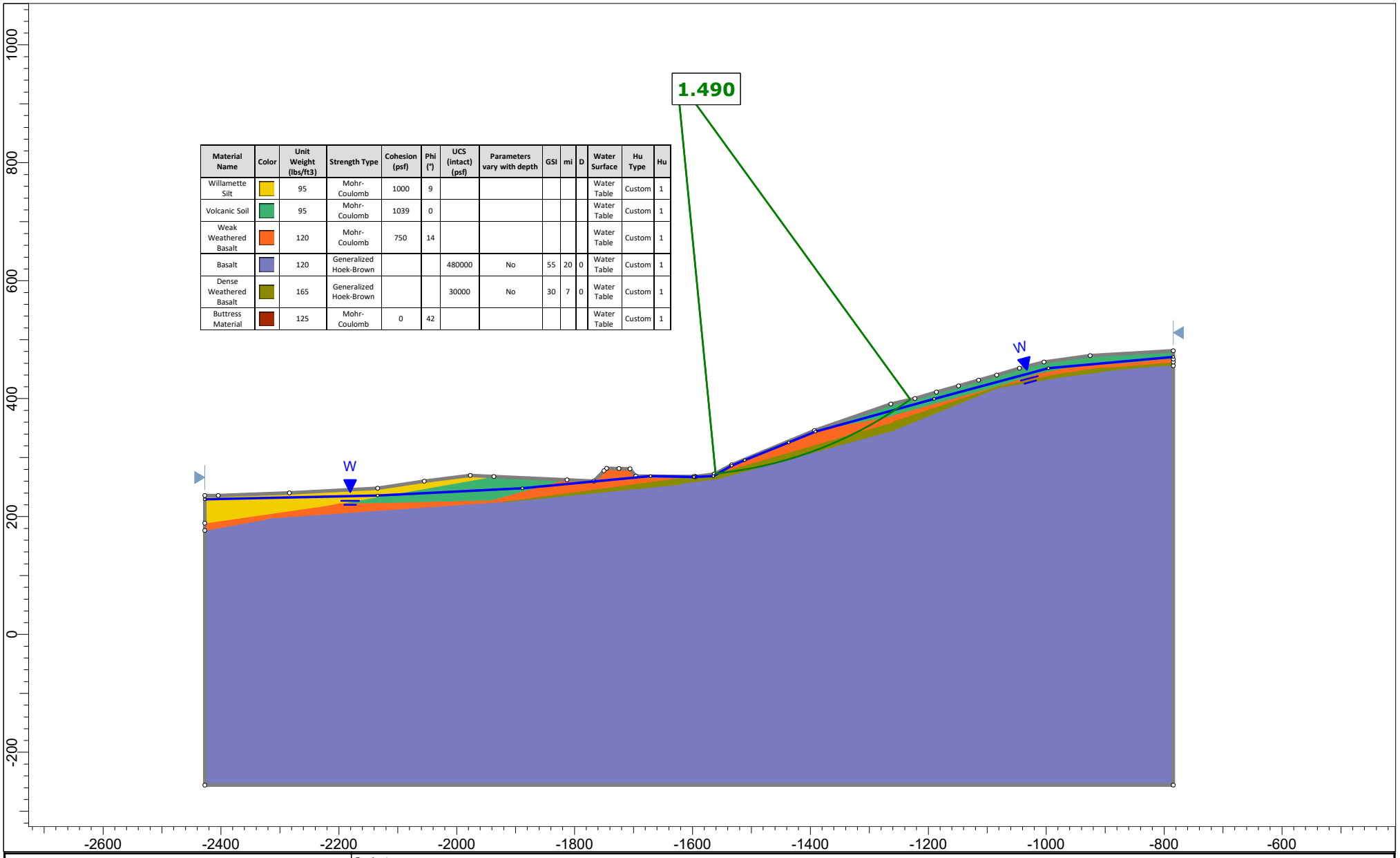
DELVE underground

SLIDEINTERPRET 9.027

Project	Coffin Butte Landfill		
Group	Section D - Seismic - 0.75:1, 2:1	*Scenario*	Cuckoo
Drawn By	Guzek	*Company*	Delve Underground
Date	9/27/2023, 8:59:34 AM	*File Name*	09-2023_Section-D.slmd

WALLACE GROUP
NORTHWEST GEOSYSTEM EXPERTS

APPENDIX F

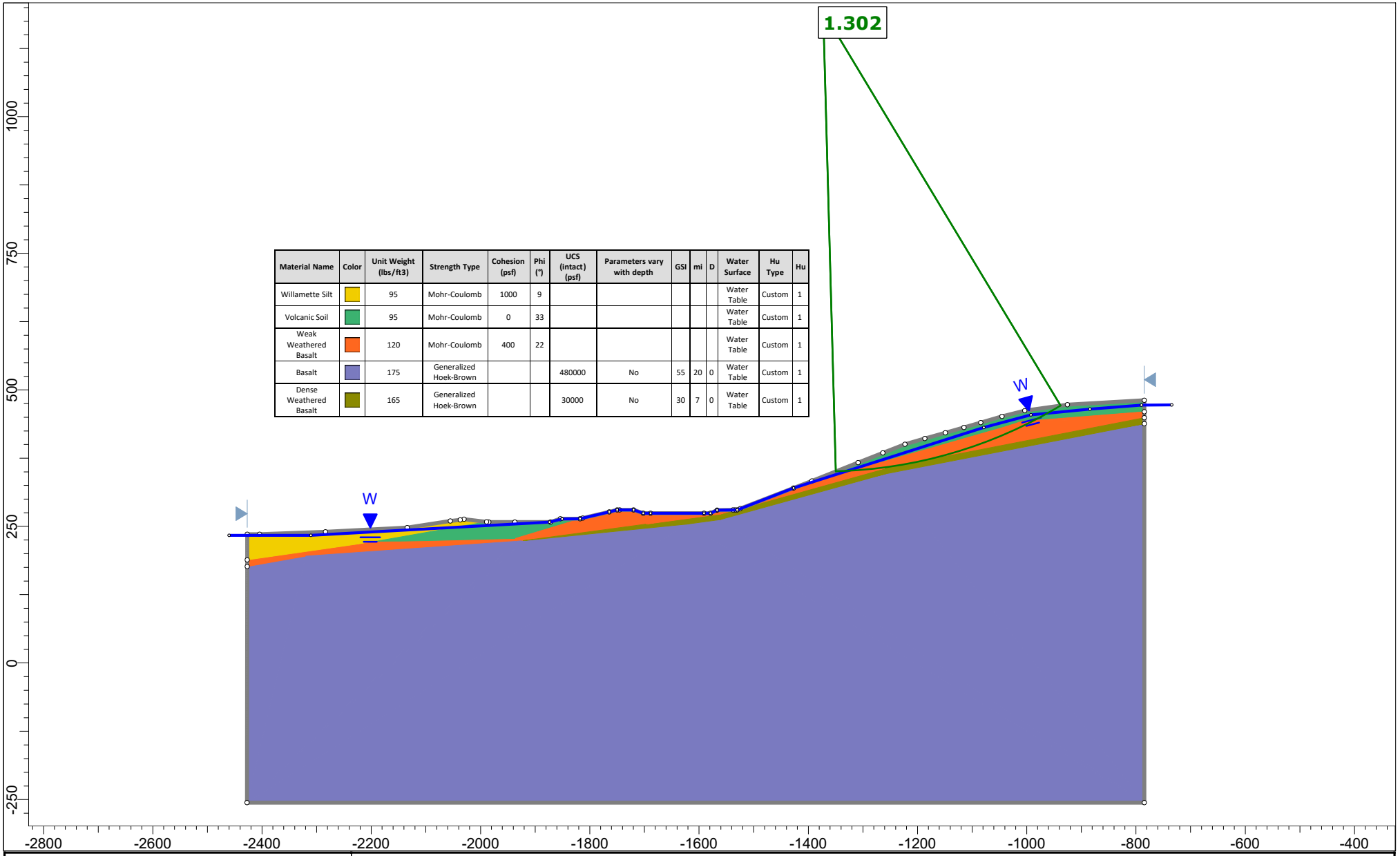


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	UCS (intact) (psf)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
Willamette Silt		95	Mohr-Coulomb	1000	9						Water Table	Custom	1
Volcanic Soil		95	Mohr-Coulomb	1039	0						Water Table	Custom	1
Weak Weathered Basalt		120	Mohr-Coulomb	750	14						Water Table	Custom	1
Basalt		120	Generalized Hoek-Brown			480000	No	55	20	0	Water Table	Custom	1
Dense Weathered Basalt		165	Generalized Hoek-Brown			30000	No	30	7	0	Water Table	Custom	1
Buttress Material		125	Mohr-Coulomb	0	42						Water Table	Custom	1

rocscience

SLIDEINTERPRET 9.028

Project	Coffin Butte Landfill Southern Expansion		
Group	Group 1	*Scenario*	Master Scenario
Drawn By	L. Splitter	*Company*	Wallace Group
Date	10/25/2023, 3:34:10 PM	*File Name*	Section E_ Short Term Condition for buttress construction.slmd

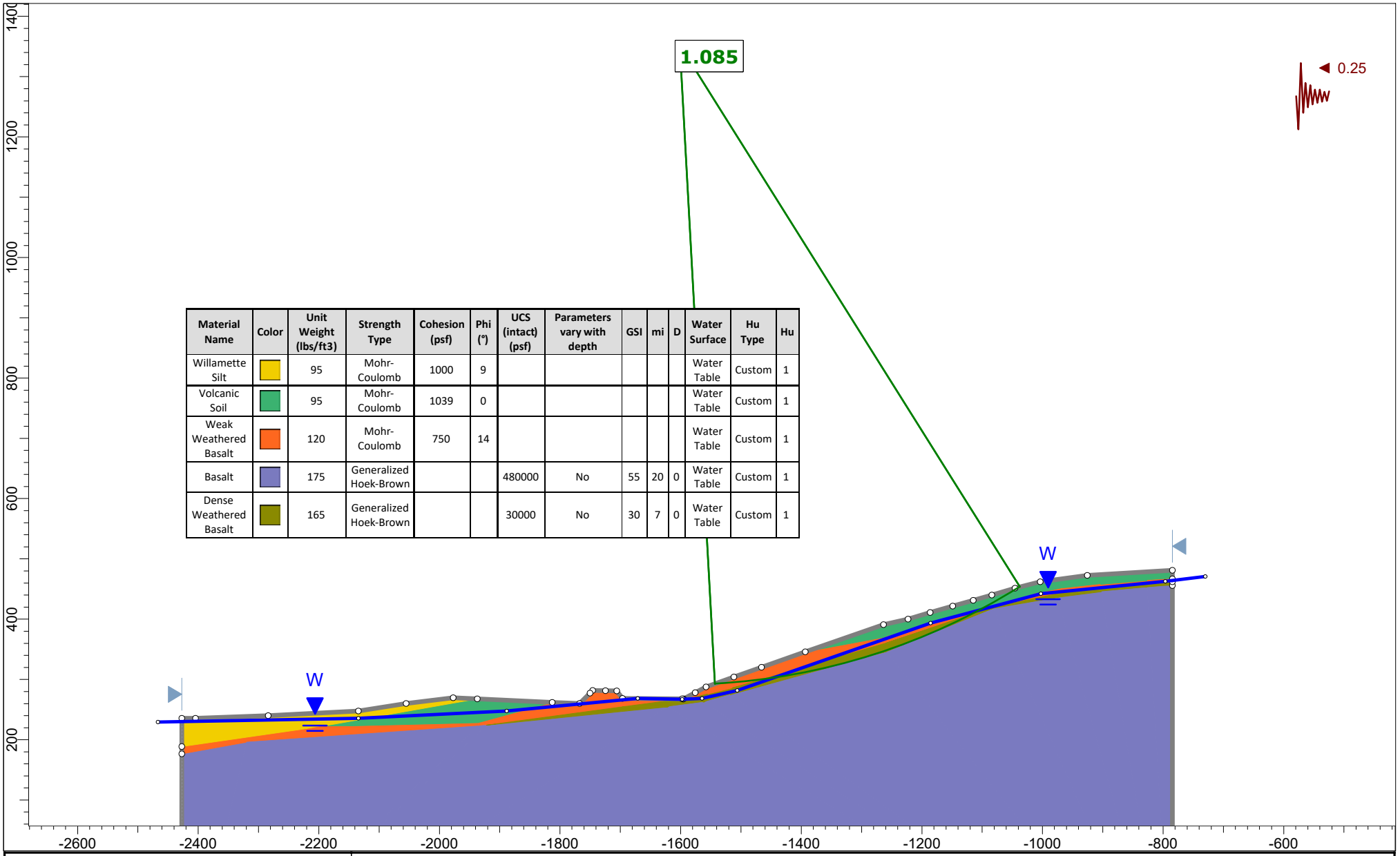


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	UCS (intact) (psf)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
Willamette Silt		95	Mohr-Coulomb	1000	9						Water Table	Custom	1
Volcanic Soil		95	Mohr-Coulomb	0	33						Water Table	Custom	1
Weak Weathered Basalt		120	Mohr-Coulomb	400	22						Water Table	Custom	1
Basalt		175	Generalized Hoek-Brown			480000	No	55	20	0	Water Table	Custom	1
Dense Weathered Basalt		165	Generalized Hoek-Brown			30000	No	30	7	0	Water Table	Custom	1

rocscience

SLIDEINTERPRET 9.028

Project	Coffin Butte Landfill Southern Expansion		
Group	Group 1	*Scenario*	Master Scenario
Drawn By	L. Splitter	*Company*	Wallace Group
Date	10/25/2023, 3:34:10 PM	*File Name*	Section E_ LongTerm Condition Static.slmd

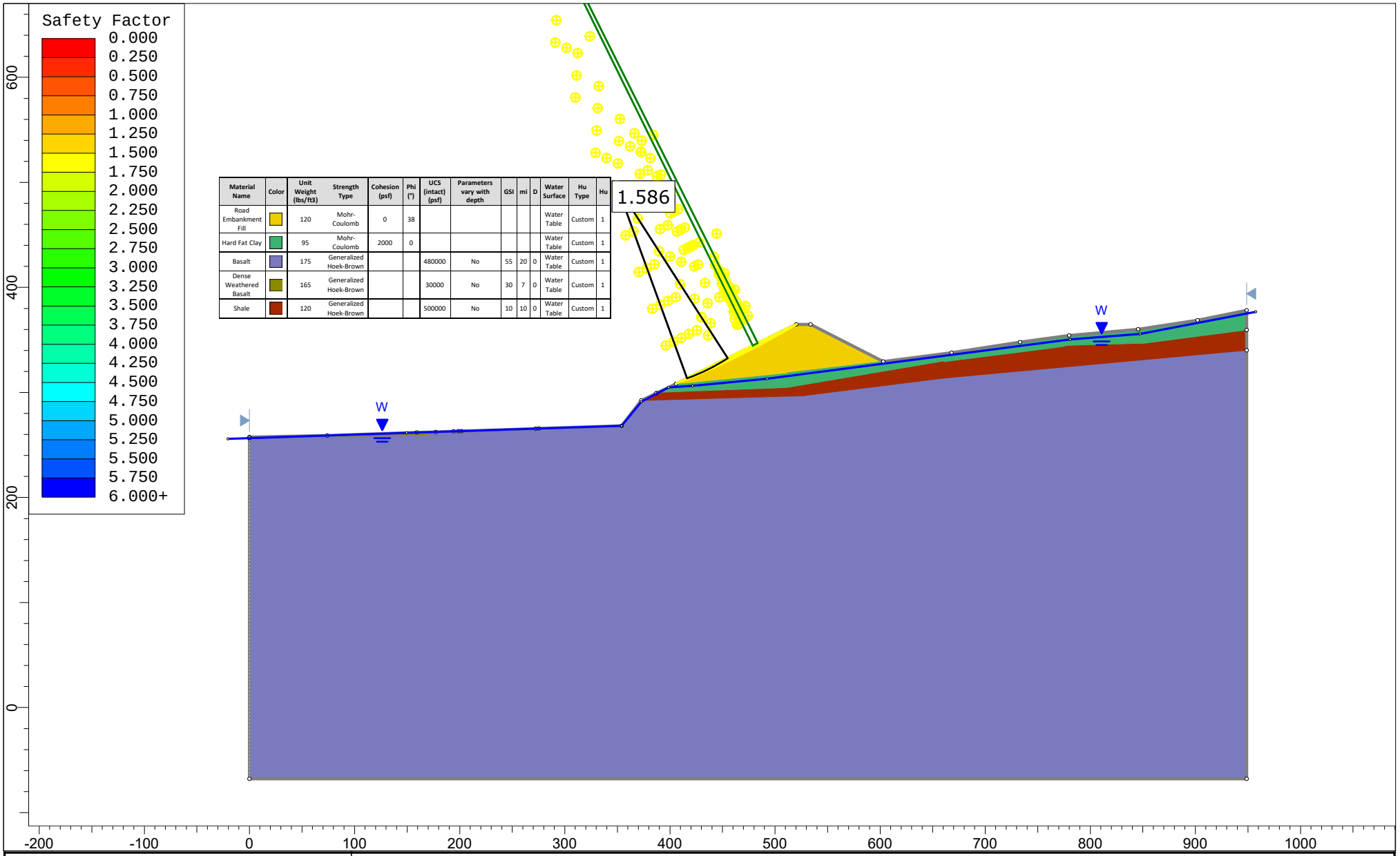


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	UCS (intact) (psf)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
Willamette Silt		95	Mohr-Coulomb	1000	9						Water Table	Custom	1
Volcanic Soil		95	Mohr-Coulomb	1039	0						Water Table	Custom	1
Weak Weathered Basalt		120	Mohr-Coulomb	750	14						Water Table	Custom	1
Basalt		175	Generalized Hoek-Brown			480000	No	55	20	0	Water Table	Custom	1
Dense Weathered Basalt		165	Generalized Hoek-Brown			30000	No	30	7	0	Water Table	Custom	1

rocscience

SLIDEINTERPRET 9.028

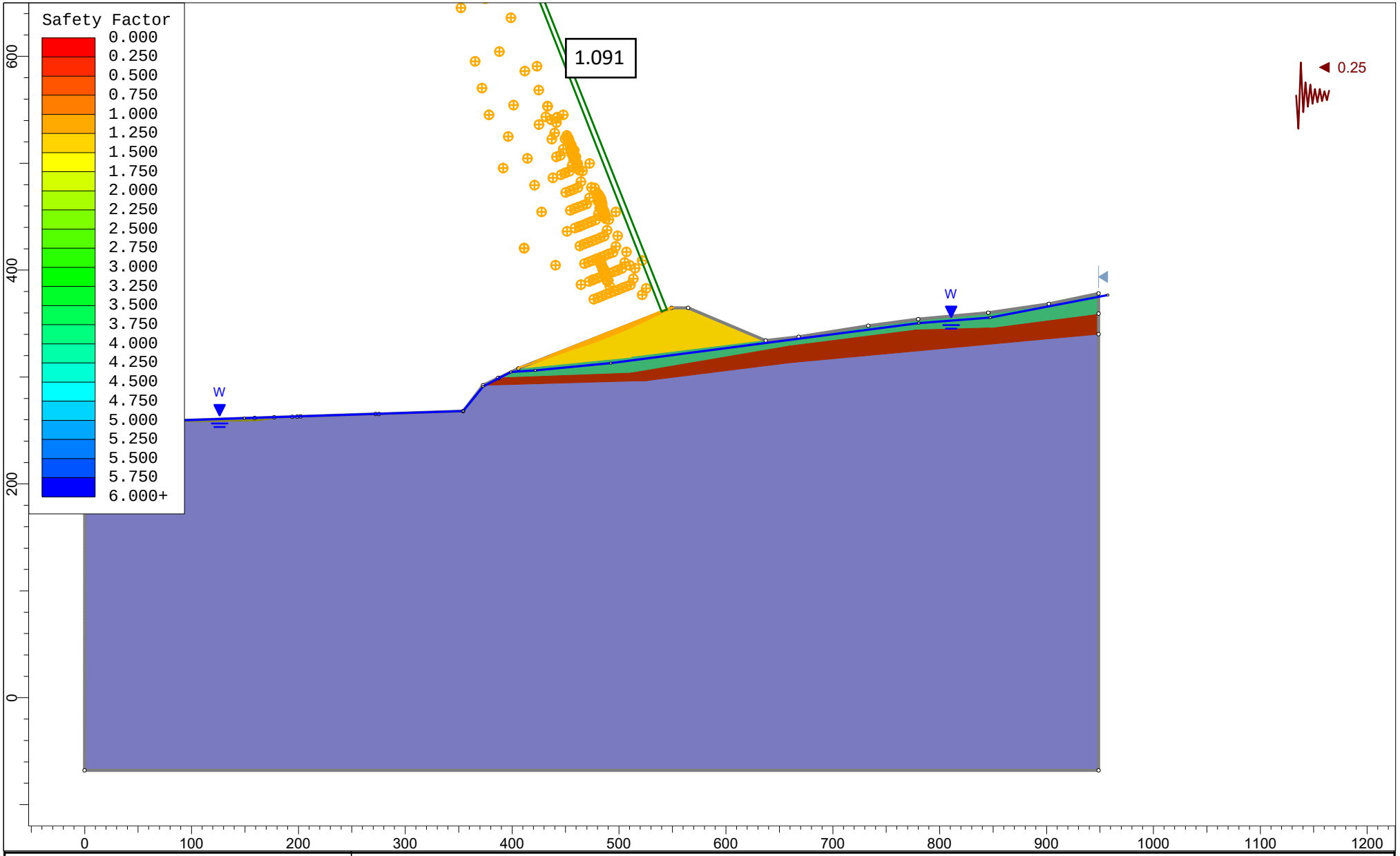
Project	Slide2 - An Interactive Slope Stability Program		
Group	Group 1	*Scenario*	Master Scenario
Drawn By	L Splitter	*Company*	Wallace Group
Date	10/25/2023, 3:34:10 PM	*File Name*	Section E_ Short Term Condition Seismic no buttress.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	UCS (intact) (psf)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
Road Embankment Fill		120	Mohr-Coulomb	0	38						Water Table	Custom	1
Hard Fat Clay		95	Mohr-Coulomb	2000	0						Water Table	Custom	1
Basalt		175	Generalized Hoek-Brown			480000	No	55	20	0	Water Table	Custom	1
Dense Weathered Basalt		165	Generalized Hoek-Brown			30000	No	30	7	0	Water Table	Custom	1
Shale		120	Generalized Hoek-Brown			500000	No	10	10	0	Water Table	Custom	1

rocscience	*Project*	Coffin Butte	
	Group	Group 1	*Scenario* Master Scenario
	Drawn By	L Splitter	*Company* Wallace Group
	Date	12/20/2023, 2:39:01 PM	*File Name* Section C_long term.slmd

SLIDEINTERPRET 9.028



rocscience	Project	Coffin Butte	
	Group	Group 1	Scenario: Master Scenario
	Drawn By	L Splitter	Company: Wallace Group
	Date	12/20/2023, 2:39:01 PM	File Name: Section C_seismic 2.5 to 1.slmd

SLIDEINTERPRET 9.034

EXHIBIT 6
WELL LOGS FOR PW-2 AND BERKLAND WELL

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

Exhibit E6

Page 1

WATER WELL REPORT

STATE OF OREGON
(Please type or print)
(Do not write above this line)

Bent 2144

EMCON 17b

RECEIVED
MAY 24 1978
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 10S/5W-2
State Permit No.

(1) OWNER:

Name John Wilkenson
Address 27460 Fern Ridge Rd.
Sweet Home Ore.

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED:

Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 20 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:

Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
"Tested w/Air 15gpm " "
Bailer test gal./min. with 189 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used Cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 12 sacks
How was cement grout placed? poured

Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Benton Driller's well number
¼ ¼ Section 24 T. 10S R. 5W W
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 196
Static level 31 ft. below land surface. Date 5/1/
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 6"
Depth drilled ft. Depth of completed well

Formation: Describe color, texture, grain size and structure of materi and show thickness and nature of each stratum and aquifer penetra with at least one entry for each change of formation. Report each chang position of Static Water Level and indicate principal water-bearing str

MATERIAL	From	To	SW
Topsoil	0	5	
Brown Broken Basalt	5	18	
Blue basalt	18	114	
Blue sandstone	114	138	
Blue basalt	138	158	
Blue sandstone	158	220	

Work started 4/27/78 19 Completed 5/1/78 19
Date well drilling machine moved off of well 5/1/78 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervisi Materials used and information reported above are true to best knowledge and belief.

[Signed] Claude Irby (Drilling Machine Operator) Date 5/8, 19
Drilling Machine Operator's License No. 1133

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report true to the best of my knowledge and belief.

Name Bert Jones (Person, firm or corporation) (Type or print)
Address 29400 Santiam Hwy Lebano
[Signed] Bert Jones (Water Well Contractor)
Contractor's License No. 514 Date 5/8/78, 19

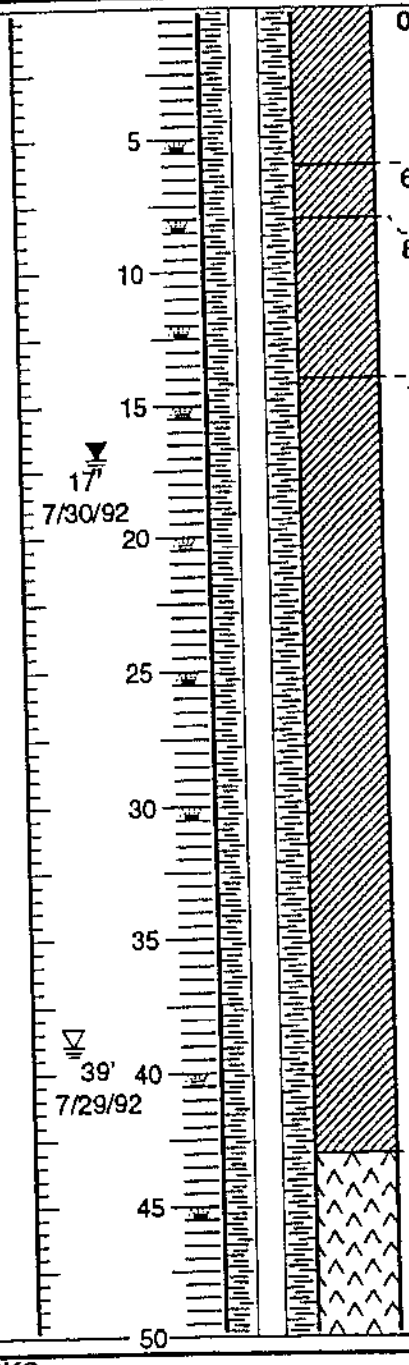
(USE ADDITIONAL SHEETS IF NECESSARY)

LOG OF EXPLORATORY BORING

PROJECT NAME COFFIN BUTTE LANDFILL
LOCATION Benton County, Oregon
DRILLED BY Staco Well Services
DRILL METHOD Air rotary
LOGGED BY Craig D. Fanshier

BORING NO. PW-2
PAGE 1 OF 5
REFERENCE ELEV. 248.90'
TOTAL DEPTH 199.00'
DATE COMPLETED 7/30/92

RECOVERY PERCENT	POCKET PENETRO-METER (TSF)	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
								0-6 feet: SILTY CLAY (CL), brown, hard, dry. (ALLUVIUM)
								6-8 feet: GRAVELLY CLAY (CL), brown, 60-80% clay, soft, 20-40% gravel (medium grain gray basalt), dry.
								8-14 feet: SILTY CLAY (CL), light brown, low plasticity, damp.
								14-43 feet: GRAVELLY CLAY (CL), light brown to light yellowish brown clay, low plasticity, 20-30% gravels (1/8-1/2").
								43-89 feet: BASALT, brown to gray, 5% green, 5% purple tint, fine to medium grained, moderately weathered.



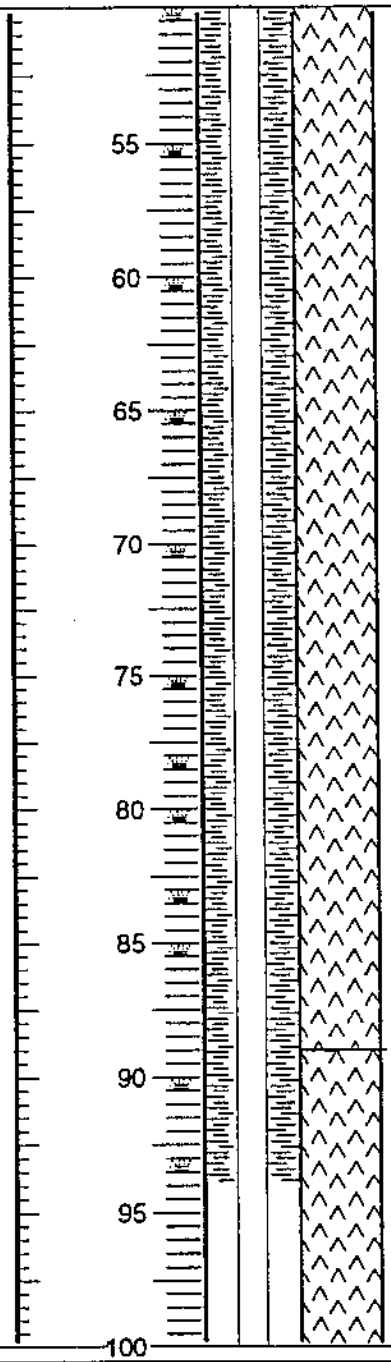
REMARKS

Boring drilled with air rotary using a 10-inch downhole hammer to 94 feet bgs and with a 6-inch downhole hammer from 94 to 199 feet bgs.

LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	PW- 2
LOCATION	Benton County, Oregon	PAGE	2 OF 5
DRILLED BY	Staco Well Services	REFERENCE ELEV.	248.90'
DRILL METHOD	Air rotary	TOTAL DEPTH	199.00'
LOGGED BY	Craig D. Fanshier	DATE COMPLETED	7/30/92

RECOVERY PERCENT	POCKET PENETRO-METER (TSF)	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION



43-89 feet: BASALT, brown to gray, 5% green, 5% purple tint, fine to medium grained, moderately weathered.

@ 52-57 feet: No green or purple tint.

@ 57 feet: Easier drilling, trace quartz and plagioclase.

@ 65 feet: Traces of quartz or plagioclase.

@ 71-72 feet: Easier drilling.

@ 85 feet: Harder drilling.

89-199 feet: BASALT, 60% greenish gray, 40% purple tint, fine to medium grained. Fresh basalt.

@ 95 feet: Borehole produces approximately 10 gpm water by air lifting through the drill pipe using the drilling air compressor.

REMARKS

Boring drilled with air rotary using a 10-inch downhole hammer to 94 feet bgs and with a 6-inch downhole hammer from 94 to 199 feet bgs.

LOG OF EXPLORATORY BORING

PROJECT NAME COFFIN BUTTE LANDFILL
LOCATION Benton County, Oregon
DRILLED BY Staco Well Services
DRILL METHOD Air rotary
LOGGED BY Craig D. Fanshier

BORING NO. PW-2
PAGE 3 OF 5
REFERENCE ELEV. 248.90'
TOTAL DEPTH 199.00'
DATE COMPLETED 7/30/92

RECOVERY PERCENT	POCKET PENETRO-METER (TSF)	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
				105				89-199 feet: BASALT, 60% greenish gray, 40% purple tint, fine to medium grained. Fresh basalt.
				110				
				115				
				120				
				125				
				130				
				135				
				140				
				145				
				150				

REMARKS

Boring drilled with air rotary using a 10-inch downhole hammer to 94 feet bgs and with a 6-inch downhole hammer from 94 to 199 feet bgs.

LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	PW-2
LOCATION	Benton County, Oregon	PAGE	4 OF 5
DRILLED BY	Staco Well Services	REFERENCE ELEV.	248.90'
DRILL METHOD	Air rotary	TOTAL DEPTH	199.00'
LOGGED BY	Craig D. Fanshier	DATE COMPLETED	7/30/92

RECOVERY PERCENT	POCKET PENETRO-METER (TSF)	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
				155				89-199 feet: BASALT, 60% greenish gray, 40% purple tint, fine to medium grained. Fresh basalt.
				160				
				165				
				170				
				175				
				180				
				185				
				190				
				195				
				200				

REMARKS

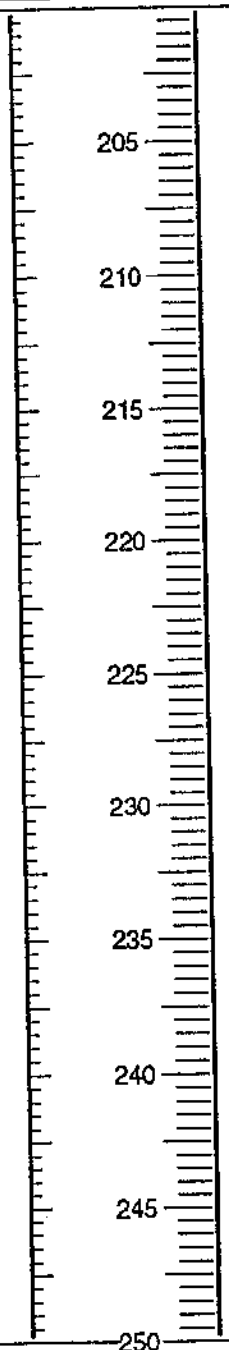
Boring drilled with air rotary using a 10-inch downhole hammer to 94 feet bgs and with a 6-inch downhole hammer from 94 to 199 feet bgs.

LOG OF EXPLORATORY BORING

PROJECT NAME **COFFIN BUTTE LANDFILL**
LOCATION **Benton County, Oregon**
DRILLED BY **Staco Well Services**
DRILL METHOD **Air rotary**
LOGGED BY **Craig D. Fanshier**

BORING NO. **PW- 2**
PAGE **5 OF 5**
REFERENCE ELEV. **248.90'**
TOTAL DEPTH **199.00'**
DATE COMPLETED **7/30/92**

RECOVERY PERCENT	POCKET PENETRO-METER (TSF)	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION



Total depth drilled 199 feet below ground surface.
Total depth sampled 199 feet below ground surface.

WELL COMPLETION DETAILS:
0-94 feet: Bentonite grout slurry surface seal.
+1.37-94 feet: 6-inch dia., 0.250-inch steel surface casing.
94-199 feet: Open borehole.
1.3-199 feet: 4.5-inch Class 160 PVC liner.
149-199 feet: 0.5-inch drilled perforation, 4 per foot (around circumference).
End cap: PVC slip cap.
BOREHOLE DIMENSIONS:
0-94 feet: 10-inch.
94-199 feet: 6-inch.

REMARKS
Boring drilled with air rotary using a 10-inch downhole hammer to 94 feet bgs and with a 6-inch downhole hammer from 94 to 199 feet bgs.

EXHIBIT 7
LETTER FROM JEFF SHEPHERD AND PAUL BURNS OF CEC REGARDING APPLICABLE OREGON DEQ PERMITS

February 26, 2024

Mr. Ian Macnab
Environmental Manager
Republic Services, Inc.
28972 Coffin Butte Rd
Corvallis, OR 97330

Subject: Oregon Department of Environmental Quality
Required Landfill Permits

Dear Mr. Macnab;

CEC has compiled the following information to provide an overview of the Oregon Department of Environmental Quality (ODEQ) permits required for the expansion of the Coffin Butte Landfill. The Coffin Butte Landfill holds permits for the existing facility and operation, but will need to obtain permit modifications from the ODEQ for approval to expand the landfill.

Modifications to the existing permits will be required for the ODEQ Solid Waste Facility Permit, the ODEQ 1200-Z stormwater Permit and the ODEQ title V (Air) Operating Permit. Following is a brief overview of each permit. The information in the overview is from the ODEQ Solid Waste Landfill Guidance Document, Department of State Lands website and ODEQ Air Quality and Water Quality websites.

As noted in the bulleted list below, a Land Use Compatibility Statement (LUCS) must accompany the application for the ODEQ permit modification application. Upon completion of the land use process by Benton County (Republic Services Conditional Use Permit Application), the County planning office completes Section 2 of the LUCS to indicate the use is compatible with the land use regulations and attaches written findings supporting the decision of compatibility. The LUCS will be included in the ODEQ Solid Waste Facility permit modification application.

<u>ODEQ Solid Waste Permit:</u>

The following documentation and information must be included with the permit application:

- A Land Use Compatibility Statement
- A recommendation from the local solid waste planning authority
- Demonstration of the need for a new, modified or expanded facility
- A Certificate of Business Registry
- Identifying any other known or anticipated permits
- Application fee and compliance fees (if required)
- Any other information DEQ deems necessary

Solid Waste facility Permit applications must include the following information:

Section 1: Location Restrictions

The location restrictions address the following:

- Airport safety
- Flood plains
- Wetlands
- Fault areas
- Seismic impact zones
- Unstable areas
- Critical habitat
- Sensitive hydrogeologic environments

Section 2: Phase I Site Characterization

- Phase I Site Characterization, the initial stage of data collection, establishes a preliminary framework for understanding the soils, geology and hydrogeology and plans the Phase II Site Characterization

Section 3: Phase II Site Characterization

- Phase II Site Characterization evaluates subsurface conditions in greater detail including the depth and extent of the uppermost (water bearing) geologic units and hydraulically interconnected units, the lithologic and hydraulic properties of these units, groundwater flow patterns, and other factors

Section 4: Geotechnical Investigations

- Phase I Geotechnical Investigation - Conduct a preliminary geotechnical investigation designed to accomplish the following objectives:
  - Characterize the variability, depth, aerial extent and engineering properties of on-site soils and other overburden deposits
  - Inventory soils and other overburden deposits suitable for use in construction, and identify the proposed use for these materials
  - Identify geotechnical considerations (such as settlement and slope stability) which must be addressed in the engineering design and/or further characterized by a Phase II Geotechnical assessment, and
  - Develop a work plan for conducting a Phase II Geotechnical investigation, as necessary, to adequately characterize on-site soils and other geotechnical considerations
- Phase II Geotechnical Investigation
  - Perform additional geotechnical investigations as required in the Phase II work plan and for design calculations and analyses.

Section 5: Conceptual Design of Landfill Facilities

- This section describes the elements of a Site Development Plan, including:
  - Facility operation
  - Conceptual design of landfill facilities
  - Leachate management
  - Surface water management
  - Landfill gas management
  - Environmental monitoring
  - Closure and end use
  - Supporting information

Section 6: Leachate Treatment and Disposal Feasibility Study

- Available leachate treatment alternatives should be evaluated. Methods that reflect site-specific conditions, and a full consideration of cross-media impacts should be selected for the facility

Section 7: Detailed Design

This section provides guidance on preparing detailed design plans and specifications for the following environmental control systems:

- Liner system
- Soil liner component
- Geomembrane component
- Primary leachate collection and removal system
- Secondary leachate collection and removal system
- Leachate treatment and storage impoundments
- Leachate holding tanks and conveyance pipelines
- Leachate treatment process
- Final cover system
- Surface water control system, and
- Landfill gas control system

Section 8: Facility Construction Program

The facility construction program should include the following elements:

- An organized, qualified construction project team
- Department-approved design drawings and specifications for each phase of landfill development
- A Construction Quality Control (CQC) program
- A Construction Quality Assurance (CQA) program, and
- Construction Certification Reports based on an evaluation of CQC and CQA documentation which certify that construction was completed in accordance with Department-approved plans and specifications

Section 9: Landfill Operations

- During the design phase of the project, prepare an operations plan that integrates the site development plan, the facility design elements, and the operational elements described in this subsection. Submit the plan to DEQ for review and approval.
- Once the landfill unit and related facilities are constructed and activated, prepare the O&M manual. Incorporate the operations plan elements, construction documents, and equipment manufacturers and suppliers data. Prepare separate O&M manuals for complex systems, such as leachate treatment systems, landfill gas control systems. Make the O&M manual available to operating personnel and place a copy of the manual(s) in the facility operating record.

Section 10: Environmental Monitoring

- Prepare and submit an Environmental Monitoring Plan (EMP) report to the Department for review and approval. Upon approval, all environmental monitoring must be conducted in accordance with the EMP, including any conditions of the approval. The plan should be stamped by an Oregon Registered Geologist with experience in environmental monitoring.
- The following regulations govern environmental monitoring:
  - 40 CFR Part 258, Solid Waste Disposal Facility Criteria
  - OAR 340 Division 94, Solid Waste Management
  - OAR 340 Division 40, Groundwater Quality Protection

Section 11: Closure and Post-Closure

- Minimum requirements for closure plans and post-closure plans for MSW landfills are specified in the Department's Financial Assurance Rule, OAR 340-94-100 through 145. The closure and post-closure requirements for Subtitle D landfills differ from those of non-Subtitle D MSW landfills (i.e., closing facilities).
- There are two separate categories of closure and post-closure plans:
  - Subtitle D ("worst case") Closure and Post-closure Plans are based on a hypothetical "worst case" scenario for closure and post-closure costs. This scenario establishes a conservative basis for estimating financial assurance funding requirements.

The Final Engineered Site Closure and Post-closure Plans are linked to the Closure Permit which must be obtained at least 5 years prior to anticipated final closure. The Final Engineered plans reflect the intended closure design. The Final Engineered plans contain all the elements of and replaces the Subtitle D plans.

Section 12: Financial Assurance

- Proper financial planning early in the development of landfill facilities is required to ensure that adequate funding will be available to cover the cost of closure(s), post-closure care, and any corrective action activities

- Maintain financial assurance to cover the costs of:
  - Closure of the landfill
  - Post-closure monitoring and maintenance of the landfill facilities, and
  - Any corrective action required by the Department

Two other Oregon Department of Environmental Quality Permits that are required for the landfill include:

Stormwater 1200-Z Industrial Stormwater General Permit –

- This permit regulates stormwater discharges from industrial facilities that may reach Oregon waterways, directly or through conveyance system such as ditches or storm drains.

The 1200-Z Permit modification is prepared and submitted to ODEQ concurrently with the ODEQ Solid Waste Facility permit modification process.

Oregon Title V (Air) Operating Permit -

- Air quality permits include enforceable conditions with which the owner or operator of a facility must comply. Some permit conditions are general to all types of emission units, and some permit conditions are specific to the source. The permit establishes limits on the types and amounts of air pollution allowed, operating requirements for pollution control devices or pollution prevention activities, and monitoring and reporting requirements

The Title V (Air) Operating Permit modification is prepared and submitted once the ODEQ Solid Waste Facility permit is issued.

A new permit which will be required for the project includes a Removal-Fill Permit for activity associated with fill required to construct an access road in a small area of wetland in the northeast corner of the development area (south side of Coffin Butte Road).

Oregon Department of State Lands Removal-Fill Permit

- Oregon's Removal-Fill Law (ORS 196.795-990) requires people who plan to remove or fill material in wetlands or waterways to obtain a permit from the Department of State Lands. This permit is broadly referred to as the "Removal-Fill Permit." The law applies to all landowners, whether private individuals or public agencies

Please let us know if you have any questions.

Sincerely;
Civil & Environmental Consultants, Inc.

Jeffery A. Shepherd, P.E.
Principal

Paul F. Burns
Principal

Attachment – ODEQ Solid Waste Landfill Guidance Document

ATTACHMENT

Section 1: Location Restrictions

1.1 Introduction

Regulatory reference

OAR 340-94-030 and 40 CFR Part 258 include location restrictions for new landfills or lateral expansions of existing landfills.

Location restrictions

The location restrictions address the following:

- airport safety
- flood plains
- wetlands
- fault areas
- seismic impact zones
- unstable areas
- critical habitat
- sensitive hydrogeologic environments

In this section

This section provides guidance on

- how to determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is located in a restricted area, and
- how to make the associated location restriction demonstrations

How to respond

Complete the appropriate location restriction demonstrations and place the associated documentation in the facility operating record. Notify the Department when the demonstration has been placed in the operating record. Cite all sources used in making each of the analyses and demonstrations.

Inadequate demonstrations

If an existing landfill unit cannot successfully meet the location restrictions, then the unit must be closed in accordance with OAR 340-94-120 and post-closure activities must be conducted in accordance with OAR 340-94-130.

Related information

Site Characterization Reports, Site Geotechnical Investigations, and the facility conceptual design should provide relevant information for making location restriction demonstrations.

1.2 Airport Safety

Notification to FAA

Determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is located within a five-mile (eight kilometer) radius of any airport runway end used by turbojet or piston-type aircraft. If so, notify the affected airport and the Federal Aviation Administration (FAA).

Need for demonstration

Determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is within

- 10,000 feet (3,048 meters) of any airport runway end used by turbojet aircraft, or
- 5,000 feet (1,524 meters) of any airport runway end used by only piston-type aircraft

If so, demonstrate that the landfill is designed and operated so that the landfill does not pose a bird hazard to aircraft. Include a copy of the notifications, and any responses received from the FAA or affected airport.

The hazard of birds

Birds may be attracted to landfill units to satisfy a need for water, food, nesting, or roosting. Scavenger birds such as starlings, crows, blackbirds, and gulls are most commonly associated with active landfill units. Where bird/aircraft collisions occur, these types of birds are often involved due to their flocking, feeding, roosting, and flight behaviors.

Bird hazard demonstration

A demonstration that a landfill unit does not pose a bird hazard to aircraft within specified distances of an airport runway end should address at least the following elements:

- regulated distance
- public use
- collision risk
- landfill operation and design

Demonstration of regulated distance

The distance measurement can be made using existing maps showing the relationship of existing runways at the airport to the existing or proposed new unit or lateral expansion. The measurement can be made by drawing a circle of appropriate radius from the centerline of each runway end. The measurement only should be made between the end of the runway and the nearest landfill unit perimeter, not between any other boundaries.

Maps: Topographic maps (USGS 15-minute series) or State, regional, or local government agency maps providing similar or better accuracy would allow direct scaling, or measurement, of the closest distance from the end of a runway to the nearest landfill unit

---

Demonstration of public use

The demonstration of whether the runway is part of a public use airport and whether all applicable public airports have been identified can be made by contacting the airport administration or the regional FAA office.

Note: The demonstration is not required for private airfields

---

Demonstration of collision risk

The demonstration should address the likelihood that the landfill unit may increase bird/aircraft collisions. One approach is to determine whether birds are attracted to the landfill unit and whether this increased population may result in more in bird/aircraft collisions. The evaluation of bird attraction can be based on field observations at existing facilities that have similar geographic location, design features, and operational procedures.

Demonstration of landfill operation and design

The landfill unit design features and operational practices significantly effect the potential for bird/aircraft collisions. The demonstration should include a discussion of techniques to reduce collision risk. The following landfill design and operation techniques may be employed to reduce the bird hazard to aircraft:

- waste management
- bird control
- landfill design

Waste management techniques

Waste management techniques to reduce the supply of food to these birds include:

- frequent covering of wastes
- shredding, milling, or baling wastes, and
- diverting wastes that represent a food source for birds by source separation, composting, waste minimization, or other methods

Frequent covering

Frequent covering of wastes effectively reduces the availability of the food supply. Depending on site operations, cover may need to be applied several times a day to minimize the working face.

Shredding, milling, or baling

Milling or shredding municipal solid waste breaks up food waste into smaller particle sizes and distributes the particles throughout non-food wastes, which dilutes food wastes and reduces the materials' attractiveness to birds.

Bird control techniques

The use of varying bird control techniques may prevent the birds from adjusting to a single method. The table below provides examples of various techniques. Many of these methods have limited long-term effects on controlling bird populations at landfills, as the birds adapt to the environment in which they find food.

Bird control technique	Example
visual deterrents	realistic models (still or animated) of the bird's natural predators (e.g., humans, owls, hawks, falcons)
sounds	cannons, distress calls of the scavenger birds, and sounds of its natural predators
physical barriers	fine wires strung across or near the working face
other more labor intensive methods	falconry and firearms

Landfill design

Proper design and operation can also reduce bird habitat. For example, good stormwater management can prevent surface water ponding, which limits a source of water for the birds.

Birds may also be attracted to a landfill unit as a nesting area. Closed landfill cells may provide a roosting habitat due to elevated ground temperatures and freedom from disturbance. Nesting can be minimized by examining the nesting patterns and requirements of undesirable birds and designing appropriate controls. For example, nesting by certain species can be controlled through the mowing and maintenance schedule at the landfill.

1.3 Floodplains

Need for demonstration

Determine if the proposed new or lateral expansion of an existing solid waste landfill is located in a 100-year floodplain. If so, demonstrate that the landfill will not:

- restrict the flow of the 100-year flood
- reduce the temporary water storage capacity of the floodplain, or
- result in washout of solid waste that poses a hazard to human health, the environment, wildlife, or land or water resources

Identification of floodplains

Identify floodplains using:

- flood insurance rate maps (FIRM) and flood boundary and floodway maps published by the Federal Emergency Management Agency (FEMA), or
- floodplain maps available through other agencies such as the U.S. Army Corps of Engineers; the U.S. Geologic Survey, the U.S. Soil Conservation Service, the Bureau of Land Management and state and local agencies

Maps not available: If floodplain maps are not available, and the facility is located within a floodplain, then a field study to delineate the 100-year floodplain may be required

Demonstration of temporary storage

To demonstrate that the facility does not significantly reduce the temporary storage capacity of the floodplain during the base flood, estimate the

- floodplain storage capacity that would likely exist in absence of the facility
- floodplain storage capacity available in the vicinity of the facility, and
- change in storage capacity and base flood elevation due to facility construction

Demonstration of washout

The location of facilities relative to the velocity distribution of floodwaters will greatly influence the susceptibility to washout. To demonstrate that the facility will not result in washout of solid wastes, provide a conservative estimate of the shear stress of the landfill components caused by the depth, velocity, and duration of impinging river waters during a 100-year storm event.

1.4 Wetlands

Need for demonstration

Determine and describe whether the proposed new or lateral expansion of an existing municipal solid waste landfill is located in wetlands. If so, demonstrate that the unit will not cause or contribute to significant degradation of the wetland.

Other required permits

If the municipal solid waste landfill unit is to be situated or significantly expanded in wetlands, then consult with and obtain a permit from the Corps of Engineers (COE). Include a copy of the permit or permit application in the demonstration, if applicable.

Reference: Section 404(b)(1) of the Clean Water Act

Involvement of other agencies

During the permitting process, the Department and the State Division of Lands will need to be contacted to schedule a site visit. In general, the COE will require notification and/or consultation on any proposed impact on any wetland regardless of the actual degree of the impact. Other agencies such as the Fish and Wildlife Service and the SCS may also need to be contacted.

Mitigation

Mitigation plans must be approved by the appropriate regulatory agencies and must achieve an agreed-upon measure of success. Examples of mitigation include restoration of degraded wetlands or creation of wetland acreage from existing uplands.

Wetlands identification

Wetlands are identified based on the presence of hydric soils, hydrophytic vegetation, and the wetland hydrology. These characteristics affect the functional value of a wetland in terms of its role in:

- supporting fish and wildlife habitats
- providing aesthetic, scenic, and recreational value
- accommodating flood storage
- sustaining aquatic diversity, and
- its relationships to surrounding natural areas through nutrient retention and productivity exportation (e.g., releasing nutrients to downstream areas, providing transportable food sources)

Examples of wetlands

The term "wetlands" includes swamps, marshes, bogs, and any areas that are inundated or saturated by ground water or surface water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions.

Wetlands assessment

A wetland assessment will need to be conducted by a qualified and experienced multi-disciplinary team. The assessment should identify:

- the limits of the wetland boundary based on hydrology, soil types and plant types
- the type and relative abundance of vegetation, including trees, and
- rare, endangered, or otherwise protected species and their habitats (if any)

Delineation methods

The current methods used to delineate wetlands are presented in "COE Wetlands Delineation Manual," 1987, per a January 1993, EPA and COE agreement. The Federal manual for “Identifying and Delineating Jurisdictional Wetlands” (COE, 1989) contains an extensive reference list of available wetland literature. For example, lists of references for the identification of plant species characteristic of wetlands throughout the United States, hydric soils classifications, and related wetland topics are presented. USGS topographic maps, National Wetland Inventory (NWI) maps, Soil Conservation Service (SCS) soil maps, wetland inventory maps, and aerial photographs prepared locally also may provide useful information.

Evaluation of wetland value

Evaluation of ecological resource protection may include assessment of the value of the affected wetland.

Methods for evaluating wetland value

Available methods include:

- analysis of functional value
- the Wetland Evaluation Technique (WET), and
- the Habitat Evaluation Procedure (HEP)

The most appropriate technique for a specific site should be selected in conjunction with the Department and other applicable regulatory agencies.

Analysis of functional value

The functional value of a given wetland is dependent on its soil, plant, and hydrologic characteristics, particularly the diversity, prevalence, and extent of wetland plant species. The relationship between the wetland and surrounding areas (nutrient sinks and sources) and the ability of the wetland to support animal habitats, or rare or endangered species, contributes to the evaluation of functional value.

WET

Wetland Evaluation Technique (WET) allows comparison of the values and functions of wetlands before and after construction of a facility, thereby projecting the impact a facility may have on a wetland. WET was developed by the Federal Highway Administration and revised by the COE (Adamus *et al.*, 1987).

HEP

Habitat Evaluation Procedure (HEP) was developed by the Fish and Wildlife Service to determine the quality and quantity of available habitat for selected species. HEP and WET may be used in conjunction with each other to provide an integrated assessment.

Locating in a wetlands

Erosion potential and stability of wetland soils and any dredged or fill material used to support the landfill unit should be identified as part of the wetlands evaluation. Any adverse stability or erosion problems that could affect the landfill or contaminant effects that could be caused by the landfill unit should be resolved.

Minimizing impacts

All practicable steps are to be taken to minimize potential impacts of the landfill unit to wetlands. A number of measures that can aid in minimization of impacts are available. Appropriate measure are site-specific and should be incorporated into the design and operation of the landfill unit. For example, placement of ground water barriers may be required if soil and shallow ground water conditions would cause dewatering of the wetland due to the existence of underdrain pipe systems at the facility.

It is possible that the landfill unit/facility will not directly displace wetlands, but that adverse effects may be caused by leachate or run-off. Engineered containment systems for both leachate and run-off should mitigate the potential for discharge to wetlands.

Unavoidable impacts

All unavoidable impacts must be "offset" or compensated for to ensure that the facility has not caused, to the extent practicable, any net loss of wetland acreage. Wetland offset studies require review and development on a site-specific basis. This compensatory mitigation may take the form of

- upgrading existing marginal or lower-quality wetlands, or
- replacement of wetlands

Upgrading existing wetlands

To identify existing wetlands that may be proposed for upgrade, a cursory assessment of surrounding wetlands and uplands should be conducted. The assessment may include a study to define the functional characteristics and inter-relationships of these potential wetland mitigation areas. An upgrade of an existing wetland may consist of transplanting appropriate vegetation and importing low-permeability soil materials that would be conducive to forming saturated soil conditions. Excavation to form open water bodies or gradual restoration of salt water marshes by culvert expansions to promote sea water influx are other examples of compensatory mitigation.

Replacement of wetlands

The Division of State Lands (DSL) has established offset ratios to determine how much acreage of a given functional value is required to replace the wetlands that were lost or impacted. Preservation of lands, such as through perpetual conservation easements, may be considered as a viable offset option. DSL offset ratios require for wetlands of an equivalent functional value, that a larger acreage be created than was displaced.

Monitoring the mitigation

Due to the experimental nature of creating or enhancing wetlands, a monitoring program to evaluate the progress of the effort should be considered and may be required as a wetland permit condition. The purpose of the monitoring program is to verify that the created/upgraded wetland is successfully established and that the intended function of the wetland becomes self-sustaining over time.

1.5 Critical Habitat

Need for demonstration	Determine if the municipal solid waste landfill unit is located where landfill activities could cause or contribute to the reduction of the likelihood of survival and recovery of a threatened or endangered species. If so, demonstrate the measures that will be taken to protect the species. Reference: OAR 340-94-030(3)
Other permits required	If the municipal solid waste landfill unit is to be situated or significantly expanded in a critical habitat, obtain a permit from the Secretary of Interior.
Information on threatened and endangered species	The Oregon Department of Fish and Wildlife maintains an up to date database of information on threatened and endangered species. The database coordinator can be reached at (503) 229-5454.

1.6 Fault Areas

Need for demonstration

Determine if faults, having displacement in Holocene time, are likely or have been identified in the vicinity of the proposed new or lateral expansion of an existing municipal solid waste landfill unit. If so, demonstrate that the landfill:

- is more than 200 feet (60 meters) of a fault that has had displacement in Holocene time, or
- that an alternative setback distance of less than 200 feet (60 meters) will prevent damage to the structural integrity of the landfill unit and protect human health and the environment

Fault danger

Proximity to a fault can cause damage through:

- movement along the fault which can cause displacement of facility structures
- seismic activity associated with faulting which can cause damage to facility structures through vibratory action, and
- earth shaking which can cause ground failures such as slope failures

Locating fault areas

U.S. Geological Survey (USGS) mapping can be used to determine if a proposed landfill unit is located in a Holocene fault area. A series of maps known as the "Preliminary Young Fault Maps, Miscellaneous Field Investigation (MF) 916" was published by the USGS in 1978. For information, call the USGS at 1-800-USA-MAPS (USGS National Center in Reston, Virginia) or by calling (303) 236-7477 (USGS Map Sales Center in Denver, Colorado). The Oregon Division of Geology and Mineral Industries (DGAMI) is a good local source of data on Holocene faults. They can be reached at (503) 731-4444 (Nature of Oregon Information Center).

Locating a fault zone that has moved since the USGS maps and other sources were published may require a geologic reconnaissance of the site and surrounding areas to identify and map these features.

1.7 Seismic Impact Zones

Need for demonstration

Determine if the proposed new or lateral expansion of an existing municipal solid waste landfill is located in a seismic impact zone. If so, demonstrate that all containment structures are designed to resist the maximum horizontal acceleration in lithified earth material for the site. To make the demonstration:

- determine the expected peak ground acceleration from a maximum strength earthquake that could occur in the area
- determine the site-specific seismic hazards such as soil settlement, and
- design the facility to withstand the expected peak ground acceleration

Note: containment structures include liners, leachate collection and storage systems, and surface water control systems

Definition: seismic impact zone

A Seismic Impact Zone is an area with a ten percent or greater probability that the maximum horizontal acceleration in lithified earth material expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10g in 250 years.

Determining horizontal acceleration

The determination of the maximum horizontal acceleration of the lithified earth material for the site (see Figure 1-1) can be made by reviewing the seismic 250-year interval maps in U.S. Geological Survey Miscellaneous Field Study Map MF-2120, entitled "Probabilistic Earthquake Acceleration and Velocity Maps for the United States and Puerto Rico" (Altermissin *et al*., 1991). To view the original of the map that is shown in Figure 1-1 (reduced in size), contact the USGS office in your area. The original map (Horizontal Acceleration - Base modified from U.S.G.S. National Atlas, 1970, Miscellaneous Field Studies, Map MF 2120) shows county lines within each state. For areas not covered by the aforementioned map, USGS State seismic maps may be used to estimate the maximum horizontal acceleration. The National Earthquake Information Center, located at the Colorado School of Mines in Golden, Colorado, can provide seismic maps of all 50 states.

Other sources of information

The National Earthquake Information Center maintains a database of known earthquakes and fault zones. Information on the location of earthquake epicenters and intensities may be available through DGAMI or the Earthquake Information Center. For information concerning potential earthquakes in specific areas, the Geologic Risk Assessment Branch of USGS may be of assistance. Other organizations that study the effects of earthquakes on engineered structures include the National Information Service for Earthquake Engineering, the Building Seismic Safety Council, the National Institute of Science and Technology, and the American Institute of Architects.

Impact of seismic activity on landfills

Studies indicate that earthquakes produce superficial (shallow) slides and differential displacement, rather than massive slope failures (U.S. Navy 1983). Stresses created by superficial failures can affect the liner system, final cover systems, and leachate and gas collection and removal systems. Tensional stresses within the liner system can result in fracturing of the soil liner and/or tearing of the flexible membrane liner.

Design considerations

The design of the facility slopes, leachate collection system, and other structural components should have built-in conservative design factors. Additionally, redundant precautionary measures should be designed and built into the various landfill systems. Establish precautions using the table below.

If the maximum horizontal acceleration in the area is	and the facility is	then
greater than 0.1g	-----	complete an engineering evaluation of seismic effects when preparing the landfill design
less than 0.1g	situated in an area with low strength foundation soils or soils with potential for liquefaction	complete an engineering evaluation of seismic effects when preparing the landfill design
less than 0.1g	not situated in an area with low strength foundation soils or soils with potential for liquefaction	assess the facility for the effects of seismic activity, and design the landfill accordingly

---

Engineering evaluation of seismic effects

The engineering evaluation should examine soil behavior with respect to earthquake intensity, including an evaluation of seismic effects on foundation soil stability and waste stability under seismic loading. When evaluating soil characteristics, it is necessary to know the soil strength as well as the magnitude or intensity of the earthquake in terms of peak acceleration. Other soil characteristics, including degree of compaction, sorting (organization of the soil particles), and degree of saturation, may need to be considered because of their potential influence on site conditions.

Example: deposits of loose granular soils may be compacted by the ground vibrations induced by an earthquake resulting in large uniform or differential settlements of the ground surface

---

Design implications

Design modifications to accommodate an earthquake may include shallower waste sideslopes, more conservative design of dikes and run-off controls, and additional contingencies for leachate collection in case primary systems are disrupted. Strengths of the landfill component should be able to withstand these additional forces with an acceptable factor of safety. The design should be based on the evaluation of seismic effects.

Materials to use

Well-compacted cohesionless embankments or reasonably flat slopes in insensitive clay are less likely to fail under moderate seismic shocks (up to 0.15g and 0.20g acceleration). Embankments made of insensitive, cohesive soils founded on cohesive soils or rock may withstand even greater seismic shocks. For earthen embankments in seismic regions, designs with internal drainage and core material most resistant to fracturing should be considered.

Vulnerable landforms and materials

Slope materials vulnerable to earthquake shocks include:

- very steep slopes of weak, fractured and brittle rocks or unsaturated loess are vulnerable to transient shocks caused by tensional faulting
- loess and saturated sand may be liquefied by seismic shocks causing the sudden collapse of structures and flow slides
- similar effects are possible in sensitive cohesive soils when natural moisture exceeds the soil's liquid limit, and
- dry cohesionless material on a slope at an angle of repose will respond to seismic shock by shallow sloughing and slight flattening of the slope

In general, loess, deltaic soils, floodplain soils, and loose fills are highly susceptible to liquefaction under saturated conditions (USEPA, 1992).

Computer modeling

Geotechnical stability investigations frequently incorporate the use of computer models to reduce the computational time of well-established analytical methods. Several computer software packages are available that approximate the anticipated dynamic forces of the design earthquake by resolving the forces into a static analysis of loading on design cross sections. A conservative approach would incorporate both vertical and horizontal forces caused by bedrock acceleration if it can be shown that the types of material of interest are susceptible to the vertical force component. Typically, the horizontal force caused by bedrock acceleration is the major force to be considered in the seismic stability analysis.

Examples of computer models: PC-Slope by Geoslope Programming (1986), FLUSH by the University of California

Staffing

The use of professionals experienced in seismic analysis is strongly recommended for design of facilities located in areas of high seismic risk.

1.8 Unstable Areas

Need for demonstration

Determine if the site is located in an unstable area. If so, demonstrate that engineering measures have been incorporated into the appropriate landfill design to protect the structural integrity of the landfill.

Note: The results of the site stability investigation (see section 4) should be assessed in making this determination

Geotechnical factors

Consider the following factors when determining whether an area is unstable:

- on-site or local soil conditions that may result in significant differential settling
- on-site or local geologic or geomorphologic features, and
- on-site or local man-made features or events (both surface and subsurface)

Natural unstable areas

Natural unstable areas include those areas that have poor soils for foundations or are susceptible to mass movement. Examples are described below:

- Areas with compressible or expansive soils.
- Expansive soils usually are clay-rich soils that, because of their molecular structure, tend to swell and shrink by taking up and releasing water and thus are sensitive to a variable hydrologic regime. Bentontite is a commonly used example.
- Soils that are subject to rapid settlement (subsidence) include saturated silts, unconsolidated clays, and wetland soils in general.
- Sloped areas subject to mass movement such as avalanches, landslides, debris slides and flows, and rock slides. Such areas can be situated on steep or gradual slopes.

Human-induced unstable areas

Examples of human-induced unstable areas are described below:

- The presence of cut and/or fill slopes during landfill construction causing slippage of existing soil or rock.
- Excessive drawdown of ground water increases the effective overburden on the foundation soils underneath the unit causing excessive settlement or bearing capacity failure of the foundation soils.
- A closed landfill as the foundation for a new landfill ("piggy-backing") becoming unstable if the foundation wastes have not undergone complete settlement.

Unstable area demonstration contents	Assess the ability of the soils and/or rock to serve as a foundation and the ability of site embankments and slopes to maintain a stable condition. Develop a design that will address these types of concerns and prevent possible associated damage to structural components.
Stability assessment	In designing a new unit or lateral expansion or re-evaluating an existing unit, conduct a stability assessment to identify stability problems and preventive measures.
Source of information on natural features	• Nature of Oregon Information Center, Oregon Department of Geology and Mineral Industries at 731-4444 • Regional or local U.S. Soil Conservation Service soil maps • Aerial photographs, and • Site-specific investigations
Finding human-induced instability	To evaluate possible sources of human-induced ground instability, the site and surrounding area should be examined for activities related to extensive withdrawal of oil, gas, or water from subsurface geologic units. Evaluate construction or other operations that may result in ground motion (e.g., blasting).
Types of soil and rock failures	Principal modes of failure in soil or rock include: • rotation (change of orientation) of an earthen mass on a curved slip surface approximated by a circular arc • translation (change of position) of an earthen mass on a planar surface whose length is large compared to depth below ground • displacement of a wedge-shaped mass along one or more plans of weakness; • earth and mud flows in loose clayey and silty soils, and • debris flows in coarse-grained soils
Common landfill failures	Two common types of failures can occur at a landfill unit: • settlement • loss of bearing strength

Settlement

Settlement beneath a landfill unit, both total and differential, should be assessed and compared to the elongation strength and flexure properties of the liner and leachate collection pipe system. Small amounts of settlement can damage leachate collection piping and sumps.

Allowable settlement is typically expressed as a function of total settlement because differential settlement is more difficult to predict. However, differential settlement is a more serious threat to the integrity of the structure than total settlement. Differential settlement generally occurs beneath a landfill in response to consolidation and dewatering of the foundation soils during and following waste loading.

Loss of bearing strength

Loss of bearing strength is a failure mode that can occur in areas that have expansive, compressible, or liquefaction-prone soils. Loss of bearing strength has occurred at sites where excavations for new landfill units near existing filled areas reduced the mass of the soil at the toe of the slope and the overall strength (resisting force) of the foundation soil.

1.9 Sensitive Hydrogeologic Environments

Need for demonstration

Determine if the landfill unit is located in a sensitive hydrogeologic environment.

Definition: sensitive hydrogeologic environments

Sensitive hydrogeologic environments are defined as:
- gravel pits excavated into or above a water table aquifer
- areas underlain by a sole source aquifer or other sensitive aquifer, and
- designated wellhead protection areas

Reference: OAR 340-90-030(4)

Definition: sensitive aquifer

A sensitive aquifer is defined as ". . . any unconfined or semi-confined aquifer which is hydraulically connected to a water table aquifer, and where flow could occur between the aquifers due to either natural gradients or induced gradients resulting from pumpage . . . ."

Location prohibition

OAR 340-94-030(4) does not allow landfill units to be located in sensitive hydrogeologic environments where the Department has determined that:
- groundwater must be protected from pollution because it has existing or potential beneficial uses, or
- existing natural protection is insufficient or inadequate to minimize the risk of polluting groundwater

1.10 Additional Resources

References

U.S. EPA's Solid Waste Disposal Facility Criteria, Technical Manual (EPA 530-R-93-017)

40 CFR Part 230 (Guidelines for Specification of Disposal Sites for Dredged or Fill Materials)

Section 2: Phase I Landfill Site Characterization

2.1 Introduction

Characterizing the site

Phase I Site Characterization, the initial stage of data collection, establishes a preliminary framework for understanding the soils, geology and hydrogeology and plans the Phase II Site Characterization.
Phase II Site Characterization (see Section 3) will evaluate site-specific subsurface conditions in greater detail including the depth and extent of the uppermost (water bearing) geologic units and hydraulically interconnected units, the lithologic and hydraulic properties of these units, groundwater flow patterns, and other factors.

Regulatory reference

OAR 340-93-130(4) requires a soils, geology and hydrogeology report and a feasibility study report for a new landfill or an expansion of an existing landfill. OAR 340-94-080, OAR 340-40 and 40 CFR Part 258 address groundwater hydrology, quality and groundwater monitoring.

Objectives of Phase I

The main objectives of the Phase I site characterization study are to
- describe existing site conditions
- determine if the site is suitable for landfill construction
- provide sufficient base-line information for developing the facility design, construction program, operations plan and environmental monitoring program.

How to respond

Prepare and submit to the Department a report describing the work performed in the Phase I Site Characterization. Geologic and hydrogeologic tasks should be performed by or under the direct supervision of an Oregon Registered Geologist with experience in conducting hydrogeologic investigations.

Report content

The Phase I Site Characterization report should address, at a minimum, completion of the tasks described in this subsection and the location restrictions defined in Section 1. Following the organizational format of this guidance will expedite Department review of the report. The report should be stamped by the Registered Geologist who performed or supervised the investigation.

In this section

This Section describes the recommended tasks that should be completed in preparation of Phase I Site Characterization study report. The following topics are addressed:

- existing conditions
- climate/meteorology
- hydrology
- water balance
- water use inventory
- geology and hydrogeology investigation, and
- phase II workplan

This guidance identifies the scope of investigations necessary to comply with the Solid Waste rules and provide the Department with sufficient data to evaluate the permit application or other submittals.

Related references

This Section focuses on technical guidance and format for the Phase I Site Characterization Report. Groundwater Monitoring requirements are addressed in more detail in Section 10 (Environmental Monitoring). Monitoring well construction standards are contained in a separate document ("Guidelines for Monitoring Well Drilling, Construction and Decommissioning," August 24, 1992).

2.2 Existing conditions

Site characterization task	Describe existing site conditions by providing the information in this subsection.
Site location	Describe the site location with respect to known or easily identifiable landmarks. Describe the site location in terms of the section, township, and range location for the site. Describe access to the site from the nearest U.S. or State Highway.
Legal description	Provide a legal description of the tract or tracts of land which have been or are proposed to be used for waste disposal activities.
Vicinity map	Prepare a map or series of maps showing the facility site and the area within at least a five-mile radius of the site boundary. The map(s) should clearly show the following: • the site location • the existing and proposed zoning and land uses • residential areas • public and private water supply wells • surface waters and surface water intakes • boundary of any municipal water supply service areas • access roads, bridges, railroads, and airports • historic sites • other existing and proposed man-made or natural features relating to the facility, and • the drawing date, a North arrow, and a bar scale Map format: The map should be on a U.S. Geological Survey (USGS) 7 1/2 minute quadrangle base or, if such a map is not available, a substitute base such as an enlargement of a USGS 15 minute quadrangle map, an Oregon Department of Transportation county map or city map at a similar scale.

Aerial photographs

Prepare a stereo pair of standard size (9 inches by 9 inches) recent vertical aerial photographs with a scale up to 1:40,000 which show the site and the area within at least a one-mile radius of the site boundary. Mark the site boundaries and actual fill areas on one of the photographs. Oblique aerial photographs or surface level photographs from various points around the site perimeter may also be submitted in support of the application. Photocopied reproductions of aerial photographs will not be accepted as fulfillment of this requirement.

Information concerning public agency sources for aerial photographs may be obtained by contacting:

Nature of Northwest
Oregon Dept. of Geology & Mineral Industries
800 NE Oregon Street #5, Suite 177
Portland, OR 97232
Phone: (503) 731-4444

Adjacent landowners

Show on a location map or on County Tax Lot map(s), the names and mailing addresses of all landowners within one quarter mile of the property and any other landowners identified as being affected by the proposed facility. Summarize this information on a separate list cross-referenced to the location map or the County Tax Lot map(s). Cite the source for obtaining the names and mailing addresses of persons identified as affected parties.

Site map

Prepare a detailed site map scaled at not more than one inch equals 200 feet (or other scale approved by the Department) that shows the following:

- the geographical location and boundaries of the disposal site
- the topography of the site and area within at least 1/4 mile of the site with contour intervals not to exceed five feet for slopes greater than five percent, or two feet if slopes are less than five percent
- natural features of the land including seeps, springs, streams, ponds and wetlands
- man-made features, including buildings, excavations, pipelines, utilities, recycling facilities, fences, roads, parking areas, drainage culverts, ditches, ponds, berms and dikes
- boundaries of all proposed, active, and closed waste disposal areas, and boundaries of all existing and proposed soil borrow areas
- locations of all existing and proposed borings, piezometers, monitoring wells, test pits, water supply wells, and any other facility monitoring or sampling points or devices
- benchmarks and permanent survey markers, and
- the drawing date, a north arrow, a bar scale, and an explanation of all map symbols

Use the National Geodetic Vertical Datum of 1929 as the vertical elevation datum, and the Oregon State Plane Coordinate System (ORS 93.330) as the horizontal control.

Map preparation: The map(s) should be prepared and stamped by a registered land surveyor or civil engineer. Surveyed well locations should:

- provide a horizontal accuracy of 0.2 feet (0.06 meters)
- provide the elevation of the land surface with a vertical accuracy of 0.1 feet (0.03 meters)
- provide the marked level at the top of the well casing with a vertical accuracy of 0.01 feet (0.003 meters)
- use National Geodetic Vertical Datum of 1929 as the vertical elevation control, and the Oregon State Plane Coordinate System (ORS 93.330) as the horizontal control
- describe the location in either latitude and longitude coordinates accurate to 0.1 seconds in latitude and longitude or UTM coordinates

2.3 Climate/Meteorology

Site characterization task	Provide current information based on or extrapolated from data collected at the closest reporting weather station or stations including: • average annual precipitation and monthly distribution of precipitation • average annual evaporation and monthly distribution of evaporation • average annual prevailing wind direction and monthly variation in wind direction • average and maximum wind velocities and monthly variations in wind velocity, and • average annual temperature and monthly variations in temperature
Obtaining information	This information can be obtained from the National Oceanic and Atmospheric Administration (NOAA), or other federal or state agencies reporting meteorological data.
On-site station	A site-specific station may need to be created if data from the nearest established meteorological station is not representative of site conditions.

2.4 Hydrology

Site characterization task	Evaluate and describe the surface water drainage of the site and of the surrounding area within at least a one-mile radius of the site. This information should include a map or maps at a scale of 1:24,000 showing major perennial, ephemeral and intermittent drainage channels, and their tributaries.
Map content	The maps should identify all existing wetlands and estuaries, and show the boundaries of the 100-year floodplain, based on data collected by the Federal Emergency Management Agency or other federal or state agencies reporting flood management data. Provide the minimum, maximum and average annual flow rates including monthly variations for all major streams. Values should be based on stream gauging data collected by the U.S. Geological Survey or other federal or state agencies reporting stream gauging data.

2.5 Water balance

Site characterization task	Analyze the average annual site water budget including precipitation, runoff, infiltration and evapotranspiration. Determine the monthly variations of each of these parameters for a one-year period.
Methods	Acceptable water balance methods include Thornthwaite-Mather (1957), the EPA Water Balance (1975), the EPA Help Model (1984), and/or other methods approved in advance by the Department.

2.6 Water Use Inventory

Site characterization task	Inventory and identify all water wells and water usage on-site and within a one-mile radius of the site boundary. Prepare a water well inventory report.
Well inventory	Identify all active and inactive water wells, irrigation wells, and surface water usage points within the targeted radius. Identify and field check all water usages within this radius which are listed in the drillers' log files or other records of the Oregon Water Resources Department (OWRD). Areas within the radius of investigation that are served by a municipal water supply should be included in the OWRD well records search.
Survey	Conduct a door-to-door field survey to identify wells not accounted for in OWRD files. For all wells identified in the OWRD files and the door-to-door survey, record the following information: • name and address of the well owner • name and address of the driller • date of drilling • well location • aquifer screened • approximate land surface elevation • depth of well • materials and construction (including casing, screen and annular seal depths and intervals) • reported yield • use of the water • reported or measured static and pumping water levels (or well drawdown) and dates of measurement, and • any available water quality data

Alternative to survey

In lieu of the door-to-door survey, provide the following information for areas served by a municipal supply:

- a map scaled at 1:24,000 or larger showing the boundary of the service area and the raw water intake location
- a record search for any other water usage within the radius of investigation
- a description of surface water supplies including the intake location, average daily and yearly withdrawal rates, and monthly distribution of withdrawals, and
- a description of groundwater supplies including their location, geologic logs and construction, average daily and yearly pumpage, monthly distribution of pumpage, and static and pumping water levels by well and aquifer

---

Report content

The water well inventory report should include a map at a scale of 1:24,000 or larger showing the location and use of each well/surface water use point, and a table presenting the required information for each point. The report should include a copy of each available drillers' log, and cross-reference the logs to the well inventory maps and forms.

2.7 Geology and Hydrogeology Investigation

Site characterization task

Conduct a preliminary geology and hydrogeology investigation. Evaluate the regional geology and hydrogeology based on geological reconnaissance field mapping and existing published or unpublished reports and data from state and federal agencies, universities, consultants or other sources.

Investigation report

In the Phase I Site Characterization report:

- describe the regional geology including the age, areal and subsurface distribution, thickness, physical properties and genesis of major stratigraphic units; and the age, occurrence, orientation and physical description of major structural features
- describe the regional hydrogeology including the depth, thickness, physical characteristics and lateral persistence of major and minor aquifers and aquitards, rates and directions of groundwater flow, areas of recharge and discharge (including water wells), hydrologic boundaries, seasonal variations in groundwater levels and flow, and chemical quality of the groundwater
- describe the thickness, lateral extent, hydraulic conductivity and attenuative capacity of all in-situ geologic materials between the proposed base excavation for the landfill and the uppermost aquifer
- evaluate and explain the degree of protection afforded by the properties and extent of geologic materials described above
- prepare a hydrogeologic map of the site and the area within at least a one-mile radius of the site scaled at not more than one inch equals 2,000 feet that shows the surficial geology, the elevation of the water table or potentiometric surface and the regional groundwater flow direction (from published sources or field measurements), and the locations of known discharging wells
- prepare two cross-sections oriented at approximately right angles to each other, which illustrate the regional geology and hydrogeology of the site and vicinity, and
- list sources used to prepare descriptions

Geologic hazards

Geologic hazards may include seismic impacts, mass movement (e.g., landslides), unstable soils, flood inundation, shallow groundwater levels, tsunami, and volcanic eruptions. Location restrictions under OAR 340-94-030 address considerations such as Holocene fault zones, seismic impact areas and unstable areas.

Earthquake safety

Evaluate the earthquake safety of the site. The analysis should include

- a description of the seismo-tectonic setting and seismic history of the area, including size, frequency, and location of historic earthquakes
- potential for area to be affected by surface rupture, including sense and amount of displacement, and width of surface deformation zone
- probable response of site to likely earthquakes, including estimated ground motion, maximum ground acceleration, velocity and displacement
- potential for area to be affected by earthquake-induced landslides or soil liquefaction, and
- potential for area to be affected by regional tectonic deformation (subsidence or uplift)

To the extent possible, identify and evaluate all other known or suspected geologic hazards which may affect the design, construction, and operation of the facility.

2.8 Phase II Workplan

Propose workplan	Prepare a proposed work plan and schedule for conducting the Phase II Site Characterization Study and preparing a final report.
Workplan approval	This work plan should receive Department approval prior to the actual onset of site work. Section 3 of this guidance describes Phase II Site Characterizations.

2.9 Additional Resources

Reference	"Location Information Needed for the Groundwater Database," March 8, 1992 (DEQ)
Contacts	Oregon Maps and Aerial Photography, Oregon Department of Geology and Mineral Resources Driller's log files, Oregon Water Resources Department
Methods to determine water balance	Thornthwaite-Mather (1957) U.S. EPA Water Balance (1975) U.S. EPA "Hydrologic Evaluation of Landfill Performance (HELP) Model" (1984)

Section 3: Phase II Landfill Site Characterization

3.1 Introduction

Characterizing the site

Phase I Site Characterization (see Section 2), the initial stage of data collection, established a preliminary framework for understanding the soils, geology and hydrogeology and for planning the Phase II Site Characterization.
Phase II Site Characterization evaluates subsurface conditions in greater detail including the depth and extent of the uppermost (water bearing) geologic units and hydraulically interconnected units, the lithologic and hydraulic properties of these units, groundwater flow patterns, and other factors.

Basis for investigation

The scope of the investigations for Phase II site characterization should be based on the Phase I study results and the work plan developed as part of the Phase I study. If the proposed project involves a lateral expansion of an existing landfill unit, portions of the Phase II work may have previously been completed. If so, the appropriate documents should be referenced in the Phase II report.
Phase II Site Characterizations are frequently negotiated with the Department and may include direct Department involvement.

Objective of Phase II

The main objective of the Phase II site characterization study is to describe and evaluate the site geology and hydrogeology, including all stratigraphic units encountered, the uppermost aquifer or waterbearing zone, and all other potential zones of contaminant transport.

Definition: uppermost aquifer

U.S. EPA has defined the "uppermost aquifer" as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facilities boundary. U.S. EPA guidance refers to any saturated strata capable of producing representative groundwater samples as an aquifer.

How to respond

Prepare and submit to the Department a report describing the work performed in the Phase II site characterization. Geologic and hydrogeologic tasks must be performed by or under the direct supervision of a Registered Geologist with current Oregon registration and with experience in conducting hydrogeologic investigations, in accordance with OAR 340-93-130.

Report content

The Phase II Site Characterization report should address, at a minimum, completion of the tasks described in this subsection. Following the organizational format of this guidance will expedite Department review of the report. The report should bear the stamp of the Registered Geologist who performed or supervised the investigation.

Report illustrations

The report should contain illustrations, including the following:

- maps showing the as-built location of all borings, monitoring wells and other sampling locations
- boring logs
- as-built well construction details
- geologic maps and cross sections
- water table or potentiometric surface maps for all major aquifers or water-bearing zones, and
- geologic-structure contour maps depicting the soil-bedrock interface or other important subsurface features

---

In this section

This Section describes the recommended tasks that should be completed in preparation of the Phase II Site Characterization Report. The following topics are addressed:

- surface investigation
- subsurface exploration
- environmental testing
- groundwater quality testing

Related references

This Section focuses on technical guidance and format for the Phase II Site Characterization Report. Groundwater Monitoring requirements are addressed in more detail in Section 10 (Environmental Monitoring). Monitoring well construction standards are contained in a separate document ("Guidelines for Monitoring Well Drilling, Construction and Decommissioning," August 24, 1992).

3.2 Surface Investigations

Site characterization task	Conduct appropriate surface mapping and surface geophysical logging to generate surface geology information, provide a basis for subsurface exploration, and delineate areas of previous waste disposal activities.
Surface geological mapping	Map the site in sufficient detail to determine the areal distribution of all surficial and bedrock units exposed across the entire site.
Standards	Practices and techniques used to obtain site-specific geologic and hydrogeologic data should be up-to-date, and consistent with industry-wide standards. All work should conform to applicable American Society for Testing and Materials (ASTM) standards, and/or appropriate U.S. Environmental Protection Agency (U.S. EPA) or Department guidelines.
Geophysical techniques	Geophysical techniques for performing surface investigations may include, but are not limited to, surface seismic, resistivity, gravity, radar, or magnetic surveys.

3.3 Subsurface Explorations

Site characterization task	Determine the geology and hydrogeology beneath the site through subsurface exploratory methods. Select the appropriate method(s) of subsurface exploration for the site that will allow collection of representative samples of subsurface media. A sufficient number of borings or other exploratory holes must be completed to adequately characterize the stratigraphy, and groundwater dynamics beneath the entire site.
Depth of investigation	The depth of investigation should be 100 feet below the landfill unit's proposed base excavation, or until the first encountered saturated zone is fully penetrated, whichever is deeper.
Methods	Borings, core drilling, test holes, test pits, cone penetration tests or other methods should be used.
Boring density	At least one boring should be continuously cored to obtain precise stratigraphic data and to obtain relatively undisturbed samples for laboratory testing and analysis. If a site is geologically complex or larger than five acres, additional continuously cored holes may be required to interpret stratigraphic and structural variations.
Standards	All borings should be constructed in accordance with applicable standards and guidelines, including: • "Guidelines for Groundwater Monitoring Well Drilling, Construction and Decommissioning," August 24, 1992 • standards developed by ASTM [such as D-5092-90] • OAR 690-240 Sampling methods should conform to ASTM D-1587, ASTM D-1586 or ASTM D-2113, as applicable.

Describe soil and overburden deposits

Classify soil and overburden deposits according to ASTM D-2488 and describe in detail according to their texture, color, mineralogy, moisture content, degree of weathering, geologic origin, and other relevant characteristics. The ASTM D-2488 visual method should be supplemented by appropriate ASTM D-2487 laboratory tests (i.e., mechanical and/or hydrometer grain size and Atterberg Limit tests) on representative samples from each stratigraphic unit.

Rock classification

Classify rock according to its lithology, mineralogy, color, grain size, degree of cementation, degree of weathering, density and orientation of fractures, other primary and secondary features, physical characteristics, and rock quality designation.

Documentation

Prepare a detailed geological log of each boring incorporating all information. Prepare a clear, labeled, photographic record of representative rock cores

Reference: Section 8.0 of the Department's August 24, 1992 guidance entitled "Groundwater Monitoring Well Drilling, Construction and Decommissioning"

Log content

The geological log should include, but is not limited to:

- the location of the hole
- the date drilled, driller's name and affiliation
- the site geologist's name and affiliation
- the elevation of the land surface surveyed to the nearest 0.01 foot
- the size (diameter) and total depth of the hole
- the type of drilling rig and method of drilling
- the type and volume of drilling fluids or additives used
- the penetration rate or standard penetration resistance
- the sampled intervals and the percent recovery
- the stratigraphic and lithologic information
- any aquifers, water-bearing zones and high permeability or fracture zones encountered
- any contamination observed
- any other drilling observations, including lost circulation zones or other difficulties encountered during drilling
- deposit classifications and descriptions
- the classification system used for deposit classification, and
- rock classifications

Geophysical	Perform appropriate downhole geophysical logging techniques to supplement data collected in the surface investigations.
Geophysical techniques	Geophysical techniques for subsurface explorations may include, but are not limited to, downhole caliper, SP, resistivity, induction, natural gamma, gamma-gamma, neutron density, sonic, dielectric, or other logging techniques.
Related activities	Subsurface exploration activities should be planned to maximize data transfer between geologic/hydrogeologic and geotechnical investigations.

3.4 Hydrogeologic Testing

Site characterization task

Conduct appropriate hydrogeologic testing to characterize the rate and directions of groundwater movement.

Unsaturated zone testing

Determine the saturated and unsaturated hydraulic conductivity and the vacuum pressure of unsaturated soils through field testing. Determine the porosity and moisture content of unsaturated soils through laboratory testing or geophysical techniques. Evaluate the spatial and temporal variability of these properties.

Saturated zone testing

Determine the hydraulic conductivity of all saturated water-bearing zones and aquifers identified in the subsurface investigation through field testing, as outlined in the Department's August 24, 1992 guidance, "Groundwater Monitoring Well Drilling, Construction and Decommissioning."

If the estimated hydraulic conductivity is...	Then...
greater than 10^{-3} cm/sec	an aquifer pumping test should be performed
less than 10^{-3} cm/sec	rising or falling head slug tests should be performed

Aquifer parameters

Determine the following:

- water table or potentiometric surface gradient
- rate and direction of groundwater flow for each aquifer or water-bearing zone
- vertical gradient between water bearing zones
- porosity for all aquifers and water-bearing zones identified during subsurface exploration, using laboratory or geophysical techniques, and
- hydraulic conductivity of all aquitards through laboratory and/or field testing

3.5 Environmental Testing

Site characterization task

Conduct appropriate environmental testing to assess background environmental quality prior to waste placement or to identify impacts from prior waste disposal practices.

Groundwater quality testing

Collect groundwater samples that are representative of formation water. Analyze these samples for the constituents and parameters listed in the table below.

Group	Parameters	Notes
Field indicators	Elevation of water level Specific Conductance pH Dissolved Oxygen Temperature Eh	These parameters must be measured in the field at the time samples are collected, either down-hole in situ, in a flow-through well, or immediately following sample recovery, with instruments calibrated to relevant standards
Laboratory indicators	Hardness (as $CaCO_3$) Total Dissolved Solids Total Alkalinity (as $CaCO_3$) Total Suspended Solids Specific Conductance (lab) Chemical Oxygen Demand pH (lab) Total Organic Carbon	Sample handling, preservation, and analysis are determined by requirements for each individual analyte: EPA or AWWA Standard Methods techniques must be followed.
Common anions and cations	Calcium (Ca) Manganese (Mn) Sulfate (SO_4) Magnesium (Mg) Ammonia (NH_4) Chloride (Cl) Sodium (Na) Carbonate (CO_3) Nitrate (NO_3) Potassium (K) Bicarbonate (HCO_3) Silica (SiO_2) Iron (Fe)	Dissolved concentrations must be measured. Samples must be field-filtered and field-preserved according to standard DEQ and/or EPA guidelines and analyzed by appropriate EPA or AWWA Standard Methods techniques. Results must be reported in mg/L and meq/L.

<table>
<tr><td>Trace metals</td><td>Antimony (Sb)
Chromium (Cr)
Selenium (Se)
Arsenic (As)
Cobalt (Co)
Silver (Ag)
Barium (Ba)
Copper (Cu)
Thalladium (Tl)
Beryllium (Be)
Lead (Pb)
Vanadium (V)
Cadmium (Cd)
Nickel (Ni)
Zinc (Zn)</td><td><table><tr><th>If the Total Suspended Solids concentration is...</th><th>then analyze for...</th></tr><tr><td>less than or equal to 100 mg/L in the sample</td><td>total concentrations (unfiltered)</td></tr><tr><td>greater than 100 mg/L in the sample</td><td>both total (unfiltered) and dissolved (field-filtered)</td></tr></table>
Samples must be field-preserved according to standard DEQ and/or EPA guidelines and analyzed by EPA Method 6010 or Department-approved equivalent. Results must be reported in mg/L.</td></tr>
<tr><td>Volatile organics</td><td>Analysis for all compounds detectable by EPA Method 8260 or EPA Method 524.2, including a library search to identify any unknown compounds present.</td><td>Method 8260 comprises the volatile organic constituents parameter group. Facilities that want to use Methods 8010 and 8020 as an alternative must obtain approval by the Department prior to use.</td></tr>
</table>

Surface water quality testing

Collect surface water samples as needed to characterize surface water quality up- and down-stream of the facility.

Other environmental testing

Conduct appropriate landfill gas testing, air quality test, or other environmental test as required to establish background environmental quality or to identify impacts from previous waste disposal practices.

Methods

Sample collection, handling, preservation, shipment, analysis and QA/QC should conform to procedures described in the approved work plan and in U.S. EPA SW-846, Test Methods for Evaluating Solid Waste, and Chapter 4 of the RCRA Technical Enforcement Guidance Document (TEGD), or other Department-approved methods.

3.6 Additional Resources

References

"Guidelines for Monitoring Well Drilling, Construction and Decommissioning," August 24, 1992 (DEQ)

Section 4: Geotechnical Investigations

4.1 Introduction

Investigation	As part of the Phase I Site Characterization, or other efforts to characterize the site, a Phase I Geotechnical Investigation may be performed.
How to respond	Prepare and submit a Geotechnical Report to support the Site Characterization Report. Geotechnical tasks must be performed by or under the direct supervision of a certified engineering geologist or professional civil engineer with current Oregon registration and experience in conducting engineering geology or geotechnical investigations.
Relation to engineering	Phase I and II Geotechnical Studies should produce sufficient site data to perform all relevant engineering analyses.
In this section	This section describes the tasks that should be performed as part of Phase I and Phase II Geotechnical Investigations.

4.2 Phase I Geotechnical Investigation

Objective of investigation

Conduct a preliminary geotechnical investigation designed to accomplish the following objectives:

- characterize the variability, depth, aerial extent and engineering properties of on-site soils and other overburden deposits
- inventory soils and other overburden deposits suitable for use in construction, and identify the proposed use for these materials
- identify geotechnical considerations (such as settlement and slope stability) which must be addressed in the engineering design and/or further characterized by a Phase II Geotechnical assessment, and
- develop a work plan for conducting a Phase II Geotechnical investigation, as necessary, to adequately characterize on-site soils and other geotechnical considerations

Tasks to be addressed

The Phase I Geotechnical Investigation should address, at a minimum, the tasks described in this subsection.

Describe surficial soils

Evaluate agricultural soil types and their distribution site-wide and within at least a one-mile radius of the site. At a minimum, prepare a soils map and describe the soils in the area. Basic data should be obtained from the U.S. Department of Agriculture Soil Conservation Service (SCS), and supplemented by additional site-specific reconnaissance or tests, as necessary, to confirm the accuracy and reliability of the SCS data.

Describe subsoils

Excavate backhoe test pits in a grid pattern across the site to characterize the depth, areal extent and uniformity of subsoils (overburden deposits). Collect representative soil samples for testing. Plot all test pits on a site map and log each test pit to include

- the location of the excavation
- a description of surface features before excavation
- the date excavated, excavator's name and affiliation
- the site geotechnical engineer's or engineering geologist's name and affiliation
- the elevation of the land surface surveyed to the nearest 0.01 foot
- depth of the excavation
- a detailed description of each stratigraphic unit, its depth, texture, color, mineralogy, grain properties, consistency or relative density, moisture content, degree of weathering, geologic origin, macroscopic features (e.g., root holes, slickensids), and other relevant or distinguishing characteristics
- each stratigraphic units Unified Soil Classification, using ASTM D-2488 visual method, and
- a clear, labeled, photographic record of all test pits

Supplemental tests

Supplement ASTM-D2488 with appropriate grain size and Atterberg limit tests on a representative number of samples of each stratigraphic unit.

Evaluate engineering properties of on-site materials

Analyze representative soil samples to evaluate their engineering properties as follows:

- determine the stability of on-site materials for foundation and sidewall construction
- determine the suitability of on-site materials facility construction, and
- inventory usable soils

Test soils

Perform the following tests:

- strength and compressibility (e.g., triaxial compression tests, consolidation tests) of foundation materials
- the following properites of low-permeability liner layer materials:
  - natural moisture content
  - in-situ density
  - compaction curves
  - Atterberg Limits
  - percent fines passing a #200 sieve
  - percent clay size content
  - percent coarse material retained on a #4 sieve, and
  - laboratory hydraulic conductivity
- grain size distribution and representative laboratory hydraulic conductivity of proposed drainage layer materials, correlate grain size distribution conductivity data

---

Investigate site stability

Evaluate the site to identify and characterize any unstable conditions that could adversely impact facility structures, and to obtain sufficient data to plan more detailed Phase II studies. Stability analyses should be based on the investigator's professional judgment, published literature, field investigation, and data obtained from representative field and laboratory tests.

Stability factors

To determine if an area is stable, evaluate the following factors:

- weak and unstable foundation materials including soils, overburden, existing solid waste, peat deposits or other materials subject to excessive settlement
- active slope failure
- soils that may fail with a small increase in pore pressure or shear stress, or a small decrease in shear strength
- signs of pre-existing slope failure or slope failure in geologically similar material near the site
  - any other features that indicate the site is susceptible to instability

---

Design considerations

Develop engineering measures to protect the integrity of the landfill structures.

Reference: OAR 340-94-030 and 40 CFR Part 258.15

Evaluation

Based on the results of the Phase I Geotechnical Investigation and Site Characterization, evaluate the following scenarios:

- Potentially unstable natural slopes and other on-site areas that could be destabilized by construction activities such as excavation, regrading or other site modifications;
- Stability of the landfill foundation considering site-specific topographic and geologic conditions, static and dynamic loads, pore-water pressures at the subgrade-liner interface, and any other relevant factors; and
- Compressibility of underlying geologic units and potential settlement of the landfill unit. Estimate total and differential settlement based on appropriate field and laboratory methods and design parameters.

Workplan

Prepare a workplan for the Phase II Geotechnical Investigation.

4.3 Phase II Geotechnical Investigations

Phase II study	Perform additional geotechnical investigations as required in the Phase II work plan and for design calculations and analyses.
Report	Document the results of the geotechnical investigations and present the findings in the Phase II Site Characterization report. Identify any geotechnical considerations that require additional investigation or analysis prior to detailed design and construction of landfill structures. As needed, confirm the engineering properties of on-site soil and rock materials that will be impacted by or used for landfill construction and operation activities.

4.4 Additional Resources

References

Sowers, G.F. (1979). "Soil Mechanics and Foundations: Geotechnical Engineering," The MacMillan Company, New York.

U.S. Navy (1986). "Design Manual - Soil Mechanics, Foundations, and Earth Structures," NAVFAC DM-7; Department of the Navy, Washington, D.C.

Winterhorn, H.F. and Fang, H.Y., (1975). "Foundation Engineering Handbook," Van Nostrard Reinhold, 1975.

U.S. EPA, (1993) "Solid Waste Disposal Facility Criteria Technical Manual" EPA 530-R-93-017.

Section 5: Conceptual Design of Landfill Facilities

5.1 Introduction

Conceptual design phase

The Site Development Plan provides the framework for establishing overall goals for facility design, construction, operation, and environmental monitoring. This section describes the methods and procedures for establishing appropriate design criteria and selecting technologies that will satisfy regulatory requirements and performance objectives.

How to respond

Prepare a comprehensive Site Development Plan that presents the conceptual design of landfill facilities and environmental control systems and documents the analysis used to select the proposed technologies. The plan should be prepared by or under the direct supervision of a professional engineer with current Oregon registration.

Plan content

The Site Development Plan should describe the elements in this subsection. The plan should be stamped by the professional engineer responsible for its preparation. Following the organizational format of this guidance will expedite Department review of the plan.

In this section

This section describes the elements of a Site Development Plan, including:

- facility operation
- conceptual design of landfill facilities
- leachate management
- surface water management
- landfill gas management
- environmental monitoring
- closure and end use
- supporting information

5.2 Facility Operation

Facility operation	Describe the existing and proposed facilities, anticipated waste stream characteristics, and operational procedures, including the items in this subsection.
Capacity and projected life	Specify the proposed capacity and projected life of the site.
Population to be served	Identify and list the communities expected to be served by the facility, and estimate their corresponding current populations. Describe how the listing was compiled. Cite all sources used to estimate population.
Industry to be served	Identify and list major industries to be served by the landfill, and describe how the listing was compiled.
Rate of waste disposal	Estimate the future flow of waste to the facility from communities and industries served and from any other projected sources. Include estimates for maximum daily, maximum monthly and average annual volume and weight of waste to be received. Cite all sources used to calculate volume and weight estimates.
Overall description of operation	Describe the operation including on-site equipment on site (i.e., compactors, dozers, grinders or chippers), anticipated hours of operation, and mode of delivery of solid waste to the site.
Site economic viability	Provide key assumptions used to calculate the economic viability of the proposed facility.
Site screening	Describe how the active landfill area(s) will be screened from public view. Reference: OAR 340-94-040(11)(f)

Planned future use

Describe the planned future use of the disposal site after closure.

Waste stream types

List and estimate the quantity of each type of waste stream projected to be disposed of at the facility.

Examples: domestic wastes, commercial and institutional wastes, industrial wastes, construction and demolition wastes, agricultural wastes, sewage sludge and grit, contaminated cleanup materials, other wastes requiring special handling [see OAR 340-94-040(11)(b)(J)]

Acceptance of industrial waste

If proposing to accept industrial wastes for disposal, report the major industrial waste stream(s). For each weight or volume calculation, treat as one waste stream all industrial waste generated from industries identified by the same first three digits in their Standard Industrial Classification (SIC) code.

Example: Spent casting sand from an aluminum foundry and spent casting sand from a nonferrous foundry should be treated as one waste stream since they are generated from industries having the same first three digits in their SIC code.

Definition: a "major" industrial waste stream comprises greater than one-quarter percent, by weight or volume, of the total estimated waste flow.

Regional facility

If the facility is a regional disposal site, discuss the following:

- plans from the local board of county commissioners for establishing a local citizens advisory committee
- how the information necessary for the Department to review and approve a Waste Reduction Program for any person who will send more than 75,000 tons of solid waste a year to the site will be submitted, and
- how the county, state and country of origin of the waste will be tracked

---

5.3 Phased Development of Landfill Facilities

Phased development

Describe the phased development of the landfill. Establish a systematic blueprint of the construction, operation, and closure of each major phase of development.

Contents

Address the following elements in the design:

- design criteria used to determine the landfill's size, configuration, capacity, location, and environmental protection features
- design, construction, and operation considerations for initial cell development
- individual cell construction and the fill sequence
- slope stability in relation to construction, fill sequence, and side-slope liner design
- facility development drawings
- utility requirements including electrical power, water supply, and wastewater treatment and disposal
- earthwork materials for site construction and development, and
- environmental control technologies

Design criteria

Define the basis and any assumptions used to establish the landfill's footprint boundaries, overall configuration, capacity, and location considering at least the following factors:

- regulatory standards for location, design, and operation
- waste stream characteristics
- waste processing (e.g., incineration, composting, shredding)
- buffer zone requirements
- surface drainage patterns and physical characteristics of the site
- slope limitations on the landfill base and final cover profile
- land use and zoning restrictions
- location of utilities and support facilities
- transportation and access patterns
- environmentally sensitive areas
- geotechnical and hydrogeologic constraints, and
- end use alternatives

Facility development drawings

Prepare a series of scaled drawings showing the phased development of the site. Show each phase of landfill cell(s) development and site status when new cells are ready to be placed into service. The drawings should include at least one scaled plan-view and two perpendicular cross-sectional drawings of the excavation plan, fill sequence plan, and final grading plan.

Content of drawings

Identify the following information on the drawings:

- environmental monitoring components including groundwater monitoring wells, and gas monitoring probes, and surface water monitoring stations
- layout of landfill components including support facilities (e.g., public receiving and recycling areas)
- entrance and on-site roads, gates and fencing
- site drainage and surface water control structures (e.g., berms, dikes, ditches, culverts)
- surface impoundments
- soil stockpiles (i.e., the extent, available volume, and intended use of each soil, sub-soil, or rock unit identified as a borrow source)
- leachate collection, storage, treatment and disposal facilities
- special waste management areas (e.g., tires, bulky wastes, asbestos)
- planned total landfill footprint including buffer zones, landscaping, and site screening features
- planned excavations and base grades for each major phase of site development, relationship to hydrogeologic features (e.g., watertable profile, water bearing formations)
- configuration of the completed landfill and final grading plan
- the final landfill surface profile and its internal components, existing topography, and underlying geology/hydrogeology (in landfill cross-section views)
- existing landfill cells, including their operational status and configuration (e.g., exposed waste, intermediate cover, final cover, leachate drainage layer), and
- gas control system components

Earthwork materials for construction and development

Inventory on-site borrow materials and characterize their intended use as follows:

- analyze the results of the Phase I and Phase II geotechnical investigations and identify the intended uses of borrow materials
- quantify the available borrow materials
- describe the management and storage of soils and other construction materials

---

5.4 Leachate Management

Leachate management

Describe the proposed leachate management strategies for the landfill's active operation, closure and post-closure stages.

Strategies

The leachate management strategy should be based on a systematic analysis of design, construction, and operation techniques, and the following objectives:

- accurately predict leachate quality and quantity
- select leachate control methods that are technically and economically sound
- maximize leachate containment and collection efficiencies (through liner system and collection and removal system design)
- maximize the reliability of leachate containment systems
- monitor the effectiveness of leachate control systems
- treat and dispose of leachate in an environmentally sound manner, and
- minimize leachate generation

Leachate management analysis

Perform a conceptual design analysis to evaluate background data, establish a rational basis for design, and to evaluate the performance and cost effectiveness of alternative technologies. This analysis should complete the following tasks:

- Evaluate leachate quantity and quality using methods described in Section 6
- Identify key assumptions and design criteria
- Evaluate alternative leachate control technologies
- Prepare conceptual design drawings of major components

Liner system: leachate containment

Prepare conceptual design drawings showing typical cross-sections of the proposed liner system including layer types and thicknesses, minimum slopes, and hydraulic conductivities of each soil layer. Describe the liner system components, including the soil and geosynthetic materials, potential sources of these materials, and the overall design basis.

Standard liner design

The standard composite-liner design incorporates the following components:

- a two-foot thick soil layer with a maximum permeability of 1×10^{-7} cm/sec
- a geomembrane layer with a minimum thickness of 60 mil for HDPE or 30 mil for other materials

The Department may require an enhanced liner design if site specific conditions suggest a significant potential for adverse groundwater quality impacts (see OAR 340-94-060(6)).

Alternative liner design demonstration

If an alternative liner system design is proposed, a demonstration must be made to the Director of the Department that the proposed design will:

- meet the performance standard in 40 CFR 258.40(a)(1), "the design must ensure that the concentration values listed in Table 1 ... will not be exceeded in the uppermost aquifer at the relevant point of compliance", and
- comply with the policies and specific performance requirements of Oregon's Groundwater Quality Protection Rules (i.e., prevent a leachate release exceeding the statistical background concentrations at the relevant point of compliance)

Workplan for alternative design

To facilitate Department review and approval of such a demonstration, submit a workplan describing methods to predict potential water quality impacts. The workplan must specify how the permittee intends to:

- characterize leachate quality and estimate leachate quantity
- estimate liner leakage using a hydrologic model such as the latest version of EPA's HELP model, and
- evaluate groundwater quality impacts due to forecasted leakage, using an appropriate groundwater flow and solute transport model, which demonstrates that the alternative liner design would adequately protect groundwater and surface water quality

---

Leachate collection and removal system

Describe the basis for the design, including key assumptions and design criteria on how the Leachate Collection and Removal System (LCRS) will maintain leachate depths of less than 30 cm. Prepare a conceptual design of the LCRS that includes drawings showing typical cross-sections and a plan-view of system layout, manholes, cleanouts, sumps.

LCRS design criteria

The Department's recommended design criteria are as follows:

- Drainage layer slopes should be at least 2% (after settlement)
- Collection pipes should:
  - have slopes of at least 1%
  - meet the recommendations of (not minimums) of OAR 340-52-030, and
  - have enough slope to maintain scouring velocity
- Manhole spacings should not exceed the capabilities of available cleanout equipment and should meet recommendations (not minimums) of OAR 340-52-030 for sewer pipelines. At a minimum, cleanouts should be provided at both ends of all leachate collection pipes with sweep ends used to allow smooth access to cleanout equipment
- Leachate pipe should have a minimum diameter of 6 inches and should be schedule 80 or equivalent strength pipe
- Granular drainage layers should consist of competent, non-angular rock or rounded gravel and have a minimum in-place hydraulic conductivity of at least 1 x 10^{-2} cm/sec

Secondary LCRS: Under certain circumstances (see OAR 340-94-060(6)), the Department may require a secondary leachate collection system. Suggested design criteria for the secondary LCRS and other pertinent design-related information are provided in Section 7 (Detailed Design).

Leachate storage

Prepare a conceptual design of the storage system including cross-section and plan-view drawings and describe the design basis. Leachate storage impoundments should be located, designed, constructed, and monitored to at least the same standards as landfills. Leachate storage impoundments should be equipped with a leak detection system beneath the entire liner system, creating a double liner system to protect against the high hydraulic head typically impinging on the liner system.

Leachate treatment and disposal

Perform a leachate treatment feasibility study as outlined in Section 6 of this guidance. The results of this study should be used to develop conceptual design drawings and preliminary equipment specifications for the proposed treatment and disposal methods. The Department recommends treatment methods that reduce leachate contaminants, not methods that transfer the environmental problem to another medium.

Leachate minimization

Describe the design, construction, and operation techniques that will be used to minimize leachate production during the landfill's active and post-closure periods. The leachate minimization program should include the following elements:

- phased development and closure to minimize the active area footprint
- temporary geosynthetic covers to minimize infiltration in active cells
- run-on and runoff control systems for active and closed areas
- subsurface drainage systems to control groundwater seepage
- low permeability final cover systems to minimize infiltration during post-closure, and
- cell construction techniques that promote surface runoff rather than infiltration

5.5 Surface Water Management

Surface water

Describe the proposed methods for managing surface water run-on and runoff during the landfill's active operation and post-closure stages.

Surface water control during active landfill operations

Describe the surface water control measures and facilities that will be implemented and maintained during active landfill operations and how the system will

- intercept and divert run-on away from active and closed landfill cells (subareas)
- promote runoff from landfill areas capped with interim or final cover
- minimize site erosion
- temporarily store excess peak runoff flow until it can be discharged at a lower controlled rate
- control sediment transport by removing suspended solids from surface water runoff as necessary to comply with the facility's NPDES stormwater discharge permit, and
- collect and contain leachate-contaminated stormwater that accumulates in active landfill areas

Surface water control after final facility closure

Describe the surface water control measures and facilities that will be implemented and maintained after final closure of the facility and how the system will

- protect the integrity and effectiveness of the landfill cover system, and
- minimize long-term maintenance requirements after closure

Conceptual design

Prepare conceptual design drawings showing the complete surface water control systems that will be in place during active landfill operations and after cell closure.

5.6 Landfill Gas Management

Landfill gas

Describe the methods and technologies that will be used to control landfill gas.

Content

Evaluate the following design and construction considerations:

- site characteristics including topography, soils, geology, hydrogeology, climate
- fluctuations in groundwater levels, soil moisture, barometric pressure, and other environmental parameters
- locations of on-site structures, utilities, etc.
- adjacent land use and development
- size and age of the landfill and quantity of in-place refuse
- regulatory standards including federal air emission standards for landfills
- the landfill's operational history
- landfill gas monitoring results
- permitting requirements for flare units and other air emission sources
- operational status of the landfill unit (closed/full, active/partially full, new/empty, etc.)
- site development sequence
- suitable space for mechanical equipment (motor blowers, flares, electrical panels, etc.)
- moisture conditions within the landfill (saturated zones can impede gas flow)
- landfill gas quality (chemistry) and potential effects on leachate and groundwater quality
- design of existing and future landfill cells and potential influences on landfill gas flow paths
- current and future landfill gas production rates
- depth of in-place refuse below grade (interface between refuse and subsurface strata)
- available options for containing and managing landfill gas condensate
- capital costs and operation and maintenance costs of alternative designs

Types of control systems

There are two general types of landfill gas control systems: active systems and passive systems. Active control systems are recommended by the Department for most applications because of their superior flexibility and performance. However, active systems are usually substantially more expensive to construct and operate.

Conceptual design plans

Prepare preliminary engineering drawings showing the following landfill gas control system features:

- extraction well and/or horizontal collection trench locations and spacings
- configuration of collection lateral and header piping
- condensate drains, storage and treatment methods, and
- mechanical equipment complex (motor-blower, flare, and associated equipment)

Design criteria

The Department's recommended design criteria for landfill gas control systems are as follows:

- The landfill gas control system should be operationally flexible to accommodate changing gas production rates, migration patterns, gas chemistry, and other variables.
- Active control systems should be designed to provide 100 percent blower standby (backup) capability.
- The landfill gas control system should be designed for phased construction and expansion potential.
- Flame arresters should be incorporated into flare systems to prevent accidental ignition in the discharge piping system.
- Flare units should be equipped with automatic ignition systems and alarms.
- Header piping systems should have minimum (post-settlement) slopes of 3 percent for condensate drainage and collection.

Methane limits

The concentration of methane gas must not exceed

- 25 percent of the lower explosive limit for methane in facility structures, excluding gas control or recovery system components, or
- the lower explosive limit (LEL) at the facility property boundary

Reference: OAR 340-94-060(4) and 40 CFR Part 258.23(a)

Monitoring

Facilities must conduct routine monitoring, with a minimum frequency of once per quarter, to verify compliance with the allowable concentration limits.

5.7 Environmental Monitoring

Establishing monitoring

In most instances, detailed environmental monitoring programs will not be established until Phase II site characterization and detailed facilities design are completed.

Conceptual monitoring plan

Describe the overall monitoring strategies and objectives for

- groundwater
- surface water
- leachate
- landfill gas
- air (if applicable)

Guidance

Guidance for preparing an environmental monitoring plan is provided in Section 10.

5.8 Closure and End Use

Closure and post-closure

Describe the general procedures for final facility closure and the end use plan for the facility property. Closure of modern landfills is accomplished in phases when discrete cells or subareas reach final capacity. Closed areas must be maintained and monitored while active operations continue in other cells. For financial assurance purposes, these activities should be considered as interim closures. The 30-year post-closure care period does not officially begin until final facility closure is complete.

Reference: OAR 340-130

Reference

Minimum regulatory requirements for final facility closure are prescribed in OAR 340-94-100 and 40 CFR Part 258.1. Detailed closure provisions should be incorporated into the closure plan (see Section 11 for further instructions).

5.9 Supporting Information

Local government endorsement

Submit written recommendations of the local government unit(s) having jurisdiction to establish a new disposal site or to substantially alter, expand, or improve a disposal site or to make a change in the method or type of disposal. Such recommendations should include, but are not limited to, a statement of compatibility with:

- the acknowledged local comprehensive land use plan and zoning requirements or the Land Conservation and Development Commission's Statewide Planning Goals (using the Department's Land Use Compatibility Statement form), and
- the adopted local solid waste management plan

Reference: OAR 340-93-070(3)(b) requires submittal of local government information to document that the proposed new landfill or expansion of an existing landfill has been reviewed and approved by the local host community

Compatibility with solid waste plans

Explain how the proposed facility or facility expansion is compatible with all elements of the local solid waste management plan, and the state integrated solid waste management plan.

Waste reduction

If any local government or other person will send more than 75,000 tons of solid waste per year to the disposal site, submit a copy of the person's plans for implementing a waste reduction program.

Other permits

Identify any local, state, or federal permits, in addition to the Solid Waste Disposal Site Permit, that will be required for the proposed facility or expansion. If the permit has been granted, include a copy of the permit. If the permit has been previously applied for but not yet granted, include a copy of the permit application.

Examples: Corps of Engineers Section 404 permit; NPDES permit

Statement of need

Submit a statement clearly demonstrating the need for the new or expanded facility. For the renewal of a permit for an existing facility, the statement should relate to the continuing need for the facility. The statement of need should address the following criteria:

- the availability and capacity of alternative disposal sites or resource recovery systems and facilities
- the relationship of the permit application to current or proposed state and local solid waste management plans for the affected area
- the existence of contracts for disposal of waste at the proposed site
- the potential costs of shifting to available alternative sites and the proximity of such sites, and
- the ability of the proposed site to comply with statutory and regulatory requirements

5.10 Additional Resources

References

U.S. EPA Solid Waste Disposal Facility Criteria Technical Manual. November 1993

Washington D.O.E. Solid Waste Landfill Design Manual. June 1987.

Section 6: Leachate Treatment and Disposal Feasibility Study

6.1 Introduction

Evaluate treatment alternatives	Available leachate treatment alternatives should be evaluated. Methods that reflect site-specific conditions, and a full consideration of cross-media impacts should be selected for the facility.
Preferred methods	Preferred treatment methods are those that reduce the leachate contaminants rather than simply transferring the environmental problem to another medium. New landfills, and municipal solid waste landfills with significant expansions built after October 9, 1993, may need to complete a supplemental information form to help identify and prevent the transfer of pollutants from one medium to another.
How to respond	Submit a Feasibility Study Report that documents the analysis of treatment and disposal alternatives, including any assumptions. The Report should be stamped by the Profession Engineer who conducted the study.

Analysis of treatment options

Evaluate leachate treatment and disposal alternatives as follows:

- estimate leachate generation rates based on the latest Help Model analyses and/or actual leachate volume measurements from existing landfill cells
- determine the chemical and physical characteristics of the leachate and predict variations in leachate characteristics over time. For lateral expansion of existing facilities, sample and analyze leachate from an adjacent cell. For new facilities, obtain data from the nearest existing facility with a comparable physio-climatic setting and incoming waste stream
- identify final disposal alternatives and evaluate their feasibility in terms of cost effectiveness, environmental impact, technological constraints, regulatory requirements, and compatibility with other elements of the landfill design and operation
- define leachate treatment (effluent) requirements for the disposal alternatives and overall design criteria
- select a treatment process or processes which will achieve desired treatment performance for each disposal alternative
- estimate the capital and operation and maintenance costs of each alternative treatment and disposal method
- select the best alternative treatment and disposal system with regard to cost, reliability, flexibility and any other appropriate considerations

The study should be conducted by a Professional Engineer with current Oregon registration.

Selection of method

Leachate characteristics and treatability may be affected by landfill expansion and by partial or final closure. Therefore, the proposed treatment methods should be highly adaptable to accommodate variable chemical and hydraulic loading. The proposed system should consist of one or a combination of treatment options.

Treatability studies

If possible, selection of a process to treat leachate should be based upon treatability studies (laboratory or pilot scale) using the actual leachate. This is recommended for several reasons:

- Published leachate treatment performance data are rare. In the absence of treatability studies, inferences must be drawn from laboratory experimental studies, and industrial and municipal water and wastewater treatment experience.
- Lacking previous experience or treatability data, there is no guarantee that high levels of treatment can be achieved.
- It is likely that a combination of several unit processes will be needed to deal with the leachate. Arriving at the optimum system is unlikely without treatability studies.
- The complex leachate may not behave like other wastewaters, thus affecting design and operating criteria (e.g., chemical dosage requirements), and invalidating extrapolations from other experiences. Leachate composition also varies with age of the landfill.
- Capital investment, and especially operation and maintenance costs, are likely to be greater per unit volume treated than for municipal or industrial wastewater. However, costs will be difficult to estimate without treatment experience. Investment in a costly, unproven system that may not meet the required treatment objectives is imprudent.

Alternative evaluation

In spite of these considerations, treatability studies may not be possible at all sites. Representative leachate samples may be unavailable at new landfill sites or arid area sites. In such cases, use a more theoretical approach that relies on published data or data from another similar facility.

In this section

This section describes alternative treatment methods for landfill leachate, including:

- discharge to privately or publicly-owned treatment works
- land application
- on-site treatment with discharge to surface water
- re-application or re-injection to lined cell
- evaporation or impoundment, and
- other alternatives

6.2 Discharge to Privately or Publicly-Owned Treatment Works

The option

This alternative is subject to any pretreatment and/or wastewater connection requirements of the authority operating the treatment works. Discharges to publicly-owned treatment works (POTW) are not directly regulated by the Department.

Reference: "Management Plan Requirements for Leachate Disposal to Publicly-Owned Treatment Works," March 19, 1993

Examples of use

This method is currently practiced by several landfill in the Northwest, including:

- St. Johns Landfill, Portland, Oregon. Contact: Metro Solid Waste
- Cedar Hills Landfill, King County, Washington. Contact: King County Solid Waste Department
- Cathcart Landfill, Snohomish County, Washington. Contact: Snohomish County Solid Waste Department
- Kent Highlands Landfill, Kent, Washington. Contact: City of Seattle

6.3 Land Application

The option

This alternative is subject to possible pretreatment requirements.

Reference: "Standards for Leachate Spray Irrigation Management," October 28, 1992

Examples of use

This method is currently practiced by several landfills in Oregon, including:

- Coffin Butte Landfill, Benton County. Contact: Valley Landfills, Corvallis, Oregon
- Riverbend Landfill, Yamhill County. Contact: Sanifill of Oregon

6.4 On-site Treatment with Discharge to Surface Water

The option

This alternative is subject to effluent limitations as defined in a National Pollutant Discharge Elimination System (NPDES) permit. Application for a permit should be completed and submitted to the Department's Water Quality Division. If Total Maximum Daily Loads have been established or proposed for the receiving waters, additional requirements may be mandated above and beyond the NPDES permit.

Treatment processes

Generally, there are eight unit treatment processes applicable to leachate treatment:

- biological treatment
  - aerobic
  - anaerobic
- chemical precipitation
- ion exchange
- reverse osmosis
- carbon absorption
- stripping
- chemical oxidation
- wet oxidation

The applicability of each of these processes depends largely on the age of the leachate and the location and design of the landfill.

Examples of use

This method is currently practiced by Roseburg Landfill in Douglas County.
Contact: Douglas County of Public Works

6.5 Re-application or Re-injection to Lined Cell

The option

This alternative is permissible under the conditions of U.S. EPA's Solid Waste Disposal Facility Criteria 40 CFR Part 258. Only those cells where the composite liner and leachate collection system are equivalent to the minimum standards as described in 40 CFR 258.40(a)(2) can this form of leachate treatment be employed.

Minimum standards

Re-application of leachate is prohibited unless the landfill cell has at least the equivalent of each of the following three elements:

- upper component: a composite liner with 30-mil FML [60-mil HDPE], installed in direct and uniform contact with the compacted soil component
- lower component: a two-foot or thicker layer of compacted soil with a hydraulic conductivity no greater than 10^{-7} cm/sec
- leachate collection: a collection system capable of maintaining less than a 12 inch [30-cm] depth of leachate head

Considerations

The following considerations should be addressed:

- hydrogeology of the landfill site and the surrounding area within a 1/4-mile radius of the site
- climatic/meteorological data
- design details of the recirculation system
- monitoring of leachate levels in the landfill
- detailed contingency plans for leachate control, in the event that the leachate head levels cannot be maintained at less than a 12 inch [30-cm] depth
- metals accumulation in cover soils (if leachate is surface applied), and
- surface runoff and erosion control (if leachate is surface applied)

Examples of use

This method is practiced in limited use at Finley Buttes Landfill in Morrow County, Oregon.

6.6 Evaporation/Impoundment

The option

This alternative is subject to the same requirements as an application for a Water Pollution Control Facility (WPCF) permit. A lagoon, impoundment structure, or evaporation pond with a discharge to surface water is subject to a NPDES permit.

Inclusion in other documents

The Site Development Plan and detailed design plans and specifications should include:

- the rationale for selecting the proposed evaporation/impoundment technique
- water balance calculations
- pilot and bench tests, as appropriate, and
- alternative methods for residuals handling

Examples of use

This method is currently practiced at Columbia Ridge Landfill and Recycling Center in Gilliam County, Oregon.

6.7 Other Alternatives

Options

The Department will consider other treatment options, such as incineration, moisture source for composting if supporting information demonstrates consistency with DEQ regulations and water quality criteria.

6.8 Additional Resources

References

"Management Plan Requirements for Leachate Disposal to Publicly-Owned Treatment Works," DEQ, March 19, 1993

"Standards for Leachate Spray Irrigation Management," DEQ, October 28, 1992

Section 7: Detailed Design

7.1 Introduction

Detailed design phase

Fundamental design assumptions and criteria established during conceptual design should be reevaluated and refined at the outset of the detailed design stage. At this point, additional site characterization data, materials testing results, input from the Department and other reviewing agencies, permit requirements, and other available information should be incorporated into the design.

Regulatory references

Mandatory design standards and performance criteria are specified in 40 CFR 258 and OAR 340 Division 94. The design approach should also reflect current technologies, and conventional engineering principals and practices. Requirements for detailed design plans and specifications are described in OAR 340-93-140.

How to respond

Submit the following design documents to the Department for approval prior to construction, consisting of:

- detailed plans and specifications, stamped by a qualified professional engineer with current registration in Oregon
- a design report that describe the technologies and engineering analyses associated with the proposed design

Design plans and specifications

Base design plans and specifications on the results of Phase I and Phase II site characterization, geotechnical studies, and conceptual design analyses and reporting.

Design report

Prepare a design report that includes the following information:

- executive summary, conclusions, recommendations
- design basis, main assumptions, design criteria, and site constraints
- descriptions of key landfill components and their design functions
- a written explanation of the detailed design drawings and specifications
- a demonstration that landfill components will function as designed
- results of design-related materials testing
- preliminary specifications for construction materials, and
- engineering analyses and calculations used to develop the design

Format

To facilitate the Department's review, design reports, design plans and specifications and other related documents should have the same organizational format used in this guidance document. Design documents should be sufficiently detailed to enable the Department to determine whether mandatory standards and performance criteria have been achieved. Specifications should follow the standard format adopted by the Construction Specifications Institute.

In this section

This section provides guidance on preparing detailed design plans and specifications for the following environmental control systems:

- liner system
  - soil liner component
  - geomembrane component
- primary leachate collection and removal system
- secondary leachate collection and removal system
- leachate treatment and storage impoundments
- leachate holding tanks and conveyance pipelines
- leachate treatment process
- final cover system
- surface water control system, and
- landfill gas control system

7.2 Liner System

Performance criteria

Landfill liners are designed to protect the environment by preventing the release of leachate and landfill gas. New municipal solid waste landfill units and lateral expansions of existing landfill units must be equipped with either a composite liner, or a site-specific alternative design that meets the environmental performance criteria. Unless the Department approves an alternative design, liner systems must include:

- a soil liner component and
- a geomembrane liner component

These components are discussed in the following sections.

Reference: Minimum design standards for liner systems are specified in 40 CFR 258.2, 40 CFR 258.40(b), and 258.40(a)(1). Associated performance criteria are contained in the Department's groundwater protection rules [OAR 340-40-020(1),(2),(3)].

Proposing an alternative design

An alternative design proposal should be discussed with Department staff, before the development of formal design details. At this point, the Department will consider, from a technical and environmental standpoint, whether the proposal is viable. The Department will not approve alternative liner designs unless a convincing demonstration is made that the alternative design meets both the environmental performance requirements and the no-groundwater-degradation policy. Alternative design proposals will be subject to the opportunity for public comment.

Reference: See the Alternative Design discussion in Section 5: Conceptual Design of Landfill Facilities

Design document content

The design documents should address technical considerations such as

- performance criteria
- construction details (anchoring, penetrations)
- material properties
- dimensions
- bottom and sidewall slopes
- site operations (particularly the cell filling sequence and configuration),
- interface friction properties of liner system components, and
- subgrade conditions such as groundwater levels and soil properties

7.3 Liner System -- Soil Liner Component

Soil characteristics

Soils have a wide range of physical characteristics that are relevant to liner construction. These characteristics, described below, effect the soil's potential to meet the specified permeability of 1×10^{-7}.

Characteristic	Description
Soil plasticity	The soil plasticity index (PI) should be greater than 10 percent. However, soils with very high PI (above 30 percent), are cohesive, sticky and difficult to work with in the field. When high PI soils are too dry, they may form clods that are difficult to break down during compaction. Perferential flow paths may form around the clods, increasing the liner's permeability. Large soil particles or rock fragments can also form perferential flow paths.
Soil density and moisture	A soil's maximum density corresponds to the optimum moisture content, the minimum permeability to a moisture content wet of optimum. Wet soils, however, have less shear strength and more potential for desiccation cracking. When specifying moisture content, consider shear strength and other engineering properties. Typically, the permeability criterion can be achieved at moisture values of 1 to 7 percent above optimum.

Liner construction

Soil liners should be constructed in a series of compacted lifts. To specify lift thickness consider soil characteristics, compaction equipment, foundation characteristics, compaction requirements and liner permeability. The compactor must reach the lower portions of the lift to establish good, homogeneous bonding between lifts.

Soil test methods

Use the following test methods to characterize prospective liner soils:

- grain size distribution (ASTM D-422)
- Atterberg limits (ASTM D-4318), and
- moisture/density relationships by standard or modified Proctors (ASTM D-698 or ASTM D-1557), whichever is appropriate for the compaction equipment the foundation characteristics

Design criteria: soil liner

Design the soil liner to meet the following criteria:

- maximum saturated hydraulic conductivity (permeability) -- 1 x 10^{-7} cm/sec
- minimum compacted thickness -- least two feet
- Atterberg limits -- plasticity index ³ 10%;
- percent fines -- ³ 50% passing a #200 sieve;
- percent coarse material -- 10% retained on a #4 sieve;
- maximum particle size including clods -- 1 - 2 inches.

Recommended design procedures

Design the soil liner component by following the procedures below.

Step	Action
1	Specify performance objectives and material properties
2	Specify Unified Soil Classification, percent clay content (by hydrometer analysis to the 2 micron particle size) and the additional soil properties in the design criteria
3	Establish liner dimensions including thickness and surface area
4	Prepare appropriate design details, including details of connections between existing and new sections of the liner
5	For bentonite amended soils, specify the bentonite application rate as a percentage of the original dry weight of the soil, and mixing techniques
6	Specify construction requirements for the soil test pad the full-scale liner and associated earthwork
7	Specify Construction Quality Control (CQC) and Construction Quality Assurance (CQA) requirements

Reference: Also refer to the construction requirements in Sections 8.3, 8.4, and 8.5.

7.4 Liner System -- Geomembrane Liner Component

Design criteria: geomembrane liner

Design the geomembrane component of the landfill liner to meet the following criteria:

- HDPE geomembranes of at least 60 mils thick (or at least 30 mil thick for other materials) should be installed in direct and uniform contact with the underlying soil liner
- the geomembrane should be chemically compatible with leachate, landfill gas, and other expected environmental conditions within the landfill
- the geomembrane should be physically compatible with the proposed subgrade and backfill properties
- the geomembrane should be capable of withstanding the anticipated short-term and long-term stresses due to facility construction and operation.
- the number of pipe penetrations through the geomembrane should be minimized to the extent possible
- the geomembrane's friction properties should be compatible with other components of the liner system to minimize mechanical stresses on any component

Design approach

A systematic approach to design will enhance the geomembrane's performance, reliability and compatibility with other landfill components.

Recommended design procedures

Design the geomembrane liner component by following the procedures below. Where listed, refer to the pages in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Step	Action	Ref. pg.
1	Specify performance criteria and material properties for geomembranes and associated geosynthetics	---
2	Perform a geomembrane design analysis to determine acceptable geomembrane properties	7-25
3	Analyze the liner system's stability in side-slope areas	7-26
4	Analyze geomembrane runout or anchor trench requirements and prepare design details	---
5	Prepare design details for sumps, pipe penetrations, mechanical attachments to structures, etc.	---

Step	Action	Ref. pg.
6	Specify Construction Quality Control (CQC) and Construction Quality Assurance (CQA) requirements	---

Geomembrane specifications

Identify the geomembrane's function and specify desired properties for:
- the geomembrane to perform its intended function
- construction survivability, and
- in-service durability (i.e., resistance to temperature variations, UV radiations, leachate, mechanical stress)

Testing and acceptance

Establish minimum requirements for testing and acceptance of geomembrane conformance, including:
- sampling frequency
- sample size
- sampling technique
- conformance testing procedures
- acceptance criteria, and
- rejection procedures

7.5 Primary Leachate Collection and Removal System

Performance criteria

The primary leachate collection and removal system (LCRS) must be designed to function automatically, continuously, and as efficiently as possible within practical limits. The LCRS should maintain a leachate depth of less than 30-cm above the liner.

Reference: 40 CFR 258.40(a)(2)

Design criteria

Design the primary leachate collection and removal system to meet the following criteria:

- granular drainage layer percent fines -- < 5% passing No. 200 sieve.
- granular drainage layer hydraulic conductivity -- 1 x 10^{-2} cm/sec.
- granular drainage material should consist of carbonate-free, rounded gravel or non-angular rock.
- leachate collection pipe -- minimum 6-inch diameter, schedule 80 or equivalent strength pipe.
- minimum slopes for collection pipes -- 1% after predicted settlement; comply with OAR 340-52-030 for sewer pipelines (enough slope to maintain scouring velocity).
- minimum slopes for leachate drainage layer -- 2% after foundation settlement.
- manhole/cleanout spacing -- Should be compatible with available cleanout equipment and meet recommendations (not minimums) of OAR 340-52-030 for sewer pipes. At a minimum, provide cleanouts at both ends of all leachate collection pipes and sweep bends to accommodate cleanout equipment.

Recommended design procedures

Design the leachate collection and removal system (LCRS) by following the procedure below. Where listed, refer to the pages in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Step	Action	Ref. pg.
1	Prepare scaled drawings of the leachate collection system layout and construction details	---
2	Specify properties, characteristics and performance criteria of granular drainage layers, including Unified Soil Classification, grain size distribution, maximum particle size, maximum percent passing No. 200 sieve, thickness, and hydraulic conductivity at anticipated field density	---

Step	Action	Ref. pg.
3	Specify properties, characteristics and performance criteria of geosynthetic drainage layers, including polymer type, transmissivity and evidence of chemical compatibility. Analyze requirements for geosynthetic drainage material to determine allowable properties	7-25, 7-26, 7-28
4	Specify properties and characteristics of any granular filter layers, including Unified Soil Classification, grain size distribution and thickness	---
5	Specify properties and characteristics of any geosynthetic layers used for filtration or for liner protection. By analysis, determine allowable properties for protection or filtration layers	7-26, 7-28
6	Describe leachate collection pipe configuration, dimensions and properties, and analyze pipe loading and structural strength	7-31
7	Identify minimum slope specifications for drainage layers and collection pipes	---
8	Prepare leachate collection sump capacity and design details	---
9	Prepare manhole/cleanout design details, describe cleanout equipment capability and procedures, and analyze manhole-foundation design requirements	7-31
10	Identify the location and minimum spacing of manhole/cleanouts	---
11	Conduct a filtration analysis to evaluate the primary LCRS's clogging potential	7-31
12	Conduct an analysis of primary LCRS performance	7-30

7.6 Secondary Leachate Collection and Removal System

Need for secondary system

Under certain circumstances (see OAR 340-94-060(6)), the Department may require a secondary leachate collection and removal system (LCRS) to provide for additional groundwater protection and/or enhanced monitoring.

Design criteria

Design the secondary LCRS to detect and collect leachate at locations of maximum leak probability (e.g., liner penetrations, leachate collection sumps and leachate drain lines). Consider the following criteria:

- locate the secondary LCRS
  - beneath areas of maximum leak probability;
  - directly below and parallel to the liner system; and
  - above or hydraulically isolated from the seasonal-high water table to prevent groundwater intrusion into the secondary LCRS and potentially erroneous monitoring results.
- granular drainage layer percent fines -- < 5% passing No. 200 sieve.
- granular drainage layer hydraulic conductivity -- 1 cm/sec (at field density).
- granular drainage layer physical properties -- non-angular rock or rounded gravel free of carbonate material
- geosynthetic drainage layer transmissivity -- 5×10^{-4} m^2/s.
- minimum slope specifications for drainage layer and collection pipes -- pipes should meet recommendations (not minimums) of OAR 340-52-030 for sewer pipelines. Drainage layer should slope at least 2% (after settlement)
- manhole/cleanout location and spacing should not exceed capabilities of available equipment

Recommended design procedures

Design the secondary leachate collection and removal system (LCRS) by following the procedure below. Where listed, refer to the pages in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Step	Action	Ref. pg.
1	Prepare scaled drawings of the secondary leachate collection and removal system layout and construction details	---
2	Describe the secondary LCRS lining system, including its physical properties and dimensions	---

Step	Action	Ref. pg.
3	Specify granular drainage layer properties and performance criteria, including Unified Soil Classification, grain size distribution, maximum particle size, maximum percent passing No. 200 sieve, thickness, and hydraulic conductivity at anticipated field density	---
4	Specify geosynthetic drainage layer properties, and performance criteria, including polymer type and transmissivity. Determine allowable properties for geosynthetic drainage material should be determined by analysis	7-25, 7-26
5	Specify granular filter layer properties and performance criteria, including Unified Soil Classification, grain size distribution and thickness. Granular filter material must be free of carbonate material	---
6	Specify geosynthetic protective or filter layer properties. Determine allowable properties for geosynthetic by analysis	7-25
7	Describe leachate collection pipe configuration, dimensions and properties. Determine allowable properties by a structural stability analysis	7-31
8	Identify minimum slope specifications for drainage layers and collection pipes	---
9	Prepare leachate collection sump capacity and design details	---
10	Prepare manhole/cleanout design and operation details, including cleanout equipment capabilities and operating procedures. Analyze foundation requirements for manholes.	7-31
11	Identify manhole/cleanout configuration and spacing	---
12	Analyze the clogging potential within secondary LCRS components	7-31
13	Analyze the collection efficiency of the secondary LCRS	7-30

7.7 Leachate Treatment and Storage Impoundments

Performance criteria

Environmental safeguards for leachate treatment and storage impoundments should be comparable to or more extensive than what is required for a Subtitle D landfill cell. For minimum standards on location, design, construction, and monitoring see OAR 340-94-060(3).

Design Criteria

Design leachate treatment and storage impoundments to meet the following criteria:

- impoundment liners equal or exceed the landfill liner design
- the leak detection system underlies the impoundment liner to account for the substantial liquid depths within such impoundments
- impoundments have sufficient freeboard to contain and prevent overflow due to the 24-hour, 25-year storm
- available storage capacity reflects adopted leachate management practices and seasonal operating restrictions

Recommended design procedures

Design the leachate treatment and storage system by following the procedures below. Where listed, refer to the pages in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Step	Action	Ref. pg.
1	Calculate required storage capacity, account for leachate flow projections and the impoundment's internal water budget	7-31
2	Incorporate landfill cell design procedures	---
3	Design the leak detection system, incorporate all applicable steps outlined in Subsection 7.6 for secondary leachate collection and removal systems	---
4	Design leachate impoundments using landfill-cell equivalent detail and engineering analysis	---
5	Use applicable information previously developed for landfill cell design analyses	---

7.8 Leachate Holding Tanks and Conveyance Pipelines

Design criteria: holding tanks

Design leachate holding tanks to be:
- watertight
- composed of landfill-leachate compatible materials
- located on a flat, stable foundation, and
- sized to support the LCRS and leachate management practices

Design criteria: conveyance pipelines

Design conveyance pipelines to be:
- composed of landfill-leachate compatible materials
- consistent with the Departments' guidelines for sewer pipelines
- watertight and
- capable of withstanding in-service conditions, physical loads, stresses

Recommended design procedures

Design leachate holding tanks to meet the same operational considerations as impoundments. Design conveyance pipelines according to the guidelines for sewer pipelines.

References: OAR 340-060(3); OAR 340-52-020, Appendix A

7.9 Leachate Treatment Process

Performance criteria

Design the leachate treatment and disposal system to achieve effluent quality (leachate strength) objectives as appropriate for direct discharge or for pretreatment followed by discharge to another treatment facility.

Designing the system

The design of a leachate treatment and disposal system should include the following main stages:

Stage	Description
A feasibility study	Evaluate treatment and disposal alternatives and identify preferred method
Conceptual design	Prepare Conceptual Design (Engineering) Report including conceptual design plans and specifications for the selected alternative
Detailed design	Prepare detailed design plans and specifications and the Design Report

Selecting a design

Leachate composition and flow rates are highly variable and subject to numerous, site-specific physical and environmental influences. Select treatment technologies which can be easily modified to accommodate substantial changes in hydraulic loading and leachate strength.

Treatability studies

If possible, conduct treatability studies on site-specific leachate before committing to a particular leachate treatment process or technology. Treatment process staging may be necessary to accommodate variations in leachate chemistry and flow rates. Staging involves adding or deleting treatment processes or changing capacity of existing processes as future conditions warrant.

Design criteria

Establish leachate treatment goals and design criteria (e.g., effluent quality, treatment efficiency) consistent with final disposal requirements and raw leachate characteristics.

Recommended design procedures

Design the leachate treatment process based on the results of the site characterization studies, a feasibility study, and the conceptual design report. Re-evaluate the following critical design parameters established during conceptual design:

Design parameter	Evaluation criteria
Leachate characteristics	additional testing may be needed to assess the leachate's variability and treatability
Site geotechnical conditions	additional, localized geotechnical testing may be required to augment site-wide investigations
Leachate flow projections (hydraulic loading)	accuracy
Storage capacity and detention times	accuracy
Treatment efficiency forecasts	accuracy
The adaptability of proposed leachate treatment technologies	ability to accommodate short-term and long-term variations in leachate characteristics and treatment requirements

7.10 Final Cover System

Performance criteria

The final cover system should minimize water infiltration and erosion. Other important design issues include landfill gas containment and control, settlement, erosion, long-term maintenance requirements, and slope stability. Landfills that undergo remedial action to alleviate groundwater contamination, may be required to meet more stringent design criteria for the final cover.

References: 40 CFR 258.60(a) and OAR 340-94-120

Alternative designs

EPA allows approved state permitting programs, like Oregon's, flexibility in interpreting Subtitle D cover design requirements. Accordingly, the Department may consider alternative designs provided that critical performance criteria (e.g., minimal infiltration) are met. In the State's arid regions, for example, a properly designed soil cover may perform as well as a geomembrane.

Design criteria

Design the final cover system to meet the following criteria:

- minimum slopes of 2% and maximum slopes of 30%
- accommodate anticipated settlements
- contain landfill gas and enhance gas collection and recovery efforts
- minimize erosion
- minimize surface water infiltration
- promote efficient surface water drainage and runoff
- maintain stability on side slopes, and
- enhance site aesthetics

Design procedures

Design the final cover system by following the procedure below. Where listed, refer to the pages in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Step	Action	Ref. pg.
1	Prepare typical cross-sections of the cover system design for top and side slope	----
2	Use the HELP Model to predict infiltration	7-25
3	Analyze slope stability	7-26, 7-27
4	Analyze potential settlement	7-28

5	Describe each layer of the cover system, including: • foundation layer • low permeability layer • drainage layer • protective layer • topsoil layer • vegetative layer	---

Foundation layer

The foundation layer will serve as a base for either a low-permeability soil layer, or a geomembrane layer. The foundation layer must support and protect the cover during and after the construction phase.

Specify appropriate material properties, thickness, and configuration.

Low Permeability Layer

Design the low permeability layer to minimize moisture infiltration, to enhance landfill gas containment and control, and to accommodate site specific physical and environmental conditions.

Reference: Section 6.2 of this guidance provides detailed information on designing geomembrane and low-permeability soil layers

Drainage layer

Design the drainage layer to minimize infiltration, leachate generation, slope stability problems, erosion, and to enhance access for maintenance equipment.

Design procedures: drainage layer

Design the drainage layer of the final cover system by following the procedures below. Where listed, refer to the pages in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Step	Action	Ref. pg.
1	Specify properties, and performance criteria of granular drainage layers, including Unified Soil Classification, grain size distribution, maximum particle size, maximum percent passing No. 200 sieve, thickness and hydraulic conductivity	---
2	Specify properties, and performance criteria of geosynthetic drainage layers, including polymer type and transmissivity	7-25
3	Identify properties of granular filter layers, including Unified Soil Classification, grain size distribution and thickness;	---

4	Specify properties of geosynthetics used for protective or filter layers. Determine allowable properties by analysis	7-28
5	Analyze filter layer performance	7-31
6	Specify configuration, dimensions and properties of the collection pipe system. Analyze structural parameters.	7-31
7	Develop exit drain design details	---
8	Analyze drainage layer performance	7-30

Protective layer

An additional soil layer may be used to protect low-permeability layers from physical or environmental damage.

Design of protective layer

Specify the protective layer's properties and dimensions, including Unified Soil Classification, grain size distribution, thickness, hydraulic conductivity and maximum particle size (if placed directly on a geomembrane layer). Design the protective layer to:

- provide adequate rooting depth and soil moisture storage for selected vegetation
- protect the low-permeability layer against root penetration, freezing, drying and desiccation, and
- protect geosynthetic layers from puncture and other physical damage

Topsoil layer

The primary function of the topsoil layer is to provide an optimal growing medium for desirable vegetation. Topsoil may be amended with woodwaste, sewage sludge, or compost if applied appropriately at agronomic rates. Soil amendments should not cause odors, air-born contaminants or surface water quality problems.

Design criteria: topsoil layer

Specify top soil characteristics based on a thorough analysis of vegetation alternatives and fertilizer requirements, such as:

- thickness
- U.S.D.A. textural classification
- Soil Taxonomy
- pH
- organic content
- salinity
- nutrient content, and
- carbon to nitrogen ratio

If the topsoil layer will function as the protective layer, follow procedures for the design of the protective layer

Note: For additional information on soil properties and enhancement techniques, contact the County Agent of the Oregon State University Extension Service

Vegetative layer

The vegetative layer's main functions are to:
- minimize erosion and long-term maintenance, and
- maximize evapotranspiration

Design criteria: vegetative layer

The vegetative layer should be compatible with other cover-system components and easy to maintain. Plant shallow-rooted, locally adapted perennial plants that:
- resist drought and temperature extremes
- thrive in low nutrient soil with minimum nutrient addition
- establish dense growth to minimize cover soil erosion (limit is no more than 2 tons/acre/year), and
- survive and function with little or no maintenance

Reference: Refer to the Page 7-33 in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Alternative to vegetative layer

A vegetative layer may be incompatible with site climatic conditions or end use plan. If an alternative layer is planned, assess soil erosion, long-term maintenance requirements, and compatibility with other cover system components. The specified material should:
- accommodate settlement without compromising function
- maintain positive slopes to promote surface drainage off the cover
- be stable and erosion resistant during extreme precipitation and/or wind, and
- limit soil erosion to no more than 2 tons/acre/year

Reference: Refer to the Page 7-33 in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Typical cover system design

A typical final cover system design meets the thickness, slope, and specifications listed in the table below.

Layer	Construction material	Thickness	Slope	Specifications

Layer	Construction material	Thickness	Slope	Specifications
Top layer	vegetation	---	---	persistent, drought resistant, adapted to local conditions, shallow-rooted
	on soil	≥ 12 inches	≥ 2%	erosion rate < 2 tons/acre/year
Drainage layer	Soil (sand and gravel mixes)	≥ 12 inches	≥ 2%	SP (USCS) soil, K > 10^{-2} cm/sec
	geosynthetic	variable	≥ 2%	performance equivalent to soil, hydraulic transmissivity > $3x10^{-5}$ m^2/s
Low-permeability layer	geomembrane (HDPE)	≥ 60 mils	≥ 2%	other types of FMLs should be at least 20 mils in thickness
	on low-permeability soil	≥ 24 inches	≥ 2%	in place K < 10^{-6} cm/sec

7.11 Surface Water Control System

Precipitation data

Select appropriate precipitation data for design analyses.

Reference: Refer to the Page 7-32 in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

Design criteria

Design the surface water control system to meet the following criteria:

- prevent run-on flow onto active or inactive portions of the landfill (assuming peak discharge from the 25-year storm)
- collect and control run-off from active and inactive portions of the landfill (assuming a 24-hour, 25-year storm)
- comply with the provisions of the storm water discharge (NPDES) permit and the Clean Water Act
- control sediment transport and remove suspended solids as necessary to comply with the NPDES permit conditions
- collect and contain leachate contaminated stormwater that accumulates in active fill areas
- temporarily store excess run-off from peak flows until it can be discharged at a lower, controlled rate
- minimize site erosion
- protect the integrity and effectiveness of the landfill cover system, and
- minimize post-closure maintenance requirements

Design Procedures

Design the surface water control system for both the active landfill operation and post-closure phases by following the procedure below.

Step	Action
1	Define drainage basin boundaries
2	Identify potentially sensitive features, such as wetlands, fish migratory streams
3	Develop site grading plans for active and closed landfill scenarios
4	Develop design storm hydrographs and calculate peak flow volumes and velocities
5	Select and size appropriate control-system components, including ditches, culverts, and detention basins to safely pass peak flows
6	Specify permanent and temporary erosion control measures

Step	Action
7	Specify permanent and temporary siltation control measures, and
8	Perform applicable analyses and calculations Reference: Refer to the Page 7-32 in Section 7.13 (Appendix of Engineering Analyses and Calculations) for additional details.

7.12 Landfill Gas Control System

Designing the system

Design the landfill gas control system to accommodate a wide range of operational and environmental variables, withstand harsh physical/ environmental conditions, and function as long as needed.

Appropriate landfill gas control system technologies are:

- flexible operationally
- easy to construct and modify
- durable (physically and chemically)
- easy to monitor, and
- easy to maintain and repair

Design criteria

Design the landfill gas control system to:

- handle the maximum gas flow rate predicted for the landfill
- accommodate variability in gas generation, composition, and other operational parameters
- expand as needed to collect gas from future cells, and
- meet the applicable criteria in the table below

If designing...	then meet the following criteria:
an active control system	• extraction well boreholes should be at least 24 inches in diameter • construct extraction well casings and collection laterals and headers of PVC, HDPE or stainless steel • provide 100% blower standby (backup) capability • equip flare systems with flame arresters to prevent accidental ignition in the discharge piping system • equip flare units with automatic ignition systems and alarms • at sites with a high risk of off-site gas migration, install alarm systems with auto-dial-phone capabilities to contact response personnel 24-hours-a-day, 7-days-a-week • design perimeter extraction wells should be designed to provide 100-percent overlap of influence between adjacent wells (i.e., radii of influence of adjacent wells should completely overlap)
a passive control system	use only in combination with geomembrane cover and liner systems

Recommended design procedures

Establish the overall design basis by re-evaluating conceptual design criteria, landfill gas test data, and site characterization data. Incorporate the latest available engineering data and gas test data and following the design procedure below.

Step	Action
1	Determine the landfill's gas generation potential. Various modeling techniques may be used to predict approximate peak and total landfill gas production
2	Define the main operating functions of the landfill gas control system (i.e., landfill gas migration control, odor or air-emissions control, energy recovery, or multi-use)
3	Establish performance criteria, construction materials properties, equipment layout, and equipment types and characteristics. Design construction details (e.g., well or collection-trench depths and spacings and perimeter setbacks, header pipe sizes and configuration) to accommodate site-specific conditions
4	Prepare a facilities plan that depicts the following system components: • extraction well and/or collection trench locations and spacings • locations of adjustment valves and sampling ports • configuration of collection header piping • condensate drain locations • layout of mechanical equipment complex (i.e., blowers, flares, electrical panels) • locations of gas monitoring probes
5	Prepare design details that describe proposed materials and equipment for the major control system components (i.e., well casings, collection piping, granular materials, valves, blowers, flares) and typical design details for the following: • extraction wells • valves and sampling ports • condensate drains, sumps, pumps, storage tanks and associated equipment • mechanical equipment complex (blowers, flares, condensers, electrical panels, alarms, etc.), and • well or piping penetrations through the cover or liner systems

7.13 Appendix of Engineering Analyses and Calculations

Design report supporting information	As applicable, describe the assumptions, technical rationale, references, and factors of safety used for each engineering analysis or calculation. Incorporate relevant analyses and calculations into the Design Report.
Soil balance calculations	Calculate quantities of specialized and general-purpose soils: • to construct and operate each phase of landfill development • for phased closure and final closure construction • available at the identified borrow source, and • to be imported over the life of the site
Water balance analysis (HELP model)	Use the latest version of U.S. EPA's Hydrologic Evaluation of Landfill Performance (HELP) Model to estimate: • water percolation through each barrier layer • lateral drainage from each drainage layer, and • hydraulic head build-up in each drainage layer Model input should consist of site-specific climatological data, if available, and site-specific geotechnical and design data. Assume landfill operational status ? development plan and engineering design plans. Provide all input assumptions and the complete model output in the Design Report.
Use of geosynthetics	Geosynthetics such as geomembranes, geotextiles, geonets, geogrids and geocomposites have many possible applications in landfill design and construction. Non-structural materials such as geomembranes and geonets should not be subjected to significant physical stresses. Other liner or cover components must be designed to protect non-structural materials from physical stresses. Note: For methods to evaluate interface friction and shear stresses of layered geosynthetic components see Stability Analyses on page 7-26.

Selecting a geosynthetic

Select geosynthetics by matching intended functions with compatible physical properties. Manufacturers' specifications are usually derived from laboratory tests which do not account or field conditions. Adjust for differences between laboratory and in-situ conditions by either:

- customizing laboratory and field tests to model field conditions, or
- using partial factors of safety to account for differences between laboratory tests and field conditions

Perform a "design by function" analysis to select the appropriate geosynthetic material, or establish material properties by following the procedure below.

Step	Action
1	Evaluate the geosynthetic layer and the materials above and below
2	Specify a design factor of safety that reflects the potential consequences of the geosynthetic's failure
3	Describe the geosynthetic's primary function(s) and other critical functions
4	Calculate the numerical value for each geosynthetic property in question (as appropriate for the geosynthetic's intended function)
5	Specify testing requirements for selecting a geosynthetic product
6	Determine the partial factors of safety needed to compensate for differences between laboratory testing and the field conditions
7	Specify the minimum allowable properties for a product in a particular application

Reference: The suggested "design by function" approach to designing with geosynthetics is summarized in pages 61-62 of R. M. Koerner's Designing With Geosynthetics, 2nd Edition, Prentice-Hall Publ. Co., Englewood Cliffs, NJ, 1990, 652 pgs

---

Stability analyses: parameters

Analyze the stability of all waste containment structures. Consider facilities design, construction and operation, and site characteristics (e.g., naturally unstable or seismically affected areas). Seismic impact zones, as defined in 40 CFR 258.14, exist at most locations in Oregon. Use appropriate testing and analysis to determine the following parameters:

- strength of soils and solid waste materials
- effective angles of internal friction for soils and solid waste
- friction angles of adjoining layer interfaces
- density of soils and solid waste, and
- pore water pressure in soils

Stability analyses: scenarios

Analyze the following scenarios using appropriate factors of safety:

- Potential rotational failure of the soil mass beneath the liner system
- Potential rotational failure of any containment dike, or other engineered structures
- Potential sliding failure of the liner system along the plane of the side slope
- The general slope stability and liner system stability along the plane of the liner system (assume active landfill operations and worst-case site development conditions
- Potential sliding failure or the cover system side slopes, assuming maximum pore water pressure in the drainage layer or cover soils over a geomembrane

Factors of safety

Suggested factor of safety (FS) values are shown in the table below. Actual values reflect engineering analyses site geotechnical and environmental characteristics, construction materials, operational procedures and risk factors.

Consequences of Slope Failure	**Uncertainty of Strength Measurements**	
	Small[1]	Large[2]
No imminent danger to human life or major environmental impact if slope fails:	1.25 (1.2)*	1.5 (1.3)
Imminent danger to human life or major environmental impact if slope fails:	1.5 (1.3)	2.0 or greater (1.7 or greater)

[1] Strength measurements are most reliable when the soil conditions are uniform and high quality test data are available

[2] Strength measurements are most uncertain when the soil conditions are complex and test data are inconsistent and incomplete

* Numbers without parentheses apply for static conditions and those within parentheses apply to seismic conditions.

Modified from: U.S. EPA, (1993), "Technical Manual for Solid Waste Disposal Facility Criteria - 40 CFR Part 258," November 1993.

Settlement

Settlement may involve a landfill cell, geologic units beneath the cell, or both. The amount of settlement depends on the characteristics of the solid waste and the underlying geological units.

Settlement analysis

Calculate for each landfill cell:

- the total consolidation of underlying geological units
- the total waste settlement
- differential settlement beneath the flattest sections of the liner system and maximum differential settlement beneath the liner footprint
- maximum differential settlement of the cover system
- slope allowance required to compensate for differential settlement of leachate drainage layers and collection pipes, and
- final cover slope allowances required to compensate for estimated differential settlement

---

Settlement tolerances

Post-settlement slopes for leachate collection systems and cover systems should meet original design criteria

---

Geotextile filter analysis

A geotextile filter should provide adequate cross-plane permeability and soil retention. Therefore, the geotextile's void spaces need to be compatible with adjoining materials. Analyze geotextile filters following the table below.

Step	Action
1	Specify a design factor of safety and calculate: • the required flow rate through the geotextile filter, and • the apparent opening size of the geotextile from the soil gradation
2	Specify appropriate geotextile testing (e.g., apparent opening size, permittivity)
3	Determine allowable flow rate. Use partial factors of safety to account for soil clogging, creep reduction of void spaces, and biological clogging
4	Consider other critical properties including: • chemical compatibility with landfill contaminants • survivability (during packaging, transportation, handling, and installation), and • ultraviolet-light resistance

Step	Action
5	Specify a particular geotextile product, or specify the required properties (e.g., apparent opening size and permittivity)

Geomembrane liner system

The geomembrane must have appropriate physical properties to withstand physical and environmental stresses during construction and long-term use. Analyze the critical design parameters following the procedure below

Step	Action
1	Calculate and specify a design factor of safety for construction and operation related stresses (i.e., tensile, shear, impact, and puncture stresses). Stress sources include anchorage, geomembrane weight, waste-weight, foundation subsidence, waste settlement, construction equipment operation, and contact subgrade and backfill materials (e.g., drainage layers)
2	Specify geomembrane testing procedures for critical properties (e.g., tensile strength, seam strength, tear resistance, puncture resistance, impact resistance, geomembrane friction, etc.). Use partial factors of safety to account for discrepancies between laboratory tests and field conditions
3	Consider other critical properties including: • chemical compatibility with leachate and gas • survivability during packaging, transportation, handling, and installation • ultraviolet light resistance, and • coefficient of thermal expansion (required slack in the geomembrane and acceptable temperature ranges for installation)
4	Specify a particular geomembrane product, or the minimum allowable geomembrane properties

Primary LCRS performance evaluation

Design the primary leachate collection and removal system (LCRS) using redundant features and conservative factors of safety to enhance its reliability. Evaluate critical design parameters using the following assumptions and analysis:

- Precipitation impinging directly on the drainage layer; the drainage layer is saturated; precipitation equals the wettest month's average rainfall. Calculate the hydraulic head for these conditions. The hydraulic head should not exceed 12 inches [30-cm] or the thickness of the drainage layer at any point in the LCRS, and
- All leachate collection pipes fail with the final cover is in place; surface water infiltration enters the drainage layer at a rate equal to the HELP Model estimate; the drainage layer is saturated; precipitation equals the wettest monthly total. Calculate hydraulic head for these conditions. The hydraulic head should not exceed 12 inches [30-cm] or the thickness of the drainage layer at any point in the LCRS.

Secondary LCRS performance evaluation

Evaluate the performance of the proposed secondary LCRS design by calculating the following:

- Leakage detection sensitivity: ". . . the smallest primary liner leakage rate which can be detected."
- Leakage collection efficiency: the ratio of the leakage collected at the secondary LCRS sump divided by the leakage entering the secondary LCRS and
- Leak detection time: the time required for leachate to travel from the point of entering the secondary LCRS to a collection sump

References: Background Document: Bottom Liner Performance in Double-Lined Landfills and Surface Impoundments, EPA/530-SW-87-013, U.S.EPA, 1987, 301 pgs.
Background Document: Proposed Liner and Leak Detection Rule, EPA 530-SW-87-015, U.S.EPA, 1987, 526 pgs.

Cover system drainage layer performance

Evaluate drainage layer performance and reliability by using the HELP Model or other appropriate method(s) to calculate the maximum hydraulic head buildup within this layer.

LCRS filtration analysis

Demonstrate that the conveyance systems for the primary, and secondary LCRSs and the final cover drainage system are designed to prevent clogging. Use analysis and calculations to show that:

- geotextile filter layers will adequately retain solids and pass liquids (see page 7-28), and
- granular filter layers will adequately retain solids and pass liquids (use analytical methods on pages 19 - 20 of Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, U.S. EPA, EPA/530-SW-89-047, July 1989, and page 7-68 of Lining of Waste Containment and Other Impoundment Facilities, U.S. EPA, EPA/600/2-88/052, September 1989, or other appropriate techniques.

Structural stability of leachate pipes

Generate structural calculations to show that leachate collection pipes will withstand:

- static and dynamic loading from construction equipment;
- maximum potential loading from vehicular traffic;
- maximum static loading from the completed landfill; and
- stresses from long-term differential consolidation of the landfill foundation.

Manhole foundation bearing capacity

Calculate the bearing capacity of manhole foundations. Demonstrate that the bearing capacity will support anticipated loads without damaging the liner system. Consider differential-settlement induced down-drag forces that may occur where compressible waste and rigid manholes meet.

Leachate storage capacity

Calculate the storage capacity of the leachate impoundment, accounting for all in puts and outputs. Demonstrate that leachate storage impoundments or holding tanks will provide:

- adequate storage capacity for the maximum leachate flows; assume the leachate collection system maintains less than 12 inches [30-cm] of leachate depth
- adequate storage capacity to manage leachate as planned and to satisfy any seasonal limitations, and
- sufficient freeboard to contain leachate and prevent overflows, assuming a 24-hour, 25-year storm

---

Leachate treatment and disposal

Calculate the efficiency of the proposed treatment system considering the following factors:

- design criteria, including regulatory requirements;
- availability of representative leachate for testing;
- untreated (influent) leachate characteristics, (i.e., quantity and quality);
- temporal and spatial variability of leachate characteristics;
- method(s) of leachate disposal;
- periodic design modifications (certain treatment processes may be phased in to accommodate variable leachate quality and hydraulic loading);
- proposed unit treatment processes and associated technologies;
- potential temperature variations in leachate and ambient air;
- nutrient addition requirements (e.g., phosphorous and/or nitrogen addition may be required to enhance biological treatment.

Surface water control

Evaluate the effectiveness of the surface water control system for conditions throughout the landfill's development and operation. Use a 24-hour, 25-year or more severe storm if extreme impacts could result from control system failure.

Obtain storm recurrence information from the Weather Bureau's Technical Paper 40, Rainfall Frequency Atlas of the United States for Durations for 30 Minutes to 100 Years. Alternatively, analyze local meteorological data to estimate storm intensity. Use the Rational Method, the Soil Conservation Service (SCS) method (i.e., Urban Hydrology for Small Watersheds, SCS Technical Release #55, June 1986 (TR-55)) or other recognized methods to estimate design-storm-related peak flows.

Demonstrate by analysis, that:

- Diversion and conveyance structures (e.g., berms and channels) are designed to divert all stormwater run-on away from the landfill footprint (assume peak discharge from the 25-year storm). Use standard analytical methods recommended by the US Dept. of Transportation (Federal Highway Administration), the US Army Corps of Engineers, the US Dept. of Agriculture (Soil Conservation Services) or other appropriate engineering methods.
- Sedimentation and detention facilities will retain peak runoff flows from the 25-year storm , trap sediment effectively, and comply with the facility's NPDES permit. Use the SCS methods (TR-55) to develop inflow hydrographs for sedimentation/detention structures.
- Active landfill cells have adequate capacity to contain stormwater and leachate during a 24-hour, 25-year storm.

Post-closure surface water control

Analyze requirements for post-closure surface water runoff control. Assuming 24-hour, 25-year storm conditions, demonstrate that:

- culvert and drainage channel cross-sections and slopes will pass design-storm-generated flow volumes
- surface water control facilities will minimize runoff velocities and related energy, and erosion of the landfill cover and drainage channels
- all drainage channels will convey flow at or below the maximum permissible (mean) velocities. Select the proper channel section for the appropriate hydraulic condition, and
- site maintenance will be minimized.

Note: Use standard engineering methods and procedures such as described in the Engineering Field Manual for Conservation Practice, U.S. Soil Conservation Service, 1984; SCS Engineering Handbook #5; Open Channel Hydraulics, V. T. Chow, 1959; Handbook of Hydraulics, 3d. edition, King, 1939; or other published references and specifications.

Cover soil erosion

Use the U.S.D.A. Universal Soil Loss Equation to estimate the erosion loss from the proposed final cover system. U.S. EPA guidance recommends a maximum soil loss of < 2 tons/acre/day. Values for the Universal Soil Loss Equation parameters can be obtained from the U.S. Soil Conservation Service's (SCS) Technical Guidance Document available at local SCS offices.

Landfill gas control system

Calculate or estimate the following design parameters:

- landfill gas production (peak and total production over the life of the landfill)
- gas well spacings and depths
- individual extraction-well flow rates
- system-wide collection efficiency
- maximum allowable headloss criterion
- minimum allowable vacuum pressure at the remotest extraction well.
- headloss from wells to the blower
- total accumulative flow rate within the collection pipes and headers
- required sizes for collection pipes and vacuum-motor-blowers, and flare units (if applicable)
- requirements for blower backup capabilities, and phased expansion of the mechanical equipment complex (i.e., blowers, flares, etc.) disposal or recovery systems and the collection system.

7.14 Additional Resources

Landfill technologies, design, and construction practices	Draft Technical Manual for Solid Waste Disposal Facility Criteria - 40 CFR Part 258, U.S.EPA, April 1992. Seminars - Requirements for Hazardous Waste Landfill Design, Construction and Closure, CERI-88-33; U.S.EPA; Center for Environmental Research Information, Cincinnati, OH 45268, 1988. Lining of Waste Containment and Other Impoundment Facilities, EPA/600/2-88/052, U.S.EPA, Risk Reduction Engineering Laboratory, Cincinnati, OH 45268, September 1988. Design, Construction, and Evaluation of Clay Liners for Waste Management Facilities, EPA/530/SW-86/007F, U.S.EPA, Office of Solid Waste and Emergency Response, Washington, DC 20460, November 1988.
Designing with geosynthetics	Koerner, Robert M., Designing With Geosynthetics, 2nd Edition, Prentice-Hall Publ. Co., Englewood Cliffs, NJ, 1990, 652 pgs.
Landfill cover systems	Seminars-Design and Construction of RCRA/CERCLA Final Covers, CERI 90-50, U.S.EPA, Office of Research and Development, Washington, DC 20460, 1990. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA/530-SW-89-047, U.S.EPA, Office of Solid Waste and Emergency Response, Washington, DC 20460, July 1989. Proceedings of the 4th GRI Seminar on the topic of Landfill Closures: Geosynthetics, Interface Friction and New Developments, Geosynthetic Research Institute, Philadelphia, PA 19104, December 1990, 260 pgs.

Leachate treatment

Thornton, Richard J., and Blanc, Fredrick C., Leachate Treatment by Coagulation and Precipitation, proceedings of the American Society of Civil Engineers, Vol. 99, No. EE4, August 1973.

Chian, E. S. K., and De Walle, F. B., 1976, Sanitary Landfill Leachates and their Treatment, ASCE Environmental Engineering Division, No. EE2.

Chian, E. S. K., and De Walle, F. B., 1977, Evaluation of Leachate Treatment, Vols. I and II, Washington, DC: U.S. EPA, EPA-600/2-77-186.

Boyle, W. C., and Ham, R. K., 1974, Treatability of Leachate from Sanitary Landfills, Journal of Water Poll. Control Federation, Vol. 46, No. 5.

De Walle, F. B., and Chian E. S. K., 1977, Leachate Treatment by Biological and Physical-Chemical Methods, Proceedings of the Third Annual Solid Waste Research Symposium, U.S. EPA, March 14-16, 1977.

Robinson, H. D., and Maris, P. J., 1985, The Treatment of Leachates from Domestic Waste in Landfill Sites, Journal of Water Poll. Control Federation, January 1985, pp. 30-38.

Nelson, P. O., and Storhaug, R., 1985, Treatment of Leachate in Aerated Lagoons, Lab-Scale Study, Oslo, Norway, Norwegian Institute for Water Research, Report No. 0-84022.

Landfill gas control

EMCON Associates, 1980, Methane Generation and Recovery from Landfills, Ann Arbor Science, Ann Arbor, Michigan, p. 139.

Ham, R. K., et al., 1979, Recovery, Processing, and Utilization of Gas from Sanitary Landfills, Cincinnati, OH: U.S. EPA 600/2-79-001.

Section 8: Facility Construction Program

8.1 Introduction

Objective

The objective of the construction program is to translate the Department-approved engineering design into a completed facility that meets or exceeds the design plan specifications and performance objectives.

Elements

The facility construction program should include the following elements:

- an organized, qualified construction project team
- Department-approved design drawings and specifications for each phase of landfill development
- a Construction Quality Control (CQC) program
- a Construction Quality Assurance (CQA) program, and
- Construction Certification Reports based on an evaluation of CQC and CQA documentation which certify that construction was completed in accordance with Department-approved plans and specifications

How to respond

Submit the information below to the Department for each phase of landfill development (i.e., construction of new cells, cell closure, or environmental control facilities).

Document	When to submit
CQA plan	prior to initiating construction
soil liner test pad evaluation report	prior to beginning construction of the soil liner
construction certification report	after completing each phase of construction

Reference: OAR 340-93-140 and OAR 340-93-150 provide information on construction documents

In this section

This section describes the major construction project elements, including:

- construction project team
- construction guidelines
  - soil test pad
  - soil liner
  - excavation and subgrade preparation
  - geosynthetic liners
  - leachate and gas collection systems
- quality control program
- quality assurance plan
- construction certification reports

Differences in materials

The physical properties of natural earth materials are generally more variable than the properties of manufactured materials (e.g., geomembranes) which are produced under factory controlled conditions. Accordingly, these guidelines concentrate more on methods for earth-materials construction.

8.2 Construction Project Team

Project team organization

Organize the project team in terms of "Owner", "Designer", and "Constructor" or other equivalent divisions of responsibility. Regardless of the contractual arrangement used, the Owner, Designer, and Constructor functions are discrete, independent responsibilities.

Establishing the team

Establish and document the construction project team organization, including:

- a list of key project team members and their roles and responsibilities
- the minimum required experience for each project team member
- key project team members, their qualifications, and phone numbers and addresses
- an organizational flow chart identifying members of the project team, lines of authority, and lines of communication between the various team members

Team roles

The table below shows a typical construction project team.

Team Member	Role
Project Manager	Individual who represents the owner and is responsible for the overall coordination and management of the project activities
Owner	Party who initiates the project and is responsible for establishing and directing the project to completion
Owner's Team	Persons who advise and assist the owner in specialized areas and, if applicable, person(s) to whom the owner delegates authority to act on the owner's behalf
Construction Quality Assurance (CQA) Consultant	Party(s), who is part of the Owner's Team, and independent from the Project Manager, Constructor and Manufacturer. The CQA Consultant is responsible for observing, conducting and documenting activities related to the quality assurance of materials and construction on behalf of the Owner
Designer	Party whose primary role is to conceive, plan and provide quality design solutions in response to the owner's stated requirements
Design Team	Experienced staff and subcontractors who are responsible for various aspects of the design

Team Member	Role
Constructor	May be a contractor. Party responsible for planning, managing, and accomplishing the construction activities
Construction Team	Construction staff, material and equipment suppliers, specialty sub-contractors assembled by the Constructor

Note: For smaller projects, multiple functions can be accomplished by a single individual

Basis for organization

"Successful construction projects are conceived, planned, designed, and built by a project team consisting of an owner, design professional, and constructor. Quality is achieved when each team member's obligations are fulfilled competently and in a timely fashion, in cooperation with the other members." (ASCE Manual No. 73.)

8.3 Construction Guidelines - Soil Test Pad

Purpose of soil test pad

The purpose of a test pad(s) is to model the construction of the full-scale liner to verify that proposed construction materials and methods will produce the desired compaction and in-situ hydraulic conductivity. The assessment will enable the Project Team to establish final requirements for soil processing, placement and compaction.

Requiring a test pad

The design specifications should require the Constructor to complete a successful test pad evaluation before constructing the full-scale soil liner. An additional test pad should be prepared and evaluated for each significant change in construction materials, equipment, or methodology.

Construction procedures

Construct soil test pads according to the table below.

Step	Action
1	Use the same soil material, CQC program, and construction equipment and methods that will be used for the full-scale liner
2	Classify representative soil samples according to the Unified Soil Classification System (ASTM D2487)
3	Evaluate soil samples to define an acceptable range of water content and dry unit weight. Use careful judgment in interpreting laboratory hydraulic conductivity values, (i.e., there may be up to 1 order-of-magnitude difference between laboratory and field values) Reference: Daniel, D. E., and Benson, C. H. (1990), "Water Content - Density Criteria for Compacted Soil Liners," *Journal of Geotechnical Engineering*, Vol. 116, No. 12, pp. 1811 -1830.
4	Construct the test pad at least four times the width of the widest piece of equipment to be used
5	Construct the test pad long enough to allow the compaction equipment to attain normal operating speed before reaching the test area
6	Construct at least four compacted lifts

Achieving low hydraulic conductivity

The most important factors in achieving hydraulic conductivity criteria are:

- using suitable soil materials
- using appropriate construction equipment
- placing the soil at the correct water content
- properly preparing the surface between lifts
- achieving density specifications by using appropriate compaction equipment and procedures, and
- protecting completed lifts from damage

Duties of CQA consultant

Suggested duties of the Construction Quality Assurance (CQA) consultant include:

- Observe, approve and document the suitability of the prepared subgrade
- Observe, approve and document soil material selected for construction
- Observe and record during soil placement and compaction:
  - weather conditions
  - the construction equipment and methods used (e.g., equipment type and specifications, lift thickness before and after compaction, number of compactor passes, compactor speed), and
  - the CQC program
- Test the physical properties that will be used to evaluate construction of the full-scale soil barrier, including at least four water content (ASTM D2216) and four density (ASTM D1556) tests per compacted lift
- Collect at least four undisturbed samples from each compacted lift immediately adjacent to where physical properties are tested, and from those samples obtain at least four undisturbed test specimens from varying depths in the compacted lift. Test the specimens in the laboratory for hydraulic conductivity (ASTM D5084) to determine any correlation between laboratory hydraulic conductivity, tested physical properties, and in-situ hydraulic conductivity
- Repair or observe the repair of all holes left by density testing and soil sample collection
- Conduct field tests to determine in-situ hydraulic conductivity. The Department recommends at least one sealed double ring infiltrometer test (ASTM D5093 or equivalent method)
- Dig at least four (4) test pits in the test area, inspect for evidence of voids, large pores between remnant clods, signs of poor bonding between lifts, and other visible problems, and
- Prepare a report documenting the test pad(s) evaluation

Test pad evaluation report

The CQA consultant should prepare and submit to the Department a soil liner test pad evaluation report that includes:

- a summary of test data
- data analysis
- conclusions and recommendations regarding test pad performance and full-scale soil barrier construction.
- a detailed description of the construction materials, equipment and methods to be employed for full-scale liner construction

---

Report review procedures

The Project Manager and Designer should evaluate the CQA Consultant's report and the test pad's conformance to the design specifications.

If the test pad's performance	then
conforms to design specifications	construct the full-scale soil liner using the same construction methods, equipment, and materials
fails design specifications	require the Constructor to construct and evaluate another test barrier using modified construction material, equipment, and methods

---

Alternative to test pad assessment

The project schedule may not allow time to complete the test pad evaluation before the soil liner is constructed. If this situation arises, demonstrate to the Department that a full evaluation of the test pad is not needed to verify that the liner will meet the specifications.

Demonstration content

The demonstration should:

- show, with laboratory testing, that the proposed soil-liner material easily meets the specified hydraulic conductivity
- permit Department representatives to observe construction of the test pad and excavation of test pits
- show that the lifts are adequately bonded together and that soil clods are adequately remolded (few inter-clod voids or macro-pores should be visible)
- use the same materials, methods, and equipment to construct the soil liner, and
- recognize that completed liner segments may need re-construction or modifications if the soil test pad fails to meet the design specifications

---

8.4 Construction Guidelines -- Soil Liner

Test pad results

The Project Manager and Designer should use the test pad modeling results to establish final requirements for liner construction and performance (specified compaction and hydraulic conductivity criteria).

Factors in establishing final construction requirements

In establishing final construction requirements, the Project Manager and Designer should carefully consider the following construction variables:

- properties of the low-permeability soils to be used for liner construction
- method of excavating and processing the soil prior to placement
- pre-compaction thickness and conditioning methods (e.g., disking, pulverizing, moisture adjustment)
- compaction equipment type, weight and length of feet (for footed rollers)
- compactor operations (number of compactor passes and maximum compactor speed)
- protection of compacted lifts that may be exposed to the elements
- scarification and moisture control between lifts
- mixing of bentonite and other soil additives

Key construction elements

Establish a construction program that has the following elements:

- systematic construction quality control (CQC) such that the resulting liner meets or exceeds the test pad's performance
- a CQA Consultant to monitor the construction and ensure that completed soil liners meet or exceed specifications, and
- provisions to protect completed soil liners from the effects of weather and other construction activities

Modifications to construction specifications

As the Constructor and CQA Consultant gain construction experience and "get a feel" for the soils, it may become desirable to modify certain construction criteria. Such adjustments should be made as described in the table below.

If the modification is	then	Examples
"functionally inferior"	obtain Department authorization prior to implementation	modifications including less compactive effort, reduced quality control, and increased lift thicknesses that potentially result in diminished hydraulic and strength properties
"functionally superior"	continue with construction	modifications, such as increased compactive effort, increased quality control, thinner lift thicknesses, that potentially reduce the hydraulic conductivity and enhance strength properties

8.5 Construction Guidelines -- Excavation and Subgrade Preparation

Excavation, stockpiling, and processing

Perform earthwork activities in accordance with the table below.

Step	Action
1	Segregate excavated soils according to their properties
2	Process excavated soils as necessary to meet required material specifications (e.g., pulverizing the soil to break down clods or screening the soil to remove large particles)
3	Place excavated/processed soils into compatible stockpiles of uniform material
4	Provide erosion control measures for excavation and stockpiling activities
5	Adjust the moisture content as necessary before using excavated or stockpiled soils (i.e., water needs to penetrate clods so they can be remolded)

Subgrade preparation

Construction procedures for liner or cover system subgrades should address the following factors:

- control of differential settlement
- removal of soft spots
- quality control testing (density, moisture content, soil classification, soil gradation)

8.6 Construction Guidelines -- Geosynthetic Materials

Typical geosynthetic materials

Landfill construction typically involves many applications for geosynthetic materials, including:

- geomembranes in liners and covers
- geotextiles as filters, cushions, and soil separators
- geogrids for slope and foundation support, and
- drain-nets for drainage

Installation specifications

Install geosynthetic materials in conformance with the specifications for:

- function and desired properties
- minimum testing and acceptance
- testing and acceptance procedures
- damage prevention, and
- installation procedures

Testing and acceptance procedures

Establish conformance testing and acceptance requirements that include the following procedures:

- The Constructor or Manufacturer should provide the Project Manager the Manufacturer's quality control certification (i.e., verification that the geosynthetic material meets project specifications)
- The Constructor or Manufacturer of a geomembrane should provide quality control certificates issued by the resin supplier, quality control certificates for each roll produced and certification that the supplied geomembrane and extrudate have the same material properties, and
- The Constructor or CQA Consultant should conduct sampling and conformance testing in accordance with ASTM D4759 "Standard Practice for Determining the Specification Conformance of Geosynthetics" to verify the manufacturer's certification

Damage prevention

Prevent damage to the geosynthetic material by using appropriate techniques for delivery packaging, labeling, transportation, handling and storage.

Installation procedure

Install the geosynthetic material as the specifications prescribe for:

- site preparation prior to placement of geosynthetic
- geosynthetics handling, placing, anchoring, seam overlaps, and post-installation inspection
- geomembrane seam welding (including preparation of geomembrane sheets and seaming equipment), weather and temperature constraints for seaming
- geomembrane wrinkles, folds, and bridging
- seam quality control testing and inspection
- repairing inadequate seams and damaged geomembranes, and
- covering or otherwise protecting geomembranes after installation to prevent damage

8.7 Construction Guidelines -- Leachate and Gas Systems

Leachate system construction

Construct the primary and secondary leachate collection and removal system(s) (LCRSs) according to specified requirements for:

- the performance objectives for each system component (i.e., for granular drainage material the hydraulic conductivity to be achieved)
- desired material properties (e.g., hydraulic conductivity, grain size distribution, non-carbonate rock for granular drainage material or inside diameter for LCRS piping)
- the required thickness for granular drainage and filter layers, and
- constructor requirements for LCRS work execution including:
  - slopes allowances to compensate for projected differential settlement
  - protection of liners during placement of overlying granular drainage materials
  - pre-operational cleaning and maintenance of the LCRS, and
  - demonstrating LCRS pipe continuity (e.g., pull a ball or other uniform object through the pipes)

Gas system construction

Construct the landfill gas control system according to the specified requirements for:

- construction staging and coordination with landfill operation and development
- connection of system components to and penetrations through geomembrane covers and other geosynthetics
- safety precautions for the Constructor's field crews and others who may be exposed (directly or indirectly) to landfill gas
- gas production and control system performance, and
- operational objectives

8.8 Quality Control Program

CQC defined

Construction quality control (CQC) refers to those actions taken by Manufacturers, Fabricators, or the Constructor to confirm that products and work quality meet the requirements of the contract. CQC includes inspections and testing of all furnished, constructed, and installed components. These activities are independent of construction quality assurance (CQA) activities.

CQC program

Establish detailed construction quality control (CQC) requirements for materials and workmanship, to show the Constructor how to furnish products and execute work. CQC should include systematic inspections and measures to control the quality of construction and to ensure conformance with the project specifications and contract requirements.

8.9 Quality Assurance Plan

CQA plan

Prepare a detailed construction quality assurance (CQA) plan that verifies and documents proper construction of facility components. The CQA plan should describe the proposed measures for monitoring the quality of materials and work performance. CQA plan elements pertaining to foundations, subgrades, embankments, soil barriers, geosynthetics, LCRSs, and landfill gas control systems should be developed and administered by a Professional Engineer with current Oregon registration and experience in the technical area.

CQA defined

CQA is an overview and inspection program consisting of systematic observations and tests to ensure that the final product meets design specifications. CQA plans, design plans and specifications, observations, and tests are used to provide quantitative criteria for evaluating final product acceptability.

Plan contents

The CQA plan should include site-specific information on the following topics:

- staff roles, responsibility, authority and communication
- qualifications of CQA consultant
- qualifications of construction team
- inspection activities
- geosynthetic construction
- earthwork construction
- documentation

Roles and responsibilities

The CQA plan should describe the role, responsibility, and authority of each party involved in executing the CQA plan. The plan should include an organizational flow diagram outlining the management structure, lines of communication, chain-of-command, and implementation procedures.

Qualifications of CQA consultant

The CQA plan should describe the technical expertise of the CQA consultant. The CQA consultant should represent the Owner's interests as an independent, qualified party and is responsible for observing, evaluating, and documenting quality of materials and construction.

Qualifications of construction team

The CQA plan should establish minimum qualifications for earthwork contractors, geosynthetic installers and geosynthetic material manufacturers.

Inspection activities

The CQA plan should outline the observations and tests that will be used to evaluate conformance with all design criteria, plans, and specifications for each project component.

Geosynthetic construction

The CQA plan should describe the responsibilities of the CQA consultant. Suggested duties include:

- monitoring geosynthetic material delivery, unloading and on-site storage and transport
- selecting geosynthetic material (destructive samples) for conformance testing
- determining the acceptability of geosynthetics according to ASTM D4759 "Standard Practice for Determining the Specification Conformance of Geosynthetics"
- monitoring the deployment of geosynthetics
- monitoring geosynthetic seaming operations
- monitoring and documenting CQC testing procedures (i.e., non-destructive seam testing, field tensiometer testing)
- monitoring and documenting geomembrane CQA testing (i.e., destructive seam sampling and testing, repair operations, sample labeling)
- documenting any on-site activities that could result in damage to the geosynthetics
- maintaining appropriate lines of communication with other project team members as specified in the CQA plan

---

Earthwork construction

The CQA plan should describe procedures associated with earthwork, including:

- grading
- foundations
- embankments
- soil liners and covers
- granular drainage and filter layers
- excavations and backfill
- top soil (vegetative) layers
- road building, and
- soil processing (e.g., mixing with bentonite)

CQA of earthwork

CQA activities should include:
- earthwork monitoring
- earthwork sampling and testing
- evaluating prospective liner materials, and
- evaluating constructed soil liners

Earthwork monitoring

The CQA consultant should oversee all key phases of earthwork to monitor and document that materials and procedures meet the design specifications. The CQA consultant's oversight should include:
- borrow soils properties and performance
- test pad construction and performance
- borrow soils stockpiling methods
- raw material processing
- foundation and sub-grade preparation
- soil layer thickness and protection of underlying layers
- repair of any holes (e.g., from grade stakes) or other construction-related damage
- soil-liner construction (soil density, moisture content, permeability, equivalency to test pad construction)
- identification and repair of penetrations of the soil liner (e.g., penetrations resulting from CQC/CQA testing)
- protection of completed soil liner sections
- all other earthwork components (i.e., granular drainage or gas venting layers, operations layer, protective layers and topsoil layer)
- identification and modification of activities that could damage liners or drainage layers

---

Earthwork sampling and testing

The CQA plan should describe sampling parameters and procedures for each discrete earthwork activity including testing frequency, rationale for selecting test locations, and acceptance and rejection criteria.

The QA Consultant should observe all aspects of earthwork, and personally perform the soil sampling and testing to develop a "feel" for the material. This hands-on involvement may improve the QA Consultant's observational skills and judgment, ultimately translating into better quality assurance.

Evaluating prospective liner materials

The CQA plan should specify parameters and testing frequencies for evaluating soils intended for liner construction. Test samples obtained from the borrow area, processing area, stockpile area or final placement area, provided:
- the samples meet low-permeability specifications, and
- the soil is suitable for or can be conditioned for compaction

Liner soil testing

The table below lists recommended parameters and testing frequencies for evaluating prospective soil liner material.

Parameter being tested	Test method reference	Testing frequency	Recommended performance
Percent fines (passing a No. 200 sieve)	ASTM D1140	1 per 1000 cy and 1 test each day soil is excavated or placed	≥ 50%
Percent gravel (dry-weight retained on the No. 4 sieve)	ASTM D422	1 per 1000 cy and 1 test each day soil is excavated or placed	≤ 10%
Atterberg limits	ASTM D4318	1 per 1000 cy and 1 test each day soil is excavated or placed	Plasticity Index ≥ 10%
Water content	ASTM D3017 ASTM D4643 ASTM D2216 (at least every 5th sample)	1 per 1000 cy and 1 test each day soil is excavated or placed	-----
Moisture/Density/ Permeability relationships	ASTM D698 ASTM D1557 ASTM D5084	1 per material type	

Note: Other equivalent tests may be used

Reference: Use relationships to define an acceptable range of Water Content and Dry Density Unit Weight, in accordance with procedures described by Daniel, and Benson, C. H. (1990), "Water Content - Density Criteria for Compacted Soil Liners," Journal of Geotechnical Engineering, Vol. 116, No. 12, pp. 1811 - 1830.

Evaluating the constructed soil liner

The CQA plan should specify parameters and testing frequencies for evaluating compacted soil liners. The plan should allow testing frequencies to be increased at the discretion of the CQA consultant.

Recommended parameters and frequencies

The table below lists recommended parameters and testing frequencies for evaluating constructed soil liners.

Parameter being tested	Test method reference	Testing frequency	Recommended performance

Water content	ASTM D3017 ASTM D4643 ASTM D2216(at least every 5th sample)	5/acre/compacted lift	
Density	ASTM D2922 ASTM D1556(at least every tenth sample)	5/acre/compacted lift	Nuclear density test should measure soil density near the bottom of each compacted lift; calibrate nuclear gauges to a known density each day of use
Thickness	Elevation monitoring	50 feet center to center or minimum 6 points per grade at top of first compacted lift and top of completed soil liner	

Note: Other equivalent tests may be used

Documentation

The CQA plan should specify detailed reporting requirements for the CQA activities, including:

- daily record keeping (observation and test data sheets)
- problem reporting and corrective measures data sheets
- project Manager and Designer acceptance reports (for errors, inconsistencies, and other problems)
- final documentation including as-built drawings, and
- the signature or initials of the person maintaining the records and generating the reports

8.10 Construction Certification Reports

Submittal

Construction Certification Reports must be submitted to the Department each time a landfill development phase is completed and/or before a newly constructed waste management unit (a landfill cell or leachate impoundment) is activated. The report should document and certify that all required components and structures have been constructed in compliance with the permit requirements and approved design specifications.

Reference: OAR 340-93-150

Report content

Construction certification reports should include the following elements:

- an executive summary describing how well the project went and major problems encountered
- a summary of all construction and CQA activities
- a summary of all CQA observations, daily inspection/photo/video logs, and test data sheets
- problem identification/corrective measures
- designer's acceptance reports for errors and inconsistencies
- deviations from design and material specifications, including justifying documentation, and copies of change orders and recorded field adjustments
- certificates of acceptance (e.g., acceptance of subgrade for geomembrane liner installation)
- as-built drawings and photographs, including record surveys of soil liner and granular drainage layer thicknesses
- a certification statement(s) and signatures legally representing the CQA Consultant, Designer and Owner, one of the which is that of a professional engineer registered in Oregon, and
- a copy of the notation on the deed to the facility property for all closed cells, as required by 40 CFR 258.60(i)

8.11 Additional Resources

Low-permeability soil liner	Daniel, D. E. (1987), "Earthen Liners For Land Disposal Facilities," Geotechnical Practice for Waste Disposal '87 Proceedings, ASCE, Geotechnical Special Publication No. 13., pp. 21-39; Daniel, D. E., and Benson, C. H. (1990), "Water Content - Density Criteria for Compacted Soil Liners," Journal of Geotechnical Engineering, Vol. 116, No. 12, pp. 1811 - 1830; U.S. EPA (1988), Design, Construction, and Evaluation of Clay Liners for Waste Management Facilities, EPA/530/SW-86/007F; U.S. EPA (1988), Lining of Waste Containment and Other Impoundment Facilities, EPA/600/2-88/052, Chapter 9; and U.S. EPA (1989), Seminar Publication: Requirements for Hazardous Waste Landfill Design, Construction, and Closure, EPA/625/4-89/022, Chapter 6.
Geosynthetics -- construction quality control	U.S. EPA (1988), Lining of Waste Containment and Other Impoundment Facilities, EPA/600/2-88/052, Chapter 9; and. U.S. EPA (1989), Seminar Publication: Requirements for Hazardous Waste Landfill Design, Construction, and Closure, EPA/625/4-89/022, Chapter 6. For guidance on seaming geomembranes: U.S. EPA (1991), Technical Guidance Document: Inspection Techniques for the Fabrication of Geomembrane Field Seams, EPA/530/SW-91/051.
Leachate Collection and Removal	U.S. EPA (1988), Lining of Waste Containment and Other Impoundment Facilities, EPA/600/2-88/052, Chapter 9.

Construction Quality Assurance

U.S. EPA (1988), Lining of Waste Containment and Other Impoundment Facilities, EPA/600/2-88/052, Chapter 10;

U.S. EPA (1985), Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, Public Comment Draft, EPA/530-SW-85-021;

Daniel, D. E., "Summary Review of Construction Quality Control for Compacted Soil Liners," Waste Containment Systems: Construction, Regulation, and Performance, R. Bonaparte (ed.), ASCE, New York, pp. 175 - 189; and

Chemical Waste Management, Inc. (June 15, 1990), Quality Assurance Manual For The Installation Of Geosynthetic Lining Systems.

General reference

For further information on construction principles and procedures, and project organization see ASCE (1990), Quality in the Constructed Project, ASCE Manual No. 73.

Section 9: Landfill Operations

9.1 Introduction

Operations plan

Develop an operations plan that describes the facility's operation and maintenance and incorporates the facility's planned development and specific design elements.

Reference: OAR 340-94-040(11)(b)

Operations and maintenance manual

Once new landfill units or related facilities are constructed and activated, prepare a detailed operations and maintenance (O&M) manual. The O&M manual should incorporate pertinent information from the following sources:

- operations plan
- final design documents
- post-construction documents
- hands-on operating experience, and
- equipment manufacturers

How to respond

During the design phase of the project, prepare an operations plan that integrates the site development plan, the facility design elements, and the operational elements described in this subsection. Submit the plan to DEQ for review and approval.

Once the landfill unit and related facilities are constructed and activated, prepare the O&M manual. Incorporate the operations plan elements, construction documents, and equipment manufacturers and suppliers data. Prepare separate O&M manuals for complex systems, such as leachate treatment systems, landfill gas control systems. Make the O&M manual available to operating personnel and place a copy of the manual(s) in the facility operating record.

O&M manual content

The O&M manual should be a practical document intended for day-to-day use by on-site operations personnel that:

- reflects the scope and content of field operations
- provides clear and detailed direction to landfill operating personnel
- addresses all topics identified in the operations plan
- includes a detailed table of contents
- includes definitions of all technical terminology, and
- is assembled as a loose-leaf binder to facilitate periodic revisions

Updating operations documents

Update the operations plan and the O&M manual as necessary to reflect significant facility expansions or changes in site operations and equipment.

In this section

This section describes the operational elements that should be addressed in the operations plan, including:

- general operations
- disposal operations -- waste handling
- disposal operations -- management of working area
- special waste management
- ancillary operations
- inspection and maintenance
- operating record
- contingency
- incremental post-closure operations, and
- personnel

9.2 General Operations

Security

Establish security measures to prevent unauthorized entry, waste disposal, and unsafe scavenging practices.

Signs

For public-use landfills, post signs bearing the following information:

- facility name
- business address and telephone number of the facility owner/operator (person or municipality)
- an emergency telephone number
- hours of operation
- current permit number, and
- a list of general types of materials which will be accepted or not accepted

Access hours and controls

Establish operating hours and man-made or natural barriers to:

- discourage entry by unauthorized persons
- limit access to the site to times when an attendant is on duty
- prevent unauthorized vehicular traffic and illegal dumping of wastes, and
- protect human health and the environment.

Reference: OAR 340-94-040(9) and 340-94-040(11)(h)

Aesthetics

Screen the active landfill area from public view.

Access roads

Construct and maintain on-site access roads to minimize traffic hazards, dust and mud and to provide reasonable all-weather access. Specify the maximum sustained grade of an access road. Construct stream crossings using culverts or other structures that do not increase the potential for flooding or excessive soil erosion. Incorporate roadway design in the detailed engineering drawings and specifications (Section 7).

Open burning

Prevent uncontrolled and/or unauthorized open burning.

Endangered species	Establish operating procedures to prevent the harming, killing, capturing or collecting of any endangered or threatened species, or to the direct or indirect alteration of critical habitat for those species. Protect any such species.
Floodplain integrity	Determine if facilities are located in the 100-year floodplain. The facility must not restrict the flow of a 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste.
Sewage disposal	Manage on-site sewage in accordance with Department-approved plans.

9.3 Disposal Operations -- Waste Handling

Weighing	Install equipment for weighing incoming loads or establish procedures for estimating weight by volume of waste loads. Account for the amount of incoming waste.
Scavenging controls	Prevent uncontrolled and unauthorized removal of solid waste. Material recovery activities must not create adverse health or environmental impacts.
Waste acceptability procedures	Establish waste acceptance procedures that include the following elements: • A random inspection program at the facility for detecting and preventing the disposal of regulated hazardous wastes, polychlorinated biphenyl wastes or any other unacceptable wastes as specified in the permit or determined by the Department. • Waste screening to control prohibited waste and special wastes which require prior Department approval. • Procedures used wherever prohibited or special wastes could enter the facility, including the working face, transfer stations, direct haulers, and landfill scale houses. • Procedures for managing prohibited wastes detected in landfilled waste. • Measures to handle unusual peak waste loads which may exceed the facility's capacity. References: 40 CFR 258.20 describes the requirements for a random inspection program; OAR 340-93-040 defines prohibited wastes
Liquid wastes	Prevent the disposal of bulk or non-containerized liquid waste and meet the requirements of 40 CFR 258.28(b).
Out of state wastes	For imported wastes, establish procedures to follow prohibitions or restrictions.
Salvage	Recover salvage materials in a planned and controlled manner. Reference: OAR 340-94-040(11)(k)

Litter control

Control litter by establishing good waste compaction practices, a small working face, and physical controls (e.g., permanent and portable fences), and cleanup procedures to prevent on and off-site windblown litter accumulations.

Reference: OAR 340-94-040(11)(l)

Vector and bird control

Control or prevent on-site populations of flies, rodents, other disease vectors, and birds.

References: OAR 340-94-040(10); 40 CFR 258.10

Inclement weather operations

Develop procedures for inclement weather operation, including provisions for:

- all-weather roads, wet-weather, and alternate disposal areas
- operating in extreme dry weather conditions or when dust emissions are excessive
- operating during other severe climatic conditions such as severe winds or snow, and
- notifying customers when severe climatic conditions require closure of disposal facilities

Reference: OAR 340-94-040(11)(b)(D)

Leachate system

Establish operation and maintenance procedures for the leachate management system and if applicable, the alternative leachate disposal system, scheduling of key activities during landfill development. Prepare a separate, detailed O&M manual for complex leachate treatment systems. Address the topics in the table below, as applicable.

System component	Topics to be addressed
Leachate Collection	Leachate collection system operation and performance Leachate level measurement techniques, frequency, location, for normal and wet weather operations Measures to prevent clogging and physical damage of collection system components
Leachate Storage	Odor control Leachate level monitoring Prevention of leachate releases to the environment (such as overflows or leaks) Liner system maintenance

System component	Topics to be addressed
Leachate Treatment/ Disposal	Influent and effluent testing Treatment efficiencies Treatment process adjustments and monitoring

Landfill gas control

Manage landfill gas to prevent subsurface migration of methane.
Describe detailed operation and maintenance procedures for the landfill gas control system in the facility O&M manual. Prepare a separate O&M manual for complex gas control systems.

References: OAR 340-94-040(5) and 40 CFR 258.23

Surface water control

Establish measures to prevent stormwater run-on onto active portions of the landfill and to control runoff. Incorporate a copy of the storm water pollution control plan into the operations plan.

Reference: Clean Water Act Sections 208, 319, and 402 involving wetlands; NPDES requirements in 40 CFR 258.26 and 258.27

Groundwater control

Operate and maintain the groundwater control system and associated equipment. Groundwater control measures may include dewatering systems (e.g., under drains and wells) and barrier systems (e.g., slurry walls, geomembrane walls) accompanied by pumps, manholes, buried piping, catch basins, outlets, and other equipment requiring operation and maintenance.

9.4 Disposal Operations -- Management of Working Area

Compatibility

Landfill disposal operations should be compatible with engineered structures and environmental control and monitoring systems, and should be consistent with the Site Development Plan and other aspects of facility operations.

Waste unloading

Develop waste unloading procedures for incoming vehicles and inspection procedures to identify and isolate prohibited or unacceptable wastes. Establish the size of the refuse unloading area from the following:

- incoming waste quantities
- number, size, and type of delivery vehicles
- compacting equipment requirements, and
- litter control and other environmental considerations

First layer of fill

Establish precautions to protect the geomembrane liner when the first layer of waste is placed and compacted in lined disposal areas. The first operations layer should be "select waste". Consider the following factors in establishing appropriate safeguards:

- the thickness and physical characteristics of the initial waste layer
- the availability of desirable "select waste" materials
- the thickness and physical characteristics of the drainage and operations layers
- whether the landfill cell design incorporates special-purpose geosynthetic materials (e.g., geotextiles) for added protection of the liner, and
- the type of equipment used to place and compact the initial waste layer

Definition: “Select waste” includes household waste but not demolition or land-clearing debris or other materials that may damage the liner system

Leachate minimization

Minimize leachate generation with appropriate landfill development and operations techniques.

Active face

Specify the nominal size of the active working face, and establish compatible waste unloading and filling procedures. Consider the following in determining the size of the working face:

- The width of the working face should only be wide enough to accommodate waste unloading and compaction equipment operation
- The cell height and length should be selected based on the daily volume of refuse received, and
- Cell end slopes should be kept as steep as possible (20 to 30 degrees)

Compaction

Establish procedures for waste spreading and compaction including layer thickness, maximum lift height, daily cell configuration and slopes, compaction equipment and compactive effort (i.e., minimum number of compactor passes over each layer of waste), and the intended density of solid waste.

Recommendation: The Department recommends that waste be spread in thin (about 1-foot-thick) layers and compacted with 3 to 5 passes of the compactor on slopes of about 3 horizontal to 1 vertical. The most effective compaction occurs with the compactor operating on a level surface.

Benefits of compaction

Proper compaction of solid waste at landfills can provide several important benefits including:

- conserving landfill space
- minimizing and controlling litter
- reducing daily cover efforts and cost
- reducing total and differential settlement of the waste and associated closure and post-closure costs, and
- creating a more aesthetic operation

Daily cover

Place "daily cover" on all exposed solid waste at the end of each operating day, or more often if necessary to control problems such as fly propagation, blowing litter, vectors, and fires. Place at least six inches of earthen material on exposed solid waste at the end of each working day, unless alternative cover designs or procedures are approved by the Department.

Reference: 40 CFR 258.21 describes requirements for daily cover

---

Alternative daily cover

Alternative cover materials must provide the same level of control as earthen material. Example alternative covers include the following materials:

- Geosynthetic tarps (e.g., geotextiles and geomembranes)
- Spray-on foams
- Slurry products
- Inert waste materials (e.g., shredded tires, foundry sands)

Specifications should be established for cover material type, minimum thickness and frequency of application. Cover material sources and stockpile requirements should be identified.

Reference: 40 CFR 258.21(b) or (c), and OAR 340-94-040(8) describe the requirements for obtaining approval of alternate daily cover

---

Intermediate cover

Place "intermediate cover" on the top and side slopes of an advancing lift which will not receive additional waste for at least two months. Design the intermediate cover to control surface water infiltration, disease vectors, fires, odors, blowing litter and scavenging. Intermediate cover should consist of at least one foot of compacted low-permeability soil. A geomembrane cover may also be required in areas where average annual rainfall exceeds 25 inches.

Interim cover

Place “interim cover” on segments of the landfill that reach final elevations before final cover installation. During the rainy season, place interim cover immediately after a cell reaches final elevations. Design the interim cover to minimize surface water infiltration, and potentially to serve as part of the foundation for the final cover system. Develop specifications for the interim cover's configuration, material properties (e.g. permeability), thickness, installation schedule and techniques, and raw-material sources.

9.5 Special Waste Management

Special waste management plan

Develop a Special Waste Management Plan including procedures for special waste acceptance, characterization, handling, storage, recordkeeping and disposal.

Contents

The plan should include the following elements:

- an analysis of special waste management alternatives
- a rationale for the proposed disposal alternative
- the physical and chemical characteristics of each waste
- the proposed (EPA and DEQ-approved) procedures for waste sampling, testing, and analysis
- an evaluation of whether the waste is compatible with the landfill (or other impoundment) liner and leachate management systems
- procedures to document and record daily and annual waste quantities (weight or volume), and waste sources and generating processes

Potential hazards

The table below descries the potential hazards associated with some wastes that may require special handling for disposal.

Potential hazard	Example waste
personnel safety hazards	asbestos
odor and vector problems	large dead animals
excessive leachate generation	sewage sludge
excessive settlement in the landfill	yard debris
puncturing or tearing the landfill liner	construction and demolition debris
fire hazards	tire chips
increasing the toxicity of landfill leachate	cleanup materials contaminated with hazardous substances

Reference: OAR 340-94-040(11)(b)(J)

Examples: special wastes

Special wastes include but are not limited to, the following specific items:

- asbestos
- treated infectious waste
- large animal carcasses
- hazardous-substance contaminated cleanup materials
- septage
- sewage sludges and grit
- industrial waste sludges
- industrial solid wastes
- ash
- construction and demolition waste, and
- over 25 gallons of petroleum-bearing wastes such as used oil filters, oil-absorbent materials, tank bottoms or oil sludges

---

9.6 Ancillary Operations

Recycling

Provide a place and opportunity for collecting source separated recyclable material. Specify the procedures to be followed in accepting recyclable materials at the facility.

Reference: OAR 340-93-160

Truck washing

Design truck washing facilities to reuse or recycle the waste water, or to discharge it to a sanitary sewer or leachate treatment system. Describe the following:

- truck washing facilities and the circumstances for their use, and
- methods for managing wash water

Required permits: Discharges to the land or to waters of the state require a National Pollutant Discharge Elimination System (NPDES) or a Water Pollution Control Facilities (WPCF) permit. The type of permit will be determined on a site-specific basis by the Department's Water Quality staff.

Operations equipment

Acquire and maintain adequate operations equipment. Select equipment for its type, important physical and mechanical specifications (i.e., ground pressure, length of compactor wheel cleats),. identify any operating restrictions (e.g., preventing compacting equipment contact with the liner), quantity and purpose. Maintain standby equipment for use in the event of breakdown or maintenance of primary equipment.

Note: The equipment types should be consistent with facility design, construction, and operational criteria

Electrical distribution system

Maintain the electrical distribution system at the facility to ensure proper function of metering points, transformers, disconnects, breakers, connections, and other power-system appurtenances.

9.7 Inspection and Maintenance

Schedule

Develop detailed inspection and maintenance procedures and a schedule for all facility components and items which require periodic inspection. Describe the activities to be conducted on a regularly scheduled basis.

Inspection form

Develop a standard inspection form to guide implementation and reporting. Form use should help maintain procedural and informational consistency.

Preventive program

Establish a preventative inspection and maintenance program schedule for all equipment and facilities including those in the table below.

Equipment/facility	Examples
personnel safety equipment	fire extinguishers
operating equipment	scrapers, dozers, compactors, loaders
support facilities	scale house, scales, public receiving area, administrative buildings
environmental control systems	landfill gas collection system, leachate collection and treatment systems sedimentation basins, cover system, liner system
environmental monitoring systems	groundwater monitoring wells, landfill gas monitoring probes, leachate monitoring sumps
transportation system	access roads, directional signs

9.8 Operating Record

Regulatory reference

Establish and maintain an operating record. Develop procedures to describe how the operating record will be established and maintained.

Reference: 40 CFR 258.29

Location

Retain the operating record near the facility or in an alternative location approved by the Department. Specify the location in the operations plan.

Content

Include the following information in the Operating Record:

Content	Regulatory source
Any required location restriction demonstrations (airport safety, floodplains, seismic impact zones or unstable areas)	40 CFR Part 258 Subpart B
Inspection records, training procedures and notification procedures included in the facility's hazardous waste screening program	40 CFR Part 258.20
Gas monitoring results and any required gas remediation plans	40 CFR Part 258.23
Documentation that the landfill meets design criteria if leachate or gas condensate is placed in the facility	40 CFR Part 258.40(a)(2)
Any demonstration, certification, finding, monitoring, testing, or analytical data (groundwater monitoring including detection and assessment monitoring, selection of a remedy and implementation of a corrective action program)	40 CFR Part 258 Subpart E
Closure and post-closure care plans and any monitoring, testing or analytical data	40 CFR Part 258 Subpart F
Any cost estimates and financial assurance documentation	40 CFR Part 258 Subpart G; OAR 340-94-140
For a landfill claiming the small community exemption, any information required by that paragraph to demonstrate compliance with the small community exemption	40 CFR Part 258.1(f)(2)

9.9 Contingency

Contingency plan scenarios

Develop a contingency plan that includes procedures for responding to the following scenarios:

- on-site personal injuries
- leachate releases
- surface water or groundwater contamination
- landfill gas migration and associated fire and explosion hazards
- liquid spills
- fires (e.g., equipment fires, "hot load" fires, disposal site fires, building fires)
- explosions, accidents, and other emergencies
- detection of leachate in any secondary leachate collection and removal system
- leachate storage facility at or above capacity
- tank and surface impoundment spills or leakage, and
- storms and inclement weather

Notification list

Create an emergency notification list in the contingency plan (e.g., contact person, address, telephone number) and procedures for:

- emergency assessment
- communication
- identification of emergency response organization
- identification of community, civil authorities and regulatory personnel, and
- reporting.

Layout map

Prepare a site layout map showing:

- facilities
- fire hydrant locations
- individual building floor plans showing locations of fire extinguishers, first aid kits and stations, exits and communication equipment, and
- other relevant site features

Fire prevention and control

Establish comprehensive procedures for fire prevention and control of equipment and solid waste fires.

Equipment fire prevention

Equipment fires generally are started by an electrical failure or fluid leak and oil and grease that spreads on the machine and on nearby refuse. Preventative maintenance on the machines will reduce the potential for leakage of flammable fluids. Routine cleaning of equipment will further contribute to fire prevention. Furnish a fire extinguisher with each piece of equipment. Consider automatic fire control systems for dozers and compactors.

Solid waste fire prevention

Landfills fires can be started by "hot loads," spontaneous combustion, unknown combustible materials subjected to sparks, and by equipment fires. On-site personnel must always be on the lookout for "hot loads" and flammable materials. Subsurface fires resulting from spontaneous combustion can be difficult to locate and extinguish. Extinguish near-surface fires by covering the area with dirt. If the fire is deep, excavating the burning material may be necessary. Follow appropriate personnel safety precautions in all of these situations. Inaccessible fires require a different strategy. Extinguish these fires by cooling the burning mass in-place, or reduce available oxygen by closing cracks and fissures, or by adjusting the gas control system operations.

9.10 Incremental Post-Closure Operations

Continuous closure

Landfill development is a continuous construction and operations activity. As areas are prepared to receive future waste, active areas are being filled and completed areas are closed. At large landfills this cycle may be repeated many times prior to final facility closure.

Relation to other plans

The site development plan provides for phased construction, operations, and closure. Final facility closure and post-closure are addressed in the closure, post-closure, and financial assurance plans.

Beginning of post-closure

The 30-year post-closure care period starts after final facility closure, not after each incremental closure. Incremental closure may involve one or more landfill modules. Final facility closure and the "worst-case closure" scenario (Subtitle D closure) involve the cessation of landfill operations.

Reference: OAR 340-94-130; Section 11 of this guidance

Inspection and maintenance

Establish routine inspection and maintenance procedures for completed landfill modules and activities to protect the integrity of the final cover system and other closure-related facilities.

Inspection and repair components

Establish procedures and a schedule for inspection, repair, and closed modules. The following critical components should be addressed:

- final cover
- surface water drainage system
- erosion and sedimentation control system
- landfill gas monitoring and control system
- leachate collection and removal system
- access control (e.g., security fence, gates, locks), and
- access roads (for inspection and maintenance)

9.11 Personnel

Operations staff

Establish an adequate operations staff and systematic qualifications, responsibilities and duties, and lines of authority.

Training topics

Train operations personnel in landfill development, construction and operation, as applicable. Training should emphasize the following:

- how to inspect waste loads and identify hazardous waste or PCB waste containers and labels
- hazardous waste handling procedures
- safety precautions, employee protective clothing and equipment, health
- first aid, 40 hour OSHA, and emergency procedures
- landfill operational practices
- record keeping, and
- permit requirements and regulatory compliance

Documentation

Place training documentation in the operating record.

Reference: 40 CFR Part 258.29

9.12 Additional Resources

References U.S. EPA "Solid Waste Disposal Facility Criteria - Technical Manual", October 9, 1993

Section 10: Environmental Monitoring

10.1 Introduction

Purpose

Environmental monitoring is required to evaluate the performance of engineered environmental control systems (e.g., liners, leachate and gas control systems) and to assess potential environmental impacts and public health and safety risks from any contaminant releases.

How to respond

Prepare and submit an Environmental Monitoring Plan (EMP) report to the Department for review and approval. Upon approval, all environmental monitoring must be conducted in accordance with the EMP, including any conditions of the approval.

The plan should be stamped by an Oregon Registered Geologist with experience in environmental monitoring.

Regulatory framework

The following regulations govern environmental monitoring:

- 40 CFR Part 258, Solid Waste Disposal Facility Criteria
- OAR 340 Division 94, Solid Waste Management
- OAR 340 Division 40, Groundwater Quality Protection.

Monitoring overview

The progression of activities and submittals related to the environmental monitoring include the following:

Stage	Activity	Guidance section
1	Site characterization	2 and 3
2	Engineering design	7
3	Interim monitoring	10.1
4	Environmental monitoring plan monitoring	10
5	Establishing permit specific concentration limits	10.15
6	Long-term monitoring	10.15

Complete the site characterization and engineering design stages prior to development of the EMP. Use the information on facility hydrology, geology, and hydrogeology in preparing the plan.

Interim monitoring

Interim monitoring may be required by the permit. Interim monitoring is conducted after site characterization until an approved EMP is implemented. Any interim monitoring requirements will be specified in the permit.

Plan updates

The monitoring program extends through the post-closure period of the landfill. Updates to the monitoring plan may be required for:

- facility development
- landfill expansion
- the addition of a new cell
- changes in the groundwater flow
- major changes in operations
- additional sampled media, or
- anytime the Department requires changes or additions to the program, such as installation of new wells or changes in sampling parameters

In this section

This section describes the elements that should be addressed in the Environmental Monitoring Plan, including:

- Environmental Monitoring Network Design
  - Groundwater
  - Surface Water
  - Leachate
  - Vadose Zone
  - Landfill Gas
  - Air Quality
- Groundwater Monitoring Network Construction
- Sampling and Analysis
- Data Analysis and Evaluation
  - Setting Permit Specific Concentration Limits
- Reporting
- Action Requirements, Assessment and Corrective Action

10.2 Environmental Monitoring Network Design

Monitoring network

The environmental monitoring network consists of several components designed to detect and characterize facility impacts through groundwater, surface water, vadose zone, leachate, and gas monitoring. The network's individual monitoring components should be compatible with each other and with site characteristics, the landfill design, and other facility operations.

Design considerations

Site characterization, engineering design, and the environmental monitoring network are interdependent elements of landfill development. Conceptual models of site hydrology, geology, and groundwater should be developed to define the physical and environmental criteria needed for designing the monitoring system.

EMP contents

The network system design section of the EMP should:

- describe how the monitoring network will characterize facility impacts through the monitoring of:
  - groundwater
  - surface water
  - leachate
  - vadose zone
  - landfill gas
  - private wells, and
  - any other appropriate environmental monitoring
- Identify new and existing wells and piezometers intended for the monitoring network. Justify the number of wells and well location, depths, and horizontal and vertical spacing
- Identify all sampling locations on a location map that shows:
  - the unique identification number of all sample locations
  - surrounding features, including manmade, natural features, and contours
  - the location and boundary of the facility
  - all landowners within one-half mile radius of the solid waste boundary
  - a North arrow
  - any USGS benchmarks

Map size: The location map should be at a scale of not more than 1" = 200' and contour intervals not to exceed 5'.

Professional surveying

The map should be prepared and stamped by a registered land surveyor or civil engineer. Surveyed well locations should:

- provide a horizontal accuracy of 0.2 feet (0.06 meters)
- provide the elevation of the land surface with a vertical accuracy of 0.1 feet (0.03 meters)
- provide the marked level at the top of the well casing with a vertical accuracy of 0.01 feet (0.003 meters)
- use National Geodetic Vertical Datum of 1929 as the vertical elevation control, and the Oregon State Plane Coordinate System (ORS 93.330) as the horizontal control, and
- describe the location in latitude and longitude coordinates accurate to 0.1 seconds of latitude and longitude

10.3 Monitoring Network Design -- Groundwater

Objective of groundwater monitoring

Monitor groundwater to provide reliable and representative information on:
- aquifer characteristics
- groundwater flow directions, and
- chemical and physical characteristics of groundwater being monitored

Network design

Describe the groundwater monitoring network, including:
- the number, location, spacing, depth, and screen interval of monitoring wells for each potentially impacted aquifer
- methods to provide background data and/or to intercept potential contaminant flow paths
- site-specific geology/hydrogeology as defined by site characterization
- the lateral and vertical extent of any existing contaminant plumes and their expected transport
- landfill configuration and size
- purpose of each well (detection, background, characterization)
- aquifer(s) monitored
- relationship to facility operations and other monitoring components (i.e., potential for landfill gas migration)

Well network

The network should adequately characterize each monitored aquifer or water bearing zone. The groundwater monitoring network should include a sufficient number of the following types of wells:
- background wells
- detection wells
- compliance wells, and
- piezometers (as appropriate)

Types of wells The table below discusses the types of groundwater monitoring wells that may be part of the monitoring program.

Well type	Description
Characterization wells	Designed to collect information to characterize the geology, hydrogeology and groundwater chemistry used for designing the facility and a long term monitoring program. Usually installed during the site characterization phases of the project. If located in desirable locations, may later be proposed for the long term monitoring program.
Background wells	Designed to characterize background water quality at the facility. Typically located upgradient from the waste disposal facility, but other configurations (i.e., cross gradient) may be approved by the Department if geologic, hydrogeologic or other conditions do not allow for a satisfactory upgradient location. Should be screened in the same water bearing zone(s) as the downgradient detection and compliance wells.
Detection wells	Designed to intercept pathways of contaminant migration from the facility. Usually installed at the downgradient edge of the solid waste disposal boundary to immediate detect any releases of contamination. Always located inside the compliance boundary. May coincide with the point of compliance.
Compliance wells	Designed to monitor the quality of groundwater downgradient from the landfill passing through the facility's compliance boundary. The compliance boundary is the point where groundwater must be at or below the permit specific concentration limits established for that facility. The default compliance boundary is the waste management boundary unless otherwise approved by the Department.
Piezometers	Used to measure groundwater elevations for determining hydraulic gradients and/or flow directions across the facility. Should be screened in the appropriate intervals to determine the vertical and horizontal groundwater gradients in the monitored aquifers.

Note: At new facilities, characterization of background water quality may be required before waste is accepted at the facility or new unit of landfill cell. Groundwater collected at both background and downgradient prior to accepting waste may be used to establish pre-operation background groundwater quality.

10.4 Monitoring Network Design -- Surface Water

Objective of surface water monitoring

Monitor surface water potentially impacted by leachate releases, contaminated groundwater seepage, or surface water run-off.

Related requirements

Surface water monitoring may be required by the Department's Water Quality program through National Pollutant Discharge Elimination System (NPDES) or Water Pollution Control Facility (WPCF) permits and/or through the solid waste permit.

Network design

Describe the surface water monitoring network, including:

- proposed upstream, downstream, and potential point of discharge locations for surface water monitoring
- provisions for minimum monitoring and reporting requirements of any facility NPDES or WPCF permit
- justification for the number and location of sampling points
- provisions to provide a permanent marker at each sampling station (i.e., survey marker) to establish re-usable sampling locations
- a description of any flow measuring devices, recording equipment, or staff gauges that may be installed at the sampling site

Sample location considerations

The proposed sampling locations should consider:

- potential or existing contaminant migration pathways
- overland flow paths defined by topographic maps and visual observation
- site drainage patterns and surface water management controls
- potential groundwater discharge points to surface water, and
- streamflow, contaminant dilution, and chemical behavior

Potential discharge sources

Landfills may produce the following surface water discharges:

- leachate seeps or other drainage
- contaminated groundwater, including springs, seeps, or underflow to surface water
- overflow of lagoons
- malfunction of leachate conveyance system

10.5 Monitoring Network Design -- Leachate

Objective of leachate monitoring

Monitor the landfill leachate's existing characteristics and changes in quality during landfill development. Monitor the primary leachate collection system's effectiveness (e.g., head level). Monitor the secondary leachate collection system for primary liner failure and the presence of liquid.

Network design

The EMP should describe the leachate monitoring network, including:

- a proposal and justification for the number, location, depths, spacing, and type(s) of leachate monitoring points to monitoring leachate quality, quantity, and the presence of liquid in the secondary leachate collection system
- proposed construction details, materials, and methods of installation for any new monitoring devices
- documentation/description of the construction and design of existing monitoring points
- scaled construction diagram of each device or typical device, and
- sampling or testing methods proposed during construction

Sampling locations

Leachate sampling locations could include:

- sumps, manholes, or other access points to the leachate collection system, if the site is equipped with such a system
- sampling points within the waste at locations that will yield representative samples, and account for the heterogeneities of the waste material and leachate
- sampling from landfill gas wells that penetrate leachate saturated waste zones, or
- vertical or horizontal wells specifically installed within the waste for sampling leachate

Design precautions

Consider the following precautions in the design of the leachate monitoring network:

- Leachate lagoons and holding ponds are not good monitoring points for characterizing raw leachate quality. The leachate can be diluted by rainfall and/or undergo chemical/quality changes during removal, exposure to the atmosphere, storage, and intentional treatment processes.
- Groundwater and surface water may infiltrate into the leachate collection system and dilute the leachate. These influences usually occur seasonally.
- Variations in the waste and leachate. Leachate quality can vary temporally and spatially due to differences in the composition, age, and disposal method.

10.6 Monitoring Network Design -- Vadose Zone

Objective of vadose zone monitoring

Detect leachate releases by monitoring the moisture content and quality of the pore water beneath the facility.

Network design

Describe the vadose zone monitoring network, including:

- the type of device, function, and site monitoring application
- the proposed number, location, depths, spacing, and type(s) of vadose zone monitoring devices
- proposed construction details, materials, and methods of installation
- scaled construction diagram of each device or typical device, and
- sampling or testing methods proposed during construction

Basis for design

Design the vadose zone monitoring network to reflect the following:

- landfill cell and leachate collection and conveyance system design
- site-specific unsaturated zone characteristics (soils, lithology, hydrology) as determined during the site characterization phases
- soil types, layers (stratigraphy), and characteristics including permeability, saturated and unsaturated hydraulic conductivity, particle size and distribution, and other chemical and physical characteristics, and
- water flow in the vadose zone beneath the landfill liner

Location considerations

Install monitoring devices beneath those areas where the liner is most likely to leak, such as sumps, collection laterals, or major liner seams. Other sensitive areas include low spots where water accumulates and locations where low permeable materials were removed during construction.

Monitoring methods

Example vadose zone monitoring methods are discussed in the table below.

Method	Description
collection lysimeters	• Lined basin installed beneath the landfill liner similar to a localized leachate collection system • Direct method of collecting soil water for chemical analysis • Collection of quantity and quality data from a discrete area

suction lysimeters	• Perform poorly in arid regions • Limited to extract samples from soils at tensions no greater than 1 or 2 atmospheres
other examples	• vapor probes - monitor/extract the soil gas for chemical analysis • ion probes - measure the ion concentrations • conductivity probes - measure the conductivity • tensiometers - measure the moisture content in the unsaturated zone • TDRs These methods monitor the soil water quality indirectly, by measuring other mediums (soil gas) or parameters, such as moisture content or conductivity, that can be used to predict water chemistry.

Note: These may not be the only available methods. Other methods may be proposed to meet the site's monitoring needs.

10.7 Monitoring Network Design -- Landfill Gas

Objective of landfill gas monitoring

Monitor for landfill gas migration at the facility boundary and within on-site structures. Design the landfill gas monitoring network to meet the following objectives:

- evaluate the performance of landfill gas control measures
- provide accurate, representative field measurements of methane and oxygen concentrations and static pressure
- monitor the efficiency of landfill gas recovery and control systems, and
- monitor the effectiveness of gas migration control wells

Network design

Describe the landfill gas monitoring network, including:

- proposed perimeter landfill gas monitoring probes to at least the same depth as the landfill's base elevation
- at least one proposed shallow probe between the landfill and each on-site structure with a maximum depth of 20 feet (6.1 meters)
- site-plan drawings showing proposed landfill gas monitoring probe locations
- design drawings showing proposed landfill gas monitoring probe depths, screened intervals and construction details
- the rationale for proposed monitoring probe locations, depths, and designs
- procedures for integrating gas monitoring system installation and operation with landfill development, and
- proposed operation and maintenance procedures

Probe construction

Probes should have maximum screened intervals of 30 feet (9.15 meters). For monitoring intervals greater than 30 feet, multiple-completion probes or probe clusters are required. Separate monitoring capabilities should be provided for each successive 30-foot interval.

Design considerations

The number and location of landfill gas probes is dependent on:

- subsurface conditions at the site
- hazards to surrounding land use
- public safety risks
- location and design of facility structures
- other underground structures or conduits
- landfill gas generation rates and migration potential, and
- the size and configuration of the landfill

Landfill gas composition

Landfill gas is composed of:

- approximately 50-60 percent methane
- approximately 40-50 percent carbon dioxide, and
- trace amount of VOC and other organic and inorganic gases

Hazards of landfill gas

Methane is combustible and explosive at concentrations of 5 - 15 percent by volume in air. Some of the trace gases, including VOCs, are toxic. Other hazards associated with landfill gas include the:

- accumulation of explosive concentrations of methane in on-site or off-site structures
- exposure of workers on or near landfills to high concentrations of toxic gasses
- exposure of workers to atmospheres lacking sufficient oxygen due to its displacement by landfill gas
- potential source of air emissions and water pollution, and
- potential impacts to groundwater from gas-born VOCs that can dissolve into solution under wet soil conditions

10.8 Monitoring Network Design -- Air Quality

Objective of air quality monitoring	Monitor point sources and diffuse area-wide sources for potential air contaminants. Point sources may include gas combustion flares. Diffuse area-wide sources may include raw landfill gas or fugitive dust from construction.
Contaminants	Potential air contaminants may include methane, odorous compounds, particulates, and volatile organic compounds.
NSPS	New source performance standards (NSPS) for municipal solid waste landfills have been issued to control emissions of non-methane organic compounds from large landfills. Landfills with a design capacity of 2.5 Mg (2.75 million tons) and emissions of non-methane organic compounds in excess of 50 Mg (55 tons per year) are subject to NSPS and may be required to implement control technologies.
Requirements	Contact the Department's Air Quality Program for monitoring and permit requirements.

10.9 Groundwater Monitoring Network Construction

EMP contents

Describe how wells will be constructed and evaluated to continually meet construction requirements and ensure accurate, representative samples are obtained, including:

- evaluation of monitoring network
- evaluation of monitoring points
- procedures for installation of new monitoring points
- plans for routinely evaluating monitoring points

Construction standards

New and existing monitoring wells proposed for the monitoring program should:

- be constructed to meet the construction criteria defined in
  - OAR 690 Division 240, and
  - the Department's August 24, 1992, Groundwater Monitoring Well Drilling, Construction and Decommissioning Guidelines
- be compatible with site-specific hydrogeologic conditions including physical, chemical, and hydraulic properties of the monitored zones
- use construction techniques that are protective of groundwater resources by preventing:
  - the introduction of surface contaminants, and
  - the vertical migration of contaminants between water bearing zones
- be designed for maximum well efficiency and minimum turbidity when sampling
- designed to last throughout the landfill's active life and post-closure period

Note: Multiple well screens or depth completions in a single borehole are not acceptable, unless approved by the department. Wells may only be screened in a single aquifer and zone.

Evaluation of monitoring network

Describe and evaluate the current status and integrity of the monitoring network as a whole.

Evaluation of monitoring points

Describe the current status and integrity of each monitoring point within the network. Evaluate monitoring wells to determine whether each is capable of obtaining representative samples. An Oregon Registered Geologist must certify this evaluation. Wells not capable of obtaining representative samples must be recommended to be decommissioned, and, if required by the Department, replaced. Provide records of the installation of existing monitoring wells including construction details and lithologic logs.

Procedures for installing new monitoring points

Install new monitoring points in accordance with the construction standards. Describe installation procedures, including:

- drilling methods, type of drilling equipment, drilling fluids, and methods to isolate surface soils and/or shallow water zones during borehole drilling and construction
- handling and decontamination of well material and equipment
- methods for subsurface sampling, including sampling intervals and provisions for collecting samples and describing color, texture, composition, moisture content, evidence of contamination and other relevant characteristics
- storage, testing, and disposal of drilling fluids and drill cuttings
- size (diameter) and depth of the borehole
- construction methods and materials, including the size and type of casing and screen, screened interval, and type and placement of filter pack and annular seal
- well development methods and procedures
- borehole geophysical methods to log the monitoring well, and
- field testing methods for aquifer characteristics

Note: Prepare a scaled construction diagram of each monitoring well

Plans for evaluating monitoring points

Describe procedures for routinely evaluating each monitoring point within the network to ensure that each point is capable of providing representative samples throughout the active and post-closure periods of the landfill.

10.10 Sampling and Analysis

EMP contents

Propose a sampling and analysis plan for collecting valid and representative groundwater, surface water, vadose zone, leachate, and landfill gas samples that will produce reliable and credible analytical results. The EMP should include:

- training provisions
- identification of devices
- sample point inspection procedures
- sampling procedures, and
- monitoring parameters and schedule

Training provisions

Describe how sampling personnel will be trained to use the sampling and analysis procedures.

Identification of devices

Provide the location, depth, and construction details of all environmental monitoring devices. Provide all monitoring point locations on a scaled, accurate map by monitoring type and identification numbers.

Sample point inspection

Describe procedures for inspecting and reporting on each monitoring point and the immediate surrounding area during sampling. Inspect each environmental monitoring point for:

- structure
- security features such as locks, cap, protective casing
- unusual conditions
- identification, and
- anything that could influence the collection of representative data or signify changing conditions.

Sampling procedures

Describe site-specific field sampling procedures for each monitoring type:

- field recordkeeping procedures
- field meter operation and calibration
- sampling order
- water level measurements
- sample equipment and collection methods
- purging equipment and method (include well volume calculation, field parameter monitoring, pump intake placement, disposal of purge water);
- sample containers and labeling
- sample filtration and preservation
- sample preservation and holding times
- sample transport/shipment
- equipment decontamination
- chain of custody
- proposed field and reporting forms

Monitoring parameters and schedule

Prepare a summary of sample parameters, frequency, and schedule, including the following:

- monitoring parameters
- approved analytical methods
- detection limits (for parameters that have a federal or state standards, the detection limit should be no more than 10% of the standard, or the rationale for setting such a detection limit should be explained)
- container type and volume
- preservative
- holding time
- sampling frequency and schedule

Typical monitoring parameters and sampling schedule for each type of environmental monitoring is discussed below.

Parameters and frequency

The following table discusses typical parameters and frequency that could be required for each type of monitoring. This is intended for general guidance purposes only. Parameters and frequency will be determined on a site-specific basis.

Media	Discussion and considerations
Groundwater	• Appropriate monitoring parameters will be based on site-specific hydrogeologic characteristics, leachate and landfill gas characteristics, regulatory requirements, anticipated contaminant mobility and persistence and contaminant concentrations relative to ambient groundwater conditions. • Quarterly monitoring of groundwater will usually be required until nine valid data points have been collected for background determination, statistical analysis, and establishment of permit-specific concentration limits.
Surface water	• Minimum monitoring and reporting requirements are specified in the Stormwater Discharge (NPDES) permit issued by the Department's Water Quality Program. • Sampling parameters should be good indicators of potential leachate discharge • Monitoring of groundwater discharges to surface water (i.e., seeps, drainages, springs) will usually require routine quarterly sampling. The monitoring parameters and schedule will be based on site-specific hydrogeology, surface hydrology and other environmental factors.
Vadose	Vadose zone monitoring parameters and sampling frequencies will vary depending on the type of monitoring devices used, site specific environmental and hydrogeologic conditions
Leachate	Leachate monitoring and frequency will be similar to the groundwater monitoring program, described above. Leachate quantity (flow rates) should be measured on a daily basis when leachate generation is occurring.
Secondary LCS	The secondary leachate collection system should be monitored on a routine basis for the presence of any liquids. If liquids are present, samples should be taken immediately and analyzed for leachate constituents.
Landfill gas	The monitoring schedule should be based on the following site specific factors: • soil conditions • hydrogeologic conditions • facility design and development history • location of facility structures and property boundaries • surrounding land use and location of off-site structures • changing site conditions which may affect gas generation and migration (e.g., barometric pressure, temperature, soil moisture, snow cover etc.) Minimum sampling frequency is quarterly. If possible monitoring should be conducted during periods when strong barometric lows are anticipated.
Air	Contact the Department's Air Quality Division

Groups defined Monitoring group parameters are defined in the table below.

Group	Parameters	Notes
1a - Field indicators	Elevation of water level Specific Conductance pH Dissolved Oxygen Temperature Eh	These parameters must be measured in the field at the time samples are collected, either down-hole in situ, in a flow-through well, or immediately following sample recovery, with instruments calibrated to relevant standards
1b - Leachate indicators	Hardness (as $CaCO_3$) Total Dissolved Solids Total Alkalinity (as $CaCO_3$) Total Suspended Solids Specific Conductance (lab) Chemical Oxygen Demand pH (lab) Total Organic Carbon	Sample handling, preservation, and analysis are determined by requirements for each individual analyte: EPA or AWWA Standard Methods techniques must be followed.
2a - Common anions and cations	Calcium (Ca) Manganese (Mn) Sulfate (SO_4) Magnesium (Mg) Ammonia (NH_4) Chloride (Cl) Sodium (Na) Carbonate (CO_3) Nitrate (NO_3) Potassium (K) Bicarbonate (HCO_3) Silica (SiO_2) Iron (Fe)	Groundwater samples: Dissolved concentrations must be measured. Samples must be field-filtered and field-preserved according to standard DEQ and/or EPA guidelines and analyzed by appropriate EPA or AWWA Standard Methods techniques. Results must be reported in mg/L and meq/L.
2b - Trace metals	Antimony (Sb) Chromium (Cr) Selenium (Se) Arsenic (As) Cobalt (Co) Silver (Ag) Barium (Ba) Copper (Cu) Thallium (Tl) Beryllium (Be)	Groundwater samples: **If the Total Suspended Solids concentration is...** / **then analyze for...** less than or equal to 100 mg/L in the sample: total concentrations (unfiltered) greater than 100 mg/L in the sample: both total (unfiltered) and dissolved (field-filtered)

Group	Parameters	Notes
	Lead (Pb)	
	Vanadium (V) Cadmium (Cd) Nickel (Ni) Zinc (Zn)	Samples must be field-preserved according to standard DEQ and/or EPA guidelines and analyzed by EPA Method 6010 or Department-approved equivalent. Results must be reported in mg/L.
3 - Volatile organic compounds	Analysis for all compounds detectable by EPA Method 8260 or EPA Method 524.2, including a library search to identify any unknown compounds present.	Method 8260 comprises the volatile organic constituents parameter group. Facilities that want to use Methods 8010 and 8020 as an alternative must obtain approval by the Department prior to use.
4 - Assessment monitoring parameters	Analysis for all compounds detectable by the following EPA methods: Semi-volatile Organic Constituents, according to EPA Method 8270 Mercury, according to EPA Method 7470 Cyanide, according to EPA Method 9010 Nitrite	All Method 8270 analyses must include a library search to identify any unknown compounds present
5 - additional surface water and leachate parameters	Total Kjeldahl Nitrogen Total Coliform Bacteria Total Phosphorus Fecal Coliform Bacteria Orthophosphate E. Coli Biological Oxygen Demand Total Halogenated Organics	In addition to Group 5, surface water samples should also be collected for Groups 1a, 1b, 2a (total concentrations) and 2b (total concentrations). In addition to Group 5, leachate samples should also be collected for Groups 1a, 1b, 2a (total concentrations), 2b (total concentrations) 3 and semi-volatile organics (EPA 8270).

10.11 Field QA/QC

EMP contents

Describe Field QA/QC procedures, including provisions for:

- documentation
- sample blanks and duplicates
- field blanks
- trip blanks
- equipment blanks
- duplicates

Documentation

Describe procedures to document sample collection, storage, including:

- maintenance of adequate field records and chain of custody
- recording sample collection data on field data sheets
- documenting sampling activities (collection, equipment calibration, decontamination) on field data sheets
- documenting any unusual conditions that may effect samples or any deviations from the normal sampling protocol
- proper labeling, storage and shipment

Sample blanks and duplicates

Describe how sample blanks and duplicates will be used to detect contamination coming from sample containers, preservation, equipment, storage, transport, and site conditions.

Field blanks

Describe procedures for managing field blanks. Field blanks should be collected and handled in the same manner as the sample group for which it is collected. Field blanks should be collected once per sampling day or once for every ten samples, whichever is more frequent.

Trip blanks

Describe procedures to ensure tat trip blanks are completed if volatile organic compounds (VOCs) are to be analyzed. Trip blanks are prepared by the laboratory at the same time and location for the sampling event. Trip blanks accompany the sample containers to and from the sample event. One trip blank for VOCs should be prepared for each sample shipment container.

Equipment blanks

Describe how equipment blanks will be used for non-dedicated sampling equipment requiring decontamination. De-ionized water is passed through the sampling equipment to the appropriate sample container. Equipment blanks are required for every sample parameter, once per sampling day or once for every ten samples, whichever is more frequent.

Duplicates

Describe procedures to collect duplicates under the same conditions as the original sample and treated the same as the sample parameter group. A duplicate for all analytes should be collected once per sample day or once every ten samples, whichever is more frequent.

10.12 Lab QA/QC

EMP contents

Describe laboratory QA/QC procedures, including:

- a written laboratory QA/QC plan from the laboratory conducting the analysis; each time the laboratory is changed, or a new lab is contracted, a new QA/QC plan is required
- routine equipment calibration to standards of known concentration on a schedule appropriate for the analytes of concern and analytical methods used
- analysis of laboratory method blanks, laboratory duplicates and matrix spikes for all analytes at a frequency of once per sampling event or once per day of analysis, whichever is more frequent
- analysis and reporting of the percent recovery of surrogate spikes in each sample analyzed for organic analytes

Reference: Contact the Department's laboratory (503-229-5983) for additional or updated laboratory QA/QC requirements.

10.13 Data Evaluation

EMP contents describe site specific procedures for
- comparing groundwater sampling results to applicable standards
- performing statistical analyses, and
- identifying and addressing any field of lab data that did not meet lab quality objectives

Review of results Review the groundwater analytical results after each groundwater sampling event:

If data show results...	Then...
above permit-specific concentration limits (if established)	1. notify the Department within 10 days of receipt of laboratory results, and 2. perform resampling within 15 days and evaluate results as described below *Note: If this is a known release, previously confirmed to the Department in writing, resampling is not required*
indicating a significant change in water quality at any monitoring point Examples of significant changes: Detection of a VOC or other hazardous constituent not previously detected in background Exceedance of a Table 1 or 3 value listed in OAR 340-40, unless the background water quality is above these numerical limits Exceedance of a Safe Drinking Water Standard Exceedance of an Action Limit Detection of a compound in an order of magnitude higher than background	1. notify the Department within 10 days of receipt of laboratory results, and 2. perform resampling within 15 days and evaluate results as described below *Note: If this is a known release, previously confirmed to the Department in writing, resampling is not required*
neither of the above	continue groundwater monitoring with next scheduled sampling event

Resampling results Upon receipt of data from resampling, the results should be reviewed according to the following table

If resampling data show results	Then
that confirm the exceedance of a permit-specific concentration limit	1. notify the Department within 10 days of receipt of laboratory data, or within 60 days of the sample date (whichever comes sooner) 2. begin assessment monitoring 3. submit a Remedial Investigation workplan for Department approval within 90 days of the date of resampling; the plan must specify how the objectives of OAR 340-40-040(3) will be met by the proposed investigation
that confirm the significant change in water quality results noted in the routine sampling event	1. notify the Department within 10 days of receipt of laboratory data, or within 60 days of the sample date (whichever comes sooner) 2. submit a plan within 30 days (unless another time period is authorized) for developing an assessment program with the Department; this may include the monitoring of Group 4 parameters, in addition to routine detection monitoring
that do not confirm the results noted in the routine sampling event	1. continue with routine monitoring 2. discuss the data from the routine sampling event and the resampling results in the next annual environmental monitoring report

10.14 Reporting

Objective

Present the environmental monitoring data to the Department in an organized and clear format. Evaluate and interpret data to

- determine regulatory and permit compliance
- determine if leachate impacts have occurred
- assess the effectiveness of any corrective actions
- monitor potential health and environmental effects, and
- prepare and submit an annual monitoring report

EMP content

Propose an the annual environmental report that will:

- discuss the results of all environmental monitoring performed during the year
- discuss the results of the previous year's Data Analysis and Evaluation
- itemize any activities resulting from the exceedance of a relevant standard or significant change in water quality, such as resampling, submittal of a Preliminary Assessment, or Assessment Monitoring
- discuss any preventative measures and the results of such actions, if applicable
- assess the current status of the environmental monitoring network
- provide updated information for each sampling event and monitored unit, depicting groundwater flow rates and directions, and piezometric water contours
- summarize Sampling and Analysis, Field QA/QC, and Lab QA/QC techniques implemented during the year
- provide copies of applicable information, including field data, laboratory analytical reports and chain-of-custody reports; all data must be cross-referenced and labeled with the designated field sampling location
- provide summary tables of the year's monitoring data by location and parameter
- provide updated time series and box plots for appropriate parameters
- provide results of a major anion-cation balance for each groundwater monitoring well sampled for major anions and cations
- provide an executive summary

Statement of compliance

A one-page cover letter must accompany the Annual Environmental Monitoring Report that:

- compares the analytical results with the relevant monitoring standards (see Section 10.13)
- states whether or not federal or state standards were exceeded for the relevant media
- states whether or not a significant change in water quality occurred

The cover letter must be signed and stamped by an Oregon Registered Geologist with experience in hydrogeological investigations.

Data presentation

Below are some suggested formats for presenting the environmental monitoring data. Specific requirements may be discussed in the solid waste permit:

Presentation Type	Description
Tables	Data tables work well for summarizing analytical data and statistical parameters. For analytical and water level data: • arrange table by monitoring point identification number, parameter, and/or sampling event • present each type of monitoring data separately (i.e.; leachate, groundwater, surface water) • group groundwater data according to well designation (upgradient, downgradient) For statistical data: • arrange in individual tables by parameter and location • arrange sampling points on one axis and sample date on the other axis. Report statistical results in table body.
Time series charts	Useful for illustrating seasonal variations and changes in data over time. Prepare as follows: • plot a separate chart for each parameter of interest • plot all monitoring points for comparison on one graph • plot concentration on vertical axis using a consistent scale and equal spacing • plot time on the horizontal axis using a consistent scale and equal spacing • represent PSCL value as a line on graph • identify parameter, sample location, and other pertinent features on the graph

Presentation Type	Description
Box plots	Evaluate spatial variability of a parameter. Useful for illustrating data dispersion or variability of a data set or between data sets about the median value. Prepare as follows: • construct individual plots for each well and each parameter • plot boxes from multiple wells for a single constituent on a single grid for comparison • plots should include median, interquartile range, and maximum and minimum values • represent PSCL value as a line on the grid • clearly identify parameter and sample location *See the statistical references and guidelines in Section 10.12 below for details on the preparation, use, and interpretation of box plots.*
Potentiometric contour maps	Useful for plotting and contouring water level data to illustrate elevations, flow directions and gradients. Maps should include: • measuring point • date and season • elevation • contour interval • scale Plot different aquifers of interest on different maps and maps for each season or sample event. Incorporate surface water elevations with shallow aquifer elevations, if appropriate, and include leachate elevation levels. Do not include measurements of shallow and deep portions of the an aquifer on the same potentiometric map unless complete hydraulic communication has previously been established and there is no discernible vertical gradient
Other graphical methods	Other useful graphical methods for presenting and interpreting data include: • hydrographs • scatter plots • cross sections • histograms • trilinear diagrams • ion-concentration diagrams, and • contour maps Consult the Department hydrogeologist for the appropriate methods to use for individual facilities.

Note: Electronic copy of data should be provided. Acceptable electronic formats include Excel, Lotus 123, and Quatro Pro.

Water quality reporting concentrations

Water quality concentrations should be reported in milligram per liter (mg/L) for most organic and inorganic parameters; both mg/L and milliequivalents per liter (meq/L) for common anions and cations; micro-ohms per centimeter (uohms/cm) for specific conductance; s.u. for pH; degrees centigrade for temperature; and nephelometric turbidity units (NTU) for turbidity.

Typical annual report

A typical annual report includes the following information:

Section	Content
Background Information and Data Reporting	• site background information • presentation of water/leachate level data and groundwater flow rates using contour maps, tables, and graphs • summary of all field data, laboratory analytical reports, chain of custody reports, all cross-referenced with the field sampling locations • data validation (i.e.; cation/anion balance, comparison of blanks and duplicates, identify data problems or discrepancies, review of detection limits and holding times) • time series graphs • summary tables of the year's monitoring data by location and parameter
Water Quality Statistical Analysis	Box plots for the purpose of: • establishing background water quality and proposing permit-specific concentration limits • comparing monitoring results to compliance concentrations to determine if a release has occurred • assessing whether any corrective/preventative actions have been effective in reducing contaminant concentrations or controlling leachate releases to the environment
Data Interpretation and Evaluation	• evaluation of data quality trends in each monitoring point for each parameter, and a determination if any significant changes have occurred • review of statistical methods for background water quality and identifying potential impacts • a comparison of water quality in the downgradient monitoring points to upgradient/background monitoring points • comparison of data quality to any PSCLs that have been established • comparison of groundwater quality data to existing federal and state groundwater standards • assessment of whether any corrective or preventive actions have been effective in reducing or controlling releases • assessment of the effectiveness of any closure measures undertaken • list of any activities resulting for an identified exceedance

Section	Content
Conclusions and Recommendations	• summary of the data collection, evaluation, and results of all environmental monitoring performed during the year • discussion of any impacts, trends in data, and violations of PSCLs, exceedences of a standard, or significant changes • any recommendations for the monitoring program • identify any impacts and action requirements • discussion of the current status of the environmental monitoring network • executive summary

10.15 Establishing Permit-Specific Concentration Limits (PSCLs)

Contents

This section of the guidance discusses PSCLs and how to establish them. The requirement for proposing PSCLs will be included in the permit. References and guidelines on how to go about determining PSCLs are provided below. A proposal to establish PSCLs does not need to be included in the EMP, only provisions that it will be done in accordance with the permit requirements.

Definition: PSCL

OAR 340-40-010(3) defines a concentration limit as the maximum acceptable concentration of a contaminant allowed in groundwater at a Department specified compliance point.

Objective

To establish regulatory compliance concentration limits for pollutants of concern at the facility's compliance boundary. An exceedence of these limits would trigger concern and require some type of regulatory, assessment, preventive and/or corrective actions.

Regulatory reference

OAR 340-40-030(3) requires that PSCLs be specified in the permit for new and existing facilities.

Data requirements

Data requirements for establishing PSCLs are:

- a minimum of nine acceptable and valid data points for each parameter from the approved background well or wells is required for setting PSCLs.
- PSCLs are required for selected parameters that will be included in the long-term monitoring program at the site. These parameters will either be specified in the permit or should be discussed with the Department's hydrogeologist.
- statistical methods and calculations for determining PSCLs and background are provided in the references discussed below.

Setting PSCLs

Different methods are allowed for setting PSCLs at new and existing facilities.

PSCLs for existing facilities

PSCLs may be established anywhere between background water quality (as calculated below) and the reference/guidance levels in Tables 1, 2, and 3 of OAR 340-40. For parameters not in Tables 1, 2, or 3, background must be used for the PSCL.

PSCLs at new facilities

PSCLs must be established at the background water quality.

PSCL calculations

Calculations must follow one of the five methods listed in 40 CFR Part 258.53.

PSCL references

Available references for statistical guidelines and setting PSCLs include:

- Dessellier, Bruce, January 12, 1993, Draft Memorandum to Solid Waste Permits and Compliance, Subject: Statistical Guidance Memo for all RCRA Sites, Oregon Department of Environmental Quality
- USEPA, June 1992, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance

---

Reduction in monitoring or parameters

Quarterly groundwater monitoring is typically required until nine valid data points are collected for each parameter. Once PSCLs are established, the permittee may request a reduction in the sampling frequency or parameter list. This request must be made, in writing, to the Department.

Long-term monitoring

Once PSCLs are established, the permittee may be required to propose an updated monitoring program for the wells to be monitored, the list of indicator parameters, new sampling frequency, and schedule. This should be discussed with the Department's hydrogeologist. Other limits, such as Action Limits, may be established in the permit. If warranted, Action Limits may be established for Table 3 (OAR 340-40) or other non-table, non-hazardous parameters depending upon site specific background concentrations.

10.16 Action Requirements, Assessment, and Corrective Action

Objective

Follow and implement the necessary notification, reporting, assessment and corrective actions required by 40 CFR Part 258 and OAR 340-40 when a contaminant release is identified at a facility during routine monitoring.

Assessment monitoring

Assessment monitoring is required if routine groundwater monitoring indicates a statistically significant increase above background in one or more of the constituents in Appendix I of the 40 CFR 258, or from an approved alternate list (40 CFR 258.54 (a)(2)) as is the case in Oregon. Individual permits may specify assessment monitoring requirements. Assessment monitoring should be discussed with the Department's hydrogeologist.

Preliminary assessment plan

The Department's Groundwater Quality Protection Rules require submittal of a plan for developing a preliminary assessment within 30 days after a confirmed exceedance of a PSCL, an Action Limit, or a significant change in water quality (as defined above), unless the Department approves another time schedule. The assessment should evaluate the source, extent, and potential migration of the contaminants.

Corrective action

Corrective action is required if an assessment monitoring parameter is detected at a concentration in excess of the PSCL or if the preliminary assessment determines that remedial action is necessary to maintain groundwater quality. Corrective action could consist of the following steps:

- perform a remedial investigation to determine the need for remedial action including a characterization of the contamination, characterization of the facility, and an endangerment assessment
- conduct a feasibility study that includes but is not limited to the development and evaluation of remedial action options
- select and implement the most appropriate remedial action

The specifics of the remedial investigation/feasibility study should be discussed with and approved by the Department prior to implementation.

Gas monitoring limits

Review gas monitoring results after each monitoring event for exceedences of methane limits. If methane levels exceed the specified limits the owner or operator must:

- immediately take necessary steps to protect human health and safety and notify the Department
- within 7 days of detection (unless the Department approves an alternative schedule), enter the methane levels in the operating record and describe the steps taken to protect human health and safety

Within 60 days of detection (unless the Department approves an alternative schedule) implement a remediation plan for the methane releases, incorporate the plan into the operating record, and notify the department that the plan has been implemented. The plan should describe the nature and extent of the problem and the proposed remedy.

Air quality and surface water

Follow specific air quality, water quality, and solid waste permit requirements.

10.17 Additional Resources

References

Oregon Department of Environmental Quality, October 27, 1989. Oregon Administrative Rules, Chapter 340, Division 40, Groundwater Quality Protection.

Oregon Department of Environmental Quality, August 24, 1992. Groundwater Monitoring Well Drilling, Construction, and Decommissioning.

Oregon Water Resources Department, July 1995. Administrative Rules, Chapter 690, Division 240, Construction, Maintenance and Abandonment of Monitoring Wells, Geotechnical Holes, and Other Holes in Oregon.

U.S. EPA, October 9, 1991. 40 CFR Parts 257 and 258, Solid Waste Disposal Facility Criteria; Final Rule.

U.S. EPA, November 1993. Technical Manual for Solid Waste Facility Criteria - 40 CFR part 258.

Oregon DEQ, March 1994, Water Quality Division. Draft Groundwater Monitoring Plan - Part B: Guidelines.

Washington Department of Ecology, June 1987, Solid Waste Landfill Design Manual.

Dessellier, Bruce, August 3, 1992, Draft Memorandum to Solid Waste Permits and Compliance, Subject: Statistical Guidance Memo For all RCRA Sites, Part 1. Oregon Department of Environmental Quality.

U.S.EPA, 1992, Statistical Analysis to Groundwater Monitoring Data at RCRA Facilities - Addendum to Interim Guidance.

Section 11: Closure and Post-Closure

11.1 Introduction

Regulatory reference

Minimum requirements for closure plans and post-closure plans for MSW landfills are specified in the Department's Financial Assurance Rule, OAR 340-94-100 through 145. The closure and post-closure requirements for Subtitle D landfills differ from those of non-Subtitle D MSW landfills (i.e., closing facilities).

Types of plans

There are two separate categories of closure and post-closure plans:

Subtitle D ("worst case") Closure and Post-closure Plans are based on a hypothetical "worst case" scenario for closure and post-closure costs. This scenario establishes a conservative basis for estimating financial assurance funding requirements.

The Final Engineered Site Closure and Post-closure Plans are linked to the Closure Permit which must be obtained at least 5 years prior to anticipated final closure. The Final Engineered plans reflect the intended closure design. The Final Engineered plans contain all the elements of and replace the Subtitle D plans.

How to respond: Subtitle D facilities

Landfills subject to Subtitle D should:

- prepare a "Worst-case" (Subtitle D) Closure Plan and a “Worst-case" (Subtitle D) Post-closure Plan for determining appropriate costs for financial assurance planning. Place the plans in the facility operating record and notify the Director of that action
- prepare a Final Engineered Closure Plan and a Final Engineered Post-closure Plan and submit them to the Department five years before the anticipated final closure date
- revise financial assurance cost estimates based on the final engineered plans

How to respond: Closing facilities

Non-Subtitle D facilities (closing facilities) are within the five-year final closure window and therefore should:

- prepare a Final Engineered Closure Plan and a Final Engineered Post-closure Plan and submit the plans to the Department at the date specified in the permittee's closure permit
- determine closure and post-closure costs for financial assurance planning, based on the Final Engineered Closure and Post-closure Plans

---

Approval

The Final Engineered Site Closure Plan and Final Engineered Site Post-Closure Plan must be submitted to the Department for review and written approval.

In this section

This section describes the contents of the closure and post-closure plans.

11.2 Closure Plans

Subtitle D "Worst-Case" Closure Plan

The Subtitle D "Worst-Case" Closure Plan should include all elements specified in 40 CFR 258.60:

- a description of the steps necessary to close all landfill cells at any point during their active life
- a description of the final cover system
- an estimate of the largest area of the landfill ever requiring a final cover
- an estimate of the maximum inventory of wastes ever on site over the active life of the landfill
- a schedule for completing all activities necessary to satisfy the closure criteria in 40 CFR 258.60

Final Engineered Site Closure Plan

The Final Engineered Site Closure Plan should supplement all the elements of the "Worst Case" Closure Plan by adding the following:

- detailed design plans and specifications for the closure improvements, including final cover system, gas control system, runoff/run-on control system, leachate treatment and disposal system
- an updated final grading (topographic) plan for the site
- an end use plan
- a landscaping plan
- an assessment of long-term settlement and its potential effects on the integrity of the closure
- a detailed description of the design, function, and operation of all environmental control systems
- a description (plan) of how and when the facility will be closed (i.e., the procedures that will be used to ensure that facility operations are compatible with closure objectives and requirements)
- a detailed description of the environmental monitoring system;
- a schedule for implementing the closure plan
- a detailed closure cost estimate, and
- other information requested in the closure permit or otherwise required to comply with all applicable DEQ and federal regulations

Previously submitted information

If some of the required information has been previously submitted, review and updated it to reflect current conditions and any proposed changes in the closure program.

11.3 Post-Closure Plans

"Subtitle D" Post-closure Plans

The "Subtitle D" Post-closure Plan should identify and describe the post-closure activities required to properly monitor and maintain the closed landfill site. This post-closure plan should address all elements specified in 40 CFR 258.61 and include procedures for the following:

- maintaining the integrity and effectiveness of the final cover system
- maintaining and operating the leachate collection, treatment, and disposal systems
- maintaining and operating the environmental monitoring systems
- conducting Environmental quality monitoring (groundwater, surface water, landfill gas, leachate, air, etc.)
- maintaining and operating the landfill gas control system
- maintaining and operating the surface water runoff/run-on control systems
- providing overall, site-wide monitoring and security, and
- establishing appropriate uses of the property during the post-closure care period

Final Engineered Post-closure Plan

Incorporate in the Final Engineered Post-closure plan all elements of the "Subtitle D" post-closure plan, along with detailed closure design information. Include the following:

- a detailed schedule for post-closure monitoring, inspection, and maintenance and repairs
- detailed operation and maintenance procedures for all environmental monitoring and control systems that will be in active use during the post-closure period, and
- any other information required to comply with DEQ and federal regulations

Previously submitted information

Review and update any previously submitted post-closure informaiton to reflect current conditions and any proposed changes in closure or post-closure activities.

11.4 Additional Resources

References

Technical Manual for Solid Waste Disposal Criteria - 40 CFR Part 258, Subpart F (Chapter 6). U.S. EPA, November 1993.

Section 12: Financial Assurance

12.1 Introduction

Purpose of financial assurance

Proper financial planning early in the development of landfill facilities is required to ensure that adequate funding will be available to cover the cost of closure(s), post-closure care, and any corrective action activities.

Coverage

Maintain financial assurance to cover the costs of:
- closure of the landfill
- post-closure monitoring and maintenance of the landfill facilities, and
- any corrective action required by the Department

Exemptions

Exempt landfills must satisfy the exemption criteria in OAR 340-94-140(2) and meet the waste acceptance and final cover deadlines below:

Landfill type	that stopped receiving waste by...	and completed installation of final cover by...
any landfill	October 9, 1993	October 9, 1994
“small landfill” [40 CFR 258.1(e)(2)]	April 9, 1994	October 9, 1994
“very small landfill serving certain small communities” [40 CFR Part 258.1(f)(1)]	October 9, 1997	October 9, 1998

How to respond

Respond to applicable financial assurance requirements, as determined by the table below.

If the facility is...	Then...
subject to Subtitle D	place a financial assurance plan in the facility operating record and submit to the Department a copy of the mechanism and certification that the plan meets requirements
seeking an exemption	demonstrate to the Department that the facility meets the exemption criteria

Updating financial assurance

Review and update the cost estimates and the financial assurance annually during the operating life and post-closure care period, or until the corrective action is completed, as applicable. Place annual adjustments to the financial assurance plan in the facility operating record. Submit a certification to the Department that the annual update has been completed.

Review date: The annual review should occur on the anniversary of the date when the financial assurance plan was placed in the facility operating record and the certification was submitted to the Department, or at the end of the corporation's fiscal year if the mechanism is the corporate guarantee.

Schedule

The appropriate schedule for providing financial assurance will depend on each facility's operating status, size, anticipated closure date, and need for corrective action. Refer to OAR 340-94-140(3) for detailed schedule requirements associated with "worst case " closure plans, "Subtitle D" post-closure plans, Final Engineered Site Closure and Post-closure Plans and corrective action.

Cost calculations

For permittees meeting the criteria in 40 CFR Part 258.75 (a) through (c), the current value of future costs should be calculated using a discount rate no greater than the Department's current reference rate. The Department will determine the reference rate annually during the month of June. It shall be in effect for the fiscal year beginning the first day of July immediately following the determination date and ending on June 30 of the following calendar year. Refer to OAR 340-94-140 (4)(a) for detailed information.

Permittees can use discounting to determine costs only if they:

- certify that the closure date is certain and there are no foreseeable circumstances that will change the estimate of site life
- comply with all applicable permit requirements
- submit a statement from a registered engineer certifying that cost estimates are complete and accurate.

Contact: Department of Environmental Quality (503) 229-5378

12.2 Financial Assurance Plan

Contents of financial assurance plan

The financial assurance plan should contain the following elements:

- cost estimates for third-party closure, post-closure, corrective action (if required) and any other requirements the Department may impose as a condition of issuing a closure permit, closing the site, implementing post-closure care activities, or implementing corrective action
- the source of the cost estimates
- a detailed description of the form of the financial assurance and a copy of the financial assurance mechanism
- a method and schedule for acquiring and managing the required financial assurance funds
- a proposal for disposing of any excess moneys received or interest earned on moneys received for financial assurance
- adequate accounting procedures to insure that funds are collected in the correct amounts and used only for authorized purposes
- certification to the Director of DEQ that the financial assurance mechanism meets all state and federal requirements (at the time a financial assurance mechanism is submitted to the Department and when a financial assurance plan is placed in the facility operating record)
- annual updates of the cost estimates and financial assurance

Cost estimate

The financial assurance plan should include written cost estimates for the Final Engineered Site Closure Plan and Final Engineered Post-closure Plan, or the "worst case" closure and Subtitle D post-closure scenarios, as applicable.

Basis for estimate

Estimate costs based on detailed engineering analyses or construction contractor bids and itemize costs for expenses such as the following:

- mobilization of equipment
- construction materials
- construction activities
- overhead
- engineering and other consulting services
- operation and maintenance of environmental monitoring and control systems
- environmental monitoring and associated laboratory analyses
- general site maintenance activities
- miscellaneous expenses, contingencies, etc.

Considerations: closure estimate

Estimate closure costs based on the Final Engineered Site Closure Plan with consideration of the following factors:

- amount and type of solid waste deposited in the site
- the effectiveness of any buffer zones designed to protect adjacent land and drinking water sources
- the cost of the site's engineered closure improvements (i.e., final cover system, run-on/runoff control systems, other environmental control and monitoring systems, etc.)
- planned future use of the disposal site property
- the extent of site area closed prior to final closure of the entire site
- any other closure conditions imposed by the Department

Considerations: post-closure estimate

Estimate post-closure costs based on the Final Engineered Post-closure Plan. Consider the following factors:

- a minimum post-closure care period of 30 years after the date of final facility closure
- annual costs associated with the operation and maintenance of any required environmental control and monitoring systems
- any other conditions imposed by the Department relating to post-closure care of the site

Considerations: corrective action

Estimate costs based on site-specific corrective action activities outlined in a Corrective Action Report (see 40 CFR Part 258.73). Estimate in current dollars and account for the cost of hiring a third party to perform the corrective action. Account for the total costs of corrective action activities for the entire corrective action period.

Form of financial assurance

Describe in detail the form of the financial assurance, using one of the allowable mechanisms. Include a copy of the mechanism in the plan.

Mechanisms for closure and post closure

Use any of the following forms of financial assurance for closure and post-closure activities:

Form of financial assurance	Requirements specified in...
trust fund	OAR 340-94-145(5)(a)
surety bond	OAR 340-94-145(5)(b) or OAR 340-94-145(5)(c)

irrevocable letter of credit	OAR 340-94-145(5)(d)
closure or post-closure insurance policy	OAR 340-94-145(5)(e)
corporate guarantee from a private corporation	OAR 340-94-145(5)(f)
local government financial test	OAR 340-94-145(5)(g)
local government guarantee	OAR 340-94-145(5)(h)
alternative form	OAR 340-94-145(5)(i); third party certification and prior approval of the form by the Department is required

Mechanisms for corrective action

Use any of the following forms of financial assurance for corrective action:

Form of financial assurance	Requirements specified in...
trust fund	OAR 340-94-145(5)(a)
performance surety bond	OAR 340-94-145(5)(c)
irrevocable letter of credit	OAR 340-94-145(5)(d)
corporate guarantee from a private corporation	OAR 340-94-145(5)(f)
local government financial test	OAR 340-94-145(5)(g)
local government guarantee	OAR 340-94-145(5)(h)
alternative form	OAR 340-940145(5)(i); third party certification and prior approval of the form by the Department is required

Method of acquiring and managing funds

Describe in detail the method and schedule for providing for or accumulating the appropriate amount of funds to ensure proper closure and post-closure care or implementation of corrective action, as applicable. The financial assurance mechanisms for closure, post-closure care and corrective action must ensure the funds will be available in a timely fashion when needed.

Excess moneys

Include a proposal for disposing of any excess moneys received or interest earned on moneys received for financial assurance. [OAR 340-94-140(4)(e)]

Collection of funds

Establish adequate accounting procedures to ensure that the disposal site operator does not:

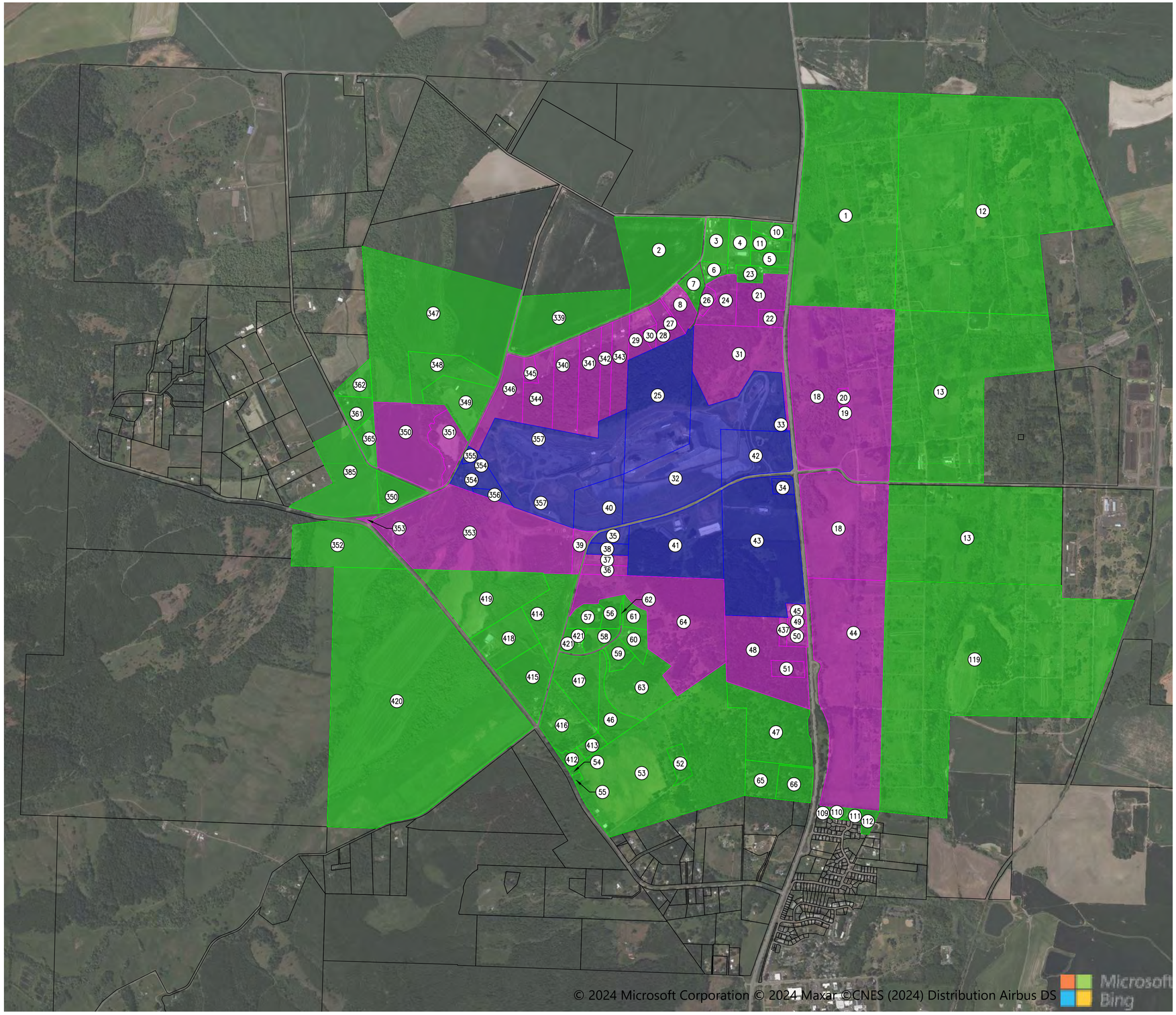
- collect funds in excess of the amount specified in the financial assurance plan, or
- use the funds for any purpose other than required by OAR 340-94-140(1)

12.3 Additional Resources

Reference	Federal Reserve Statistical Release H.15 (519) Selected Interest Rates. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business.
Contact	Department of Commerce Bulletin Board: (202) 482-1986.

EXHIBIT 8
MAP AND LIST OF ADJACENT AND NEARBY PROPERTIES

Exhibit E8



LEGEND

- PROPERTY WITH LANDFILL OPERATIONS
- PROPERTY ADJACENT TO LANDFILL OPERATIONS
- PROPERTY ADJACENT TO ADJACENT PROPERTY

NORTH

SCALE IN FEET

0 1,000 2,000

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

REVISION RECORD

NO	DATE	DESCRIPTION

CEC

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 · Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

BENTON COUNTY TAX LOTS
& ZONING

DATE:	JULY 2024	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:	322-142	APPROVED BY:	JAS

DRAWING NO.: 2

P:\320-0001\322-142\-CADD\Dwg\2401\322142-2401-2-Benton County Tax Lots Exhibit.dwg[2] LS(8/13/2024 - jahash) - LP: 8/13/2024 8:31 AM

Exhibit E8

NO.	TAX LOT NO.	OWNER NAME	CURRENT ZONING
1	104070000100	OREGON STATE GAME COMMISSION	OS
2	104070000300	R B WEBBER DEVELOPMENT LLC	EFU
3	104070000400	WILFONG TRISHA M	RR-5
4	104070000500	BURDOCK GARLAND R	RR-5
5	104070000601	RINKER TRISTA M	RR-5
6	104070000700	CLEARY BRYCE LAWRENCE	RR-5
7	104070000800	SCOTT DARCI L	RR-5
8	104070000900	WHITE JASON BYRON & JULIE B	RR-5
10	104070001100	AMADOR MARIBEL	RR-5
11	104070001200	LEAVENWORTH EDYNE	RR-5
12	104080000100	OREGON STATE GAME COMMISSION	OS
13	104170000100	OREGON STATE GAME COMMISSION	OS
18	104180000100	OREGON STATE GAME COMMISSION	OS
19	104180000101	CONSUMERS POWER INC	OS
20	104180000102	BUREAU OF LAND MANAGEMENT	OS
21	104180000200	PELTIER REAL ESTATE CO	FC
22	104180000201	POWELL LYNN MAY & HEALD NATHAN LESLIE	FC
23	104180000202	GOETZINGER DALE L & MONA G	RR-5
24	104180000300	DUBIKIN ALEXANDRE & POLUSHKIN GLIKERIA	FC
25	104180000301	VALLEY LANDFILLS INC	FC
26	104180000400	DUBIKIN ALEXANDRE & POLUSHKIN GLIKERIA	RR-5
27	104180000500	YOUNG CAROLYN	RR-5
28	104180000600	YOUNG CAROLYN	RR-5
29	104180000700	HOCKEMA JOSEPH E & JASMINE L	RR-5
30	104180000701	HOCKEMA JOSEPH E & JASMINE L	RR-5
31	104180000800	OREGON STATE FISH & WILDLIFE	FC
32	104180000801	VALLEY LANDFILLS INC	FC
33	104180000900	VALLEY LANDFILLS INC	FC
34	104180001000	VALLEY LANDFILLS INC	FC
35	104180001101	VALLEY LANDFILLS INC	FC
36	104180001102	VALLEY LAND FILLS INC	FC
37	104180001103	PHILLIPS SAMUEL F & CHERYL G	FC
38	104180001104	VALLEY LANDFILLS INC	FC
39	104180001105	PELTIER REAL ESTATE CO	EFU
40	104180001106	VALLEY LANDFILLS INC	LS
41	104180001107	VALLEY LANDFILLS INC	LS
42	104180001108	VALLEY LANDFILLS INC	LS
43	104180001200	VALLEY LANDFILLS INC	FC
44	104190000100	OREGON STATE GAME COMMISSION	OS
45	104190000200	BRADLEY LOWELL THOMAS & MARY ERIN	RR-10
46	104190000301	HOLDORF CATHERINE E, TR	EFU
47	104190000400	TAMPICO RIDGE LLC	RR-10
48	104190000402	KIPPER ROBERT J & JULIE A, TR	RR-10
49	104190000500	GEIER JOEL E & REBECCA S SHERMAN	RR-10
50	104190000600	CRESS MERRILL	RR-10
51	104190000700	MORRELL JEFFREY J & PATRICIA D	RR-10
52	104190001700	CLAPP CYNTHIA R	EFU & RR-10
53	104190001800	KEN & SARAH EDWARDSSON RL TRUST	EFU
54	104190001801	SLABAUGH ROGER L & MICHELLE V	EFU
55	104190001900	HERNANDEZ VICTOR	EFU
56	10419B000300	PELTIER REAL ESTATE CO	RR-10

NO.	TAX LOT NO.	OWNER NAME	CURRENT ZONING
57	10419B000400	CARLIN KATHERYN L, TR	RR-10
58	10419B000500	FRAZIER STEVEN & DAVIS LUE ANN	RR-10
59	10419B000600	GIBBS LANCE A	RR-10
60	10419B001200	BARBARA FICK LIVING TRUST	RR-10
61	10419B001300	BARBARA FICK LIVING TRUST	RR-10
62	10419B001301	VALLEY LANDFILLS INC	RR-10
63	10419B001500	CATHERINE E HOLDORF LIVING TRUST	RR-10
64	10419B001600	VALLEY LANDFILLS INC	RR-10
65	10419D000100	POSTLEWAIT JACOB EDWARD & ELIZABETH REGA	RR-10
66	10419D000200	HOLMES RICHARD H & CHARLCY L	RR-10
109	10419DD03700	YANEZ ERIC & BETHANY J	RR-5
110	10419DD03800	LOPEZ OMAR GENARO	RR-5
111	10419DD03900	ANTONIO & ELIZABETH AMANDI REVOCABLE LIV	RR-5
112	10419DD04000	ANTONIO & ELIZABETH AMANDI REVOCABLE LIV	RR-5
119	104200000300	OREGON STATE GAME COMMISSION	OS
339	105130000100	R B WEBBER DEVELOPMENT LLC	EFU
340	105130000200	DAVID & DEBRA HACKLEMAN TRUST	FC
341	105130000201	DAVID & DEBRA HACKLEMAN TRUST	FC
342	105130000202	BERKLUND HARRISUE, TR	FC
343	105130000203	BERKLUND HARRISUE, TR	FC
344	105130000300	DENOMA JOHN T JR & SEARS DONNA J	FC
345	105130000301	SEARS ROLLIN & DONNA JEANNE	FC
346	105130000400	BRISKEY JOINT REVOCABLE LIVING TRUST	FC
347	105130000500	DAVID A PLANT TRUST	EFU
348	105130000501	MARCUM DONALD R JR	EFU
349	105130000502	LINDSEY RICHARD T & KAREN J	EFU
350	105130000600	WINN TERRILL JAMES & APRIL DOVE	EFU
351	105130000601	GOETZINGER DALE L & MONA G	EFU
352	105130000700	OSC	FC
353	105130000800	VALLEY LANDFILLS INC	EFU
354	105130000900	VALLEY LANDFILLS INC	EFU
355	105130000901	VALLEY LANDFILLS INC	EFU
356	105130000902	VALLEY LANDFILLS INC	EFU
357	105130001000	VALLEY LANDFILLS INC	LS
361	105140000105	HARLAN ANNE M	EFU
362	105140000107	EDWARD L PORTZ & JOANN PORTZ TRUST	EFU
365	105140000111	HARLAN ANNE M	EFU
385	105140001400	BUCKOVIC FAMILY TRUST	EFU
411	105230000100	OREGON STATE BOARD HIGHER ED	FC
412	105240000101	JOHNSON DEBORA LEE, TR	EFU
413	105240000102	JOHNSON DEBORA LEE, TR	EFU
414	105240000103	VALLEY LANDFILLS INC	EFU
415	105240000104	LABRASSEUR GEORGE F & YOLANDE	EFU
416	105240000105	MASON FAMILY LIVING TRUST	EFU
417	105240000106	HOLDORF CATHERINE E, TR	EFU
418	105240000190	STAHL DEE M & WAYNE A	EFU
419	105240000200	VALLEY LANDFILLS INC	EFU
420	105240000300	OREGON STATE BOARD HIGHER ED	FC
421	105240000400	FLAK TIMOTHY A & LIND GINA M	RR-10
437	104190000401	SEARLS JAMES CLUETT	RR-10

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

BENTON COUNTY TAX LOTS & ZONING

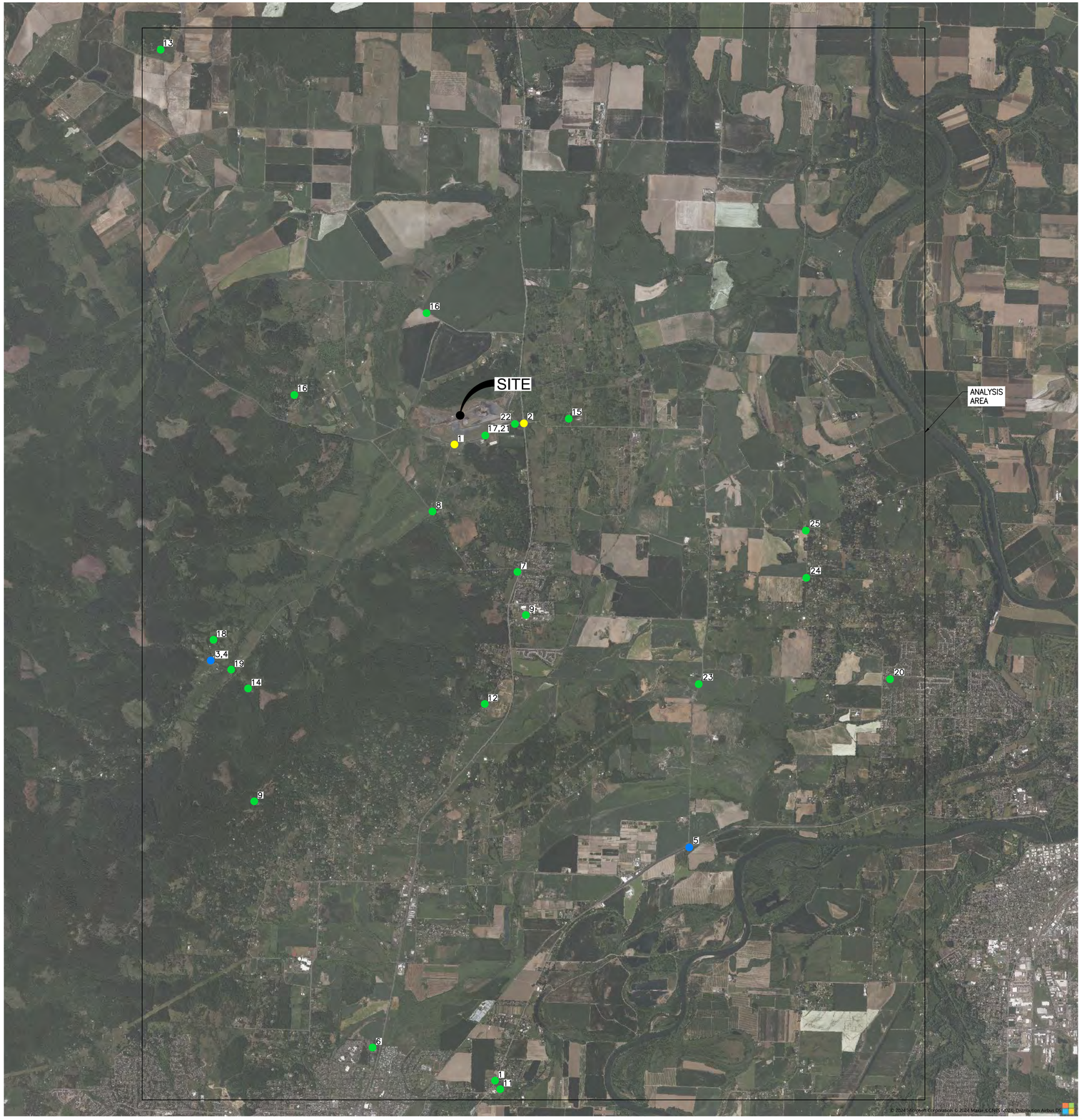
DATE:	JULY 2024
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.:
2A

P:\320-000\322-142\-CADD\Dwg\SWD\322142-SWD1-2-Benton County Tax Lots Exhibit.dwg[2A] LS(8/13/2024 - jsmith) - LO: 8/13/2024 8:31 AM

EXHIBIT 9
MAP DEFINING THE ANALYSIS AREA SHOWING ODOR COMPLAINTS

Exhibit E9



LEGEND

- ODOR COMPLAINTS FROM 2021
- ODOR COMPLAINTS FROM 2023
- ODOR COMPLAINTS FROM 2024

NO.	YEAR	MONTH
1	2021	OCTOBER
2		NOVEMBER
3	2023	NOVEMBER
4		DECEMBER
5		DECEMBER
6	2024	JANUARY
7		FEBRUARY
8		FEBRUARY
9		FEBRUARY
10		FEBRUARY
11		FEBRUARY
12		FEBRUARY
13		MARCH
14		MARCH
15		MARCH
16		MARCH
17		MARCH
18		APRIL
19		APRIL
20		APRIL
21		JULY
22		JULY
23		JULY
24		AUGUST
25		AUGUST

NORTH

SCALE IN FEET

0 3,000 6,000

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

EXHIBIT 9 - MAP OF THE ANALYSIS AREA

DATE:	JULY 2024	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:	322-142		
APPROVED BY:	JAS		

DRAWING NO.: A

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-EXHIBIT 9-Map of the Analysis Area.dwg[A] LS:(10/21/2024 - jshah) - LP: 10/21/2024 2:33 PM

EXHIBIT 10

AERIAL IMAGE OF TOPOGRAPHY AND ROADS SURROUNDING THE LANDFILL AREA

Exhibit E10

LEGEND

300 EXISTING 50-FT CONTOUR

0 3,000 6,000
SCALE IN FEET

NORTH

REGISTERED PROFESSIONAL ENGINEER
JEFF A. SHEPHERD
OREGON
JULY 13, 2007
92360PE
EXPIRES: 06/30/2026

EXHIBIT 10 - AERIAL IMAGE OF TOPOGRAPHY AND ROADS SURROUNDING THE COFFIN BUTTE LANDFILL

DRAWING NO.: A

DATE:	JULY 2024	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

REVISION RECORD

NO	DATE	DESCRIPTION

EXHIBIT 11
NOISE STUDY

REPUBLIC SERVICES COFFIN BUTTE LANDFILL
NOISE STUDY

September 25, 2023

Prepared For:

Civil & Environmental Consultants, Inc.

Prepared By:

THE GREENBUSCH GROUP, INC.

1900 West Nickerson Street Suite 201
Seattle, Washington 98119

Table of Contents

1.0 Executive Summary 1
2.0 Introduction 1
3.0 Nomenclature 1
4.0 Regulatory Criteria 3
5.0 Sound Level Measurements 6
5.1 Existing Sound Levels 6
5.2 Equipment Sound Levels 8
6.0 Analysis 9
7.0 Modeling Results 12
8.0 Appendix 17
8.1 Location 1 Ambient Sound Levels 17
8.2 Location 2 Ambient Sound Levels 20
8.3 Location 3 Ambient Sound Levels 23
8.4 Location 4 Ambient Sound Levels 26

List of Tables

Table 3.1 A-Weighted Levels of Common Sounds, dBA 2
Table 4.1 OAR Hourly Sound Limits, dBA 3
Table 4.2 OAR Octave Band Sound Limits, dB 3
Table 4.3 Project Sound Limits, (L_{01} / L_{10} / L_{50}), dBA 5
Table 5.1 Measurement Equipment 6
Table 5.2 Measured Hourly Sound Levels, Low-High (Median) 8
Table 5.3 Equipment Sound Levels, L_{eq} 8
Table 6.1 Modeled Equipment 10
Table 7.1 Predicted Unmitigated Broadband Sound Levels – Scenario 1, dBA 13
Table 7.2 Predicted Unmitigated L_{50} Octave Band Sound Levels – Scenario 1, dB 13
Table 7.3 Predicted Unmitigated Broadband Sound Levels – Scenario 2, dBA 14
Table 7.4 Predicted Unmitigated L_{50} Octave Band Sound Levels – Scenario 2, dB 15
Table 8.1 Hourly L_{10} Sound Levels - Location 1, dBA 17
Table 8.2 Hourly L_{50} Sound Levels - Location 1, dBA 18
Table 8.3 Hourly L_{10} Sound Levels - Location 2, dBA 20
Table 8.4 Hourly L_{50} Sound Levels - Location 2, dBA 21
Table 8.5 Hourly L_{10} Sound Levels - Location 3, dBA 23
Table 8.6 Hourly L_{50} Sound Levels - Location 3, dBA 24
Table 8.7 Hourly L_{10} Sound Levels - Location 4, dBA 26
Table 8.8 Hourly L_{50} Sound Levels - Location 4, dBA 27

List of Figures

Figure 5.1 Measurement Locations 7
Figure 5.2 Location 1 7
Figure 5.3 Location 2 7
Figure 5.4 Location 3 7
Figure 5.5 Location 4 7
Figure 5.6 On-Site Equipment Frequency Spectrum 9
Figure 6.1 Modeled Equipment Locations – Scenario 1 11
Figure 6.2 Modeled Equipment Locations – Scenario 2 11
Figure 7.1 Evaluation Point Locations 12
Figure 7.2 Predicted L_{50} Sound Level Contours – Scenario 1 14
Figure 7.3 Predicted L_{50} Sound Level Contours – Scenario 2 15

Figure 8.1 Hourly L_{10} Sound Levels over Measurement Period - Location 1.....19
Figure 8.2 Hourly L_{50} Sound Levels over Measurement Period - Location 1.....19
Figure 8.3 Hourly L_{10} Sound Levels over Measurement Period - Location 2.....22
Figure 8.4 Hourly L_{50} Sound Levels over Measurement Period - Location 2.....22
Figure 8.5 Hourly L_{10} Sound Levels over Measurement Period - Location 3.....25
Figure 8.6 Hourly L_{50} Sound Levels over Measurement Period - Location 3.....25
Figure 8.7 Hourly L_{10} Sound Levels over Measurement Period - Location 4.....28
Figure 8.8 Hourly L_{50} Sound Levels over Measurement Period - Location 4.....28

1.0 EXECUTIVE SUMMARY

This Noise Study includes a summary of existing sound levels measured near the proposed expansion area, sound levels produced by equipment currently being used at the landfill, and discussion of applicable regulatory criteria. To assess sound emissions of fill operations in the new area, predictions were made for both beginning grade and maximum future grade conditions. Predicted sound levels included in this Noise Study comply with applicable regulatory criteria without the inclusion of noise mitigation. Although not required to comply with code limits, it is recommended that all backup alarms used on the site be replaced with ambient sensing broadband backup alarms, if permitted by safety regulations.

2.0 INTRODUCTION

This Noise Study evaluates sound levels associated with the proposed expansion of the Republic Services Coffin Butte Landfill (project) located at 28972 Coffin Butte Road in Corvallis, Oregon. The proposed expansion is located on the south side of Coffin Butte Road, directly south of the existing landfill area.

In addition to the landfill expansion, a new 2,160 square foot employee building, scale house access road on the north side of Coffin Butte Road, access road on the south side of the proposed expansion area, and relocation of leachate ponds to support the landfill are proposed.

Equipment operating in the expansion area is anticipated to be similar to existing landfill operations: dozers, excavators, and compactors to move debris, tipping machines used to unload haul vehicles, and truck traffic.

This Noise Study includes a summary of sound level measurements made of existing operations and equipment, measurements of existing sound levels near the expansion area, predicted sound levels from future operations in the expansion area, and an analysis of compliance with regulatory criteria.

3.0 NOMENCLATURE

The auditory response to sound is a complex process that occurs over a wide range of frequencies and intensities. The decibel level, or “dB,” is a form of shorthand that compresses this broad range of intensities into a convenient numerical scale. The decibel scale is logarithmic. For example, using the decibel scale, a doubling or halving of energy causes the sound level to change by 3 dB; it does not double or halve the perceived loudness as might be expected.

The minimum sound level variation perceptible to a human observer is generally around 3 dB. A 5 dB change is clearly perceptible, and an 8 to 10-dB change is associated with a perceived doubling or halving of loudness. Common sound pressure levels are reported in Table 3.1. Mathematical descriptors have been developed to provide better assessment of sounds that vary over time and the human response to them.

- Equivalent Sound Level, L_{eq}, is the level of a constant sound having the same energy content as the actual time-varying level during a specified interval. The L_{eq} is used to characterize complex, fluctuating sound levels with a single number. Typical intervals for L_{eq} are hourly, daily, and annually.
- Maximum Sound Level, L_{max}, is the maximum recorded root mean square (rms) sound level for a given time interval or event. L_{max} can be defined for two time weightings, "slow" and "fast." "Slow" uses 1-second time constant, and "fast" uses a 125-millisecond time constant. For transient events of very short duration, L_{max} "fast" will be greater than L_{max} "slow." L_{max} "fast" is used throughout this report.
- Percentage Sound Level, $L_{(n)} – L_{(n)}$, is the sound level that is exceeded n percent of the time; for example, L_{08} is the level exceeded 8% of the time. L_{25} is the sound level exceeded 25% of the time.
- Sound Power Level, PWL or L_wA (A-weighted PWL), is the amount of energy per second generated by a source, measured in watts. The sound power level (PWL) is a decibel representation with a reference value of 1 pico-watt (pW). Sound power is independent of distance, path, or influence from any nearby surfaces.
- Sound Pressure Level, SPL, correlates with what is heard by the human ear. SPL is defined as the squared ratio of the sound pressure with reference to 20 micropascal (µPa). Sound pressure is affected by distance, path, barriers, directivity, etc. All sound pressure levels referenced in this document utilize this reference pressure.

Table 3.1 A-Weighted Levels of Common Sounds, dBA

Sound	Sound Level	Approximate Relative Loudness[1]
Jet Plane at 100 feet	130	128
Rock Music with Amplifier	120	64
Thunder, Danger of Permanent Hearing Loss	110	32
Boiler Shop, Power Mower	100	16
Orchestral Crescendo at 25 feet	90	8
Busy Street	80	4
Interior of Department Store	70	2
Ordinary Conversation at 3 feet	60	1
Quiet Car at Low Speed	50	1/2
Average Office	40	1/4
City Residence, Interior	30	1/8
Quiet Country Residence, Interior	20	1/16
Rustle of Leaves	10	1/32
Threshold of Hearing	0	1/64

1. As compared to ordinary conversation at 3 feet

Source: US Department of Housing and Urban Development, Aircraft Noise Impact Planning Guidelines for Local Agencies, November 1972

4.0 REGULATORY CRITERIA

The project is located within unincorporated Benton County and noise emissions are subject to the Benton County Code (BCC). However, the BCC does not include sound limits applicable to the site. Therefore, sound level limits default to requirements of the Oregon Administrative Rules (OAR).

OAR 340-035-0035 regulates sound emissions from commercial and industrial sound sources and are based on whether the site was previously used as a commercial or industrial site. The site has been used as an industrial site for over 20 years to support existing landfill operations and currently has two leachate ponds, soil stockpiles, and trucks hauling leachate. Based on existing operations at the site it is our understanding that the expansion area will be considered a new industrial or commercial sound source located on a previously used site and will be subject to OAR 340-035-0035(1)(A).

Under OAR 340-035-0035(1)(A) sound levels from the proposed operations could not exceed the levels shown in OAR 340-35-035 Table 8 (see Table 4.1). Additionally, if there is reasonable cause to believe these requirements do not adequately protect the health, safety, or welfare of the pubic, sound levels generated by the proposed operations would be subject to the octave band sound limits specified in OAR 340-35-035 Table 10 (see Table 4.2).

Sounds level limits identified in OAR 340-35-035 Table 8 and OAR 340-35-035 Table 10 are only enforced at noise sensitive properties, which are defined in OAR 340-035-0015(38) as follows:

"'Noise Sensitive Property' means real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries. Property used in industrial or agricultural activities is not Noise Sensitive Property unless it meets the above criteria in more than an incidental manner."

Measurement locations used to enforce these sound limits are 25 feet towards the noise source from the point of the noise sensitive building nearest the noise source, or at the point on the noise sensitive property line nearest the noise source, whichever is further from the noise source.

Table 4.1 OAR Hourly Sound Limits, dBA

Noise Metric	7:00 AM to 10:00 PM	10:00 PM to 7:00 AM
L_{50}	55	50
L_{10}	60	55
L_{01}	75	60

Source: OAR 340-35-035 Table 8

Table 4.2 OAR Octave Band Sound Limits, dB

Time	Frequency, Hz								
	31.5	63	125	250	500	1,000	2,000	4,000	8,000
7:00 AM to 10:00 PM	68	65	61	55	52	49	46	43	40
10:00 PM to 7:00 AM	65	62	56	50	46	43	40	37	34

Source: OAR 340-35-035 Table 10

OAR 340-035-0035(5) provides the following exemptions from OAR 340-35-035 Table 8 and Table 10 sound limits:

- Emergency equipment not operated on a regular or scheduled basis (OAR 340-035-0035(5)(a))
- Warning devices not operating continuously for more than 5 minutes (OAR 340-035-0035(5)(b))
- Sounds created by the tires or motor used to propel any road vehicle complying with the noise standards for road vehicles (OAR 340-035-0035(5)(c))
- Sounds created by bells, chimes, or carillons (OAR 340-035-0035(5)(e))

In addition to the regulations for commercial and industrial noise sources defined in OAR 340-35-0035, OAR 340-035-0030 includes policies for motor vehicle sound emissions (including road and off-road vehicles) and sound limits at noise sensitive properties when motor vehicles operate on private property within 1,000 feet of noise sensitive properties.

OAR 340-035-0015 defines motor vehicles, road vehicles, and off-road recreational vehicles as follows:

"'Motor Vehicle' means any vehicle which is, or is designed to be self-propelled or is designed or used for transporting persons or property. This definition excludes airplanes, but includes watercraft."

"'Off-Road Recreational Vehicle' means any motor vehicle, including watercraft, used off public roads for recreational purposes. When a road vehicle is operated off-road the vehicle shall be considered an off-road recreational vehicle if it is being used for recreational purposes."

"'Road Vehicle' means any motor vehicle registered for use on public roads, including any attached trailing vehicles."

OAR 340-035-0030(1)(d)(B) provides the following exemptions from the sound limits shown in OAR 340-35-030 Table 5, which apply to noise sensitive properties within 1,000 feet of vehicle operations:

- Motor vehicles initially entering or leaving property which is more than 1,000 feet from the nearest noise sensitive property or quiet area (OAR 340-035-0030(1)(d)(B)(ii))
- Motor vehicles operating on public roads (OAR 340-035-0030(1)(d)(B)(iii))
- Motor vehicles operating off-road for non-recreational purposes (OAR 340-030-0030(1)(d)(B)(iv))

Warning devices used on motor vehicles are exempt from all noise regulations under OAR 340-035-0030(3)(b).

Although OAR exemptions could be interpreted as exempting haul truck activities throughout the site given haul trucks are considered "road vehicles" and are operating off-road for non-recreational purposes, the Noise Study includes an evaluation of potential effects from trucking operations at nearby noise sensitive properties.

Increases to existing sound levels are not governed under the OAR for new industrial or commercial noise sources on previously used sites. However, this analysis includes an

assessment of increases to existing sound levels to address concerns expressed by the community. Increases to existing sound levels are compared with OAR regulatory criteria for new industrial and commercial noise sources on previously unused sites, which prohibits increasing exiting L_{10} or L_{50} statistical noise levels by more than 10 dB.

Based on OAR regulatory criteria and measured ambient sound levels (see Section 5.1 for additional information) the resulting sound limits for the project are shown in Table 4.3. The operating hours of the landfill are 4:30 AM to 5:30 PM on weekdays and 7:30 AM to 5:30 PM on Saturdays. Therefore, both daytime and nighttime sound limits shown in Table 4.3 apply. This analysis assumes on-site operations do not vary between daytime and nighttime hours and assesses compliance using the more stringent nighttime sound limits in Table 4.3.

Table 4.3 Project Sound Limits, (L_{01} / L_{10} / L_{50}), dBA

Location	Time	OAR Table 8 Limits (X)	Existing Sound Levels[1]	Existing Sound Levels + 10 dB (Y)	Project Limit (lowest of X and Y)
Location 1	Daytime	75 / 60 / 55	-[2] / 39 / 32	- / 49 / 42	75 / 49 / 42
	Nighttime	60 / 55 / 50	- / 28 / 22	- / 38 / 32	**60 / 38 / 32**
Location 2	Daytime	75 / 60 / 55	- / 41 / 38	- / 51 / 48	75 / 51 / 48
	Nighttime	60 / 55 / 50	- / 33 / 29	- / 43 / 39	**60 / 43 / 39**
Location 3[3]	Daytime	75 / 60 / 55	- / 58 / 53	- / 68 / 63	75 / 60 / 55
	Nighttime	60 / 55 / 50	- / 50 / 36	- / 60 / 46	**60 / 55 / 46**
Location 4	Daytime	75 / 60 / 55	- / 46 / 39	- / 56 / 49	75 / 56 / 49
	Nighttime	60 / 55 / 50	- / 35 / 29	- / 45 / 39	**60 / 45 / 39**
Noise Sensitive Properties	Daytime	75 / 60 / 55	-	-	75 / 60 / 55
	Nighttime	60 / 55 / 50	-	-	**60 / 55 / 50**

1. OAR 340-035-0035(1)B only prohibits L_{10} and L_{50} ambient sound levels from being exceeded by 10 dB
2. Indicates a non-applicable value
3. Measured sound levels may be influenced by the existing power plant, which will remain in place during the expansion

5.0 SOUND LEVEL MEASUREMENTS

Sound levels were measured near noise sensitive properties in the vicinity of the proposed expansion area to document the existing acoustic environment. Measurements were also made of existing operations at the current site for use in the analysis. Equipment used during the measurements are identified in Table 5.1.

Table 5.1 Measurement Equipment

Make and Model	Description	Serial Number
Svantek SV307	Sound Level Analyzer	78647
Svantek ST30	Microphone	82351
Svantek SV307	Sound Level Analyzer	78633
Svantek ST30	Microphone	103657
Svantek SV307	Sound Level Analyzer	106247
Svantek ST30	Microphone	111967
Svantek SV307	Sound Level Analyzer	78646
Svantek ST30	Microphone	114514
Larson Davis CAL200	Acoustic Calibrator	18605
Svantek 971	Sound Level Analyzer	51818
Svantek SV18	Preamplifier	49561
Aco Pacific 7052E	Microphone	62522
Larson Davis CAL200	Acoustic Calibrator	9512

All equipment was calibrated at a certified laboratory within one year of the measurement date. Field calibrations were made before and immediately after the measurements were completed. Environmental windscreens were used on all microphones during the measurements.

5.1 Existing Sound Levels

Existing sound levels were measured at three locations near noise sensitive properties between Friday October 15 and Tuesday October 19, 2021, and at a fourth location between Thursday January 13 and Saturday January 22, 2022. Wind conditions during the October measurements ranged from calm to 10 miles per hour and were generally from the south. Temperatures ranged between 40- and 69-degrees Fahrenheit. Precipitation ranged from 0 to 0.15 inches per day. Wind conditions during the January measurements ranged from calm to 12 miles per hour and were typically from the south. Temperatures during the January measurements ranged between 33- and 57-degrees Fahrenheit and precipitation ranged from 0 to 0.26 inches per day.

The four Svantek SV307 sound level analyzers shown in Table 5.1 were used to measure the existing acoustic environment. At all measurement locations, equipment collected hourly and 1-second 1/3 octave L_{eq}, broadband L_{max} sound levels at both 1-second and hourly intervals, and 1-hour L_n data were also measured. To help identify local noise sources, audio recordings were made when sound levels exceeded 40 dBA at Locations 1 and 2, 50 dBA at Location 3, and 65 dBA at Location 4. The locations of the measurements are illustrated in Figure 5.1 and photos of the measurement equipment are shown in Figure 5.2 through Figure 5.5.

Figure 5.1 Measurement Locations

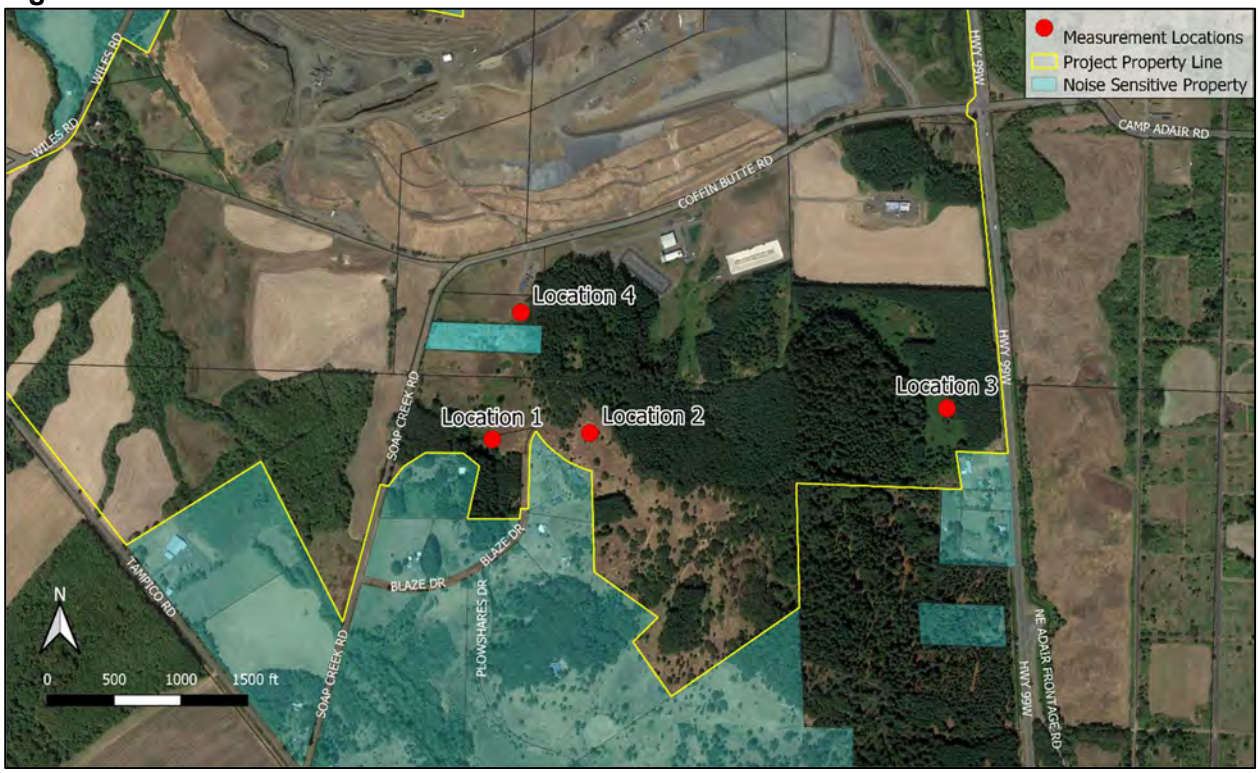


Figure 5.2 Location 1

Figure 5.3 Location 2

Figure 5.4 Location 3

Figure 5.5 Location 4

The range and median hourly L_{10} and L_{50} sound levels at each measurement location are shown in Table 5.2 and graphically in the Appendix. It should be noted that due to equipment connectivity issues, some hours of data were incomplete. Levels in this document only include data collected over complete hours. Times when data was not recorded over a complete hour are identified in the Appendix.

Table 5.2 Measured Hourly Sound Levels, Low-High (Median)

Measurement Location	Daytime, dBA		Nighttime, dBA	
	L_{10}	L_{50}	L_{10}	L_{50}
Location 1	28-54 (39)	21-51 (32)	22-52 (28)	15-50 (22)
Location 2	33-53 (41)	30-50 (38)	27-49 (33)	26-48 (29)
Location 3	53-60 (58)	45-56 (53)	38-59 (50)	27-53 (36)
Location 4	30-55 (46)	26-47 (39)	26-51 (35)	24-46 (29)

Measured median L_{10} and L_{50} sound levels were below OAR sound limits at all measurement locations. Dominant sound sources at the measurement locations included birds, other nature sounds, and vehicle traffic on Soap Creek Road, Coffin Butte Road, and Highway 99 West. Sound levels were generally louder at locations closer to Highway 99 West and traffic noise became more prevalent. The existing on-site power plant may have contributed to the measured sound levels at Location 3.

5.2 Equipment Sound Levels

Sound levels from existing equipment and operations at the landfill were measured the morning of October 15, 2021, using the Svantek 971 sound level analyzer. Measurements were made of individual pieces of equipment including, excavators, dozers, compactors, tippers, and haul trucks, at distances of 15 feet to 75 feet.

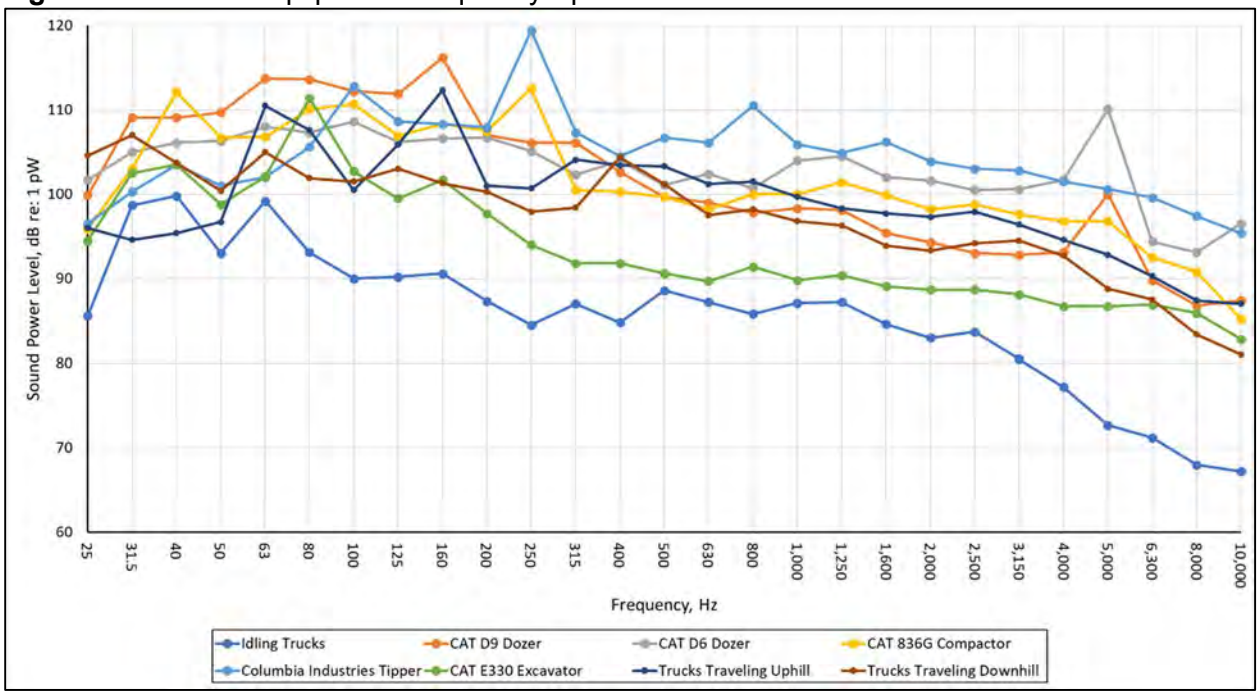
For mobile equipment and equipment not operating continuously, reported sound levels only include the loudest portions of the measurements. Because the data was collected at a variety of distances, measured sound pressure levels were used to compute equipment sound power levels, which are independent of distance. Measurement distances, sound pressure levels, and calculated sound power levels are shown in Table 5.3. A graph showing the frequency spectrum of the equipment is shown in Figure 5.6.

Table 5.3 Equipment Sound Levels, L_{eq}

Equipment	Measurement Distance, Feet	Sound Pressure Level, dBA	Sound Power Level, L_wA
CAT D9 Dozer	75	75	110
CAT D6 Dozer[1]	75	80	115
CAT 836G Compactor	45	81	111
Columbia Industries Tipper	30	90	117
CAT 330 Excavator	60	68	102
Idling Trucks	25	70	96
Trucks Traveling Uphill[2]	15	89	110
Trucks Traveling Downhill[3]	26	81	108

1. Reported sound levels are the logarithmic average of two measurements
2. Reported sound levels are the logarithmic average of eight measurements
3. Reported sound levels are the logarithmic average of five measurements

Figure 5.6 On-Site Equipment Frequency Spectrum



6.0 ANALYSIS

The primary tool used to predict sound levels at neighboring properties from proposed future operations was the 3-D computer noise modeling software environment, Cadna/A. Cadna/A utilizes the CADNA (Control of Accuracy and Debugging for Numerical Applications) computation engine developed by the Pierre et Marie Curie University of Paris. The models used for this project utilized the International Organization for Standardization 9613 Part II algorithms, implemented in the Cadna/A software, which accounted for the effects of distance, topography, and surface reflections.

The modeling process is typically accurate within 3 dB. Conservative assumptions were used in the model created for this project to ensure sufficient design margin within the predicted sound levels, allowing for direction comparison with project criteria.

Locations of equipment and future on-site topography were determined from drawings provided by Civil and Environmental Consultants, Inc. Offsite topographical information was based on LIDAR images of the area. Property line locations, zoning information, and locations of structures were determined from Benton County Geographical Information System (GIS) data.

To account for changes to the topography in the expansion area over time, both the beginning of landfill operations, when the site is nearly empty (Scenario 1), and when on-site operations are nearing completion and the site is nearly full (Scenario 2) were modeled. Near the beginning of operations, the middle of the expansion area will be approximately 260 feet above sea level and near the end of operations the expansion area will be approximately 450 feet above sea level.

Equipment measured on October 15, 2021, was modeled within the proposed expansion area. Operations within the expansion area are expected to be similar to existing operations and generate similar sound levels. In Scenario 1, equipment was placed near the southern portion of

the expansion area to produce conservative results at noise sensitive properties located south of the site. Equipment in Scenario 2 were distributed along at the highest point of the expansion area. Trucks using the landfill were modeled entering from Highway 99 West, using the scale house, proceeding to the expansion area, and returning to Highway 99 West. The hourly vehicle counts included in the noise models are shown in Table 6.1 and all vehicles were modeled traveling at 15 miles per hour.

OAR sound limits are based on hourly L_{01}, L_{10}, and L_{50} percentile sound levels. Percentile sound levels present modeling challenges due to variability in the duration of equipment operations, changes in sound levels produced by the equipment, and times when multiple pieces of equipment may operate simultaneously. This analysis predicts hourly L_{01} and L_{50} percentile sound levels as follows:

- L_{01} was modeled with all equipment operating simultaneously and each piece of equipment generating the loudest one-second sound level produced during the on-site equipment measurements. The L_{01} captures loud, transient events, such as banging truck gates and loud noises from unloading. Calculated pass-by levels were used to estimate the L_{01} sound level from trucks at individual properties. These predicted levels were then combined with predicted sound levels from other on-site equipment. While L_{01} sound levels themselves are not appropriately combined in this way, it represents a conservative prediction for L_{01} sound levels from the site.
- L_{50} is modeled with the assumption that L_{50} sound levels are similar to measured L_{eq} equipment sound levels. Equipment was modeled generating the loudest 1-second L_{eq} sound levels produced by each piece of equipment during the on-site measurements with a usage factor applied. The percentage of an hour that each piece of equipment produces the loudest sound levels (acoustical usage factors) were applied based on Federal Highway Administration (FHWA) Construction Noise Control Specification 721.560 and estimated operating times noted during the on-site equipment measurements.

Equipment types and quantities included in the noise models are shown in Table 6.1.

Table 6.1 Modeled Equipment

Equipment	Quantity	Usage Factor (%)[1]
CAT D9 Dozer	1	40
CAT D6 Dozer	1	40
CAT 836G Compactor	2	50
Columbia Industries Tipper	1	50
CAT 330 Excavator	1	40
Idling Trucks	4	100
Landfill Trucks[2]	47/hour	100

1. Based on information in the FHWA Construction Noise Control Specification 721.560 and operating times noted during on-site measurements.
2. Sound levels from trucks traveling uphill were used in the models.

Figure 6.1 Modeled Equipment Locations – Scenario 1

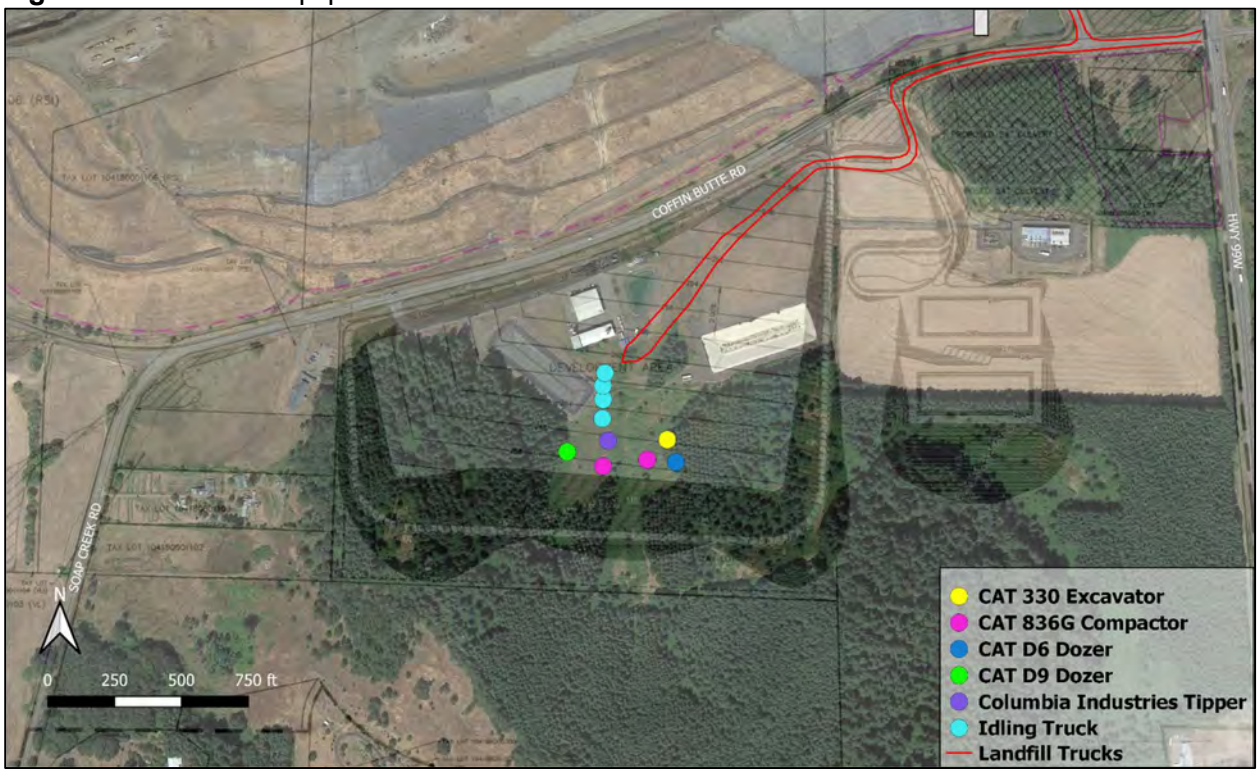
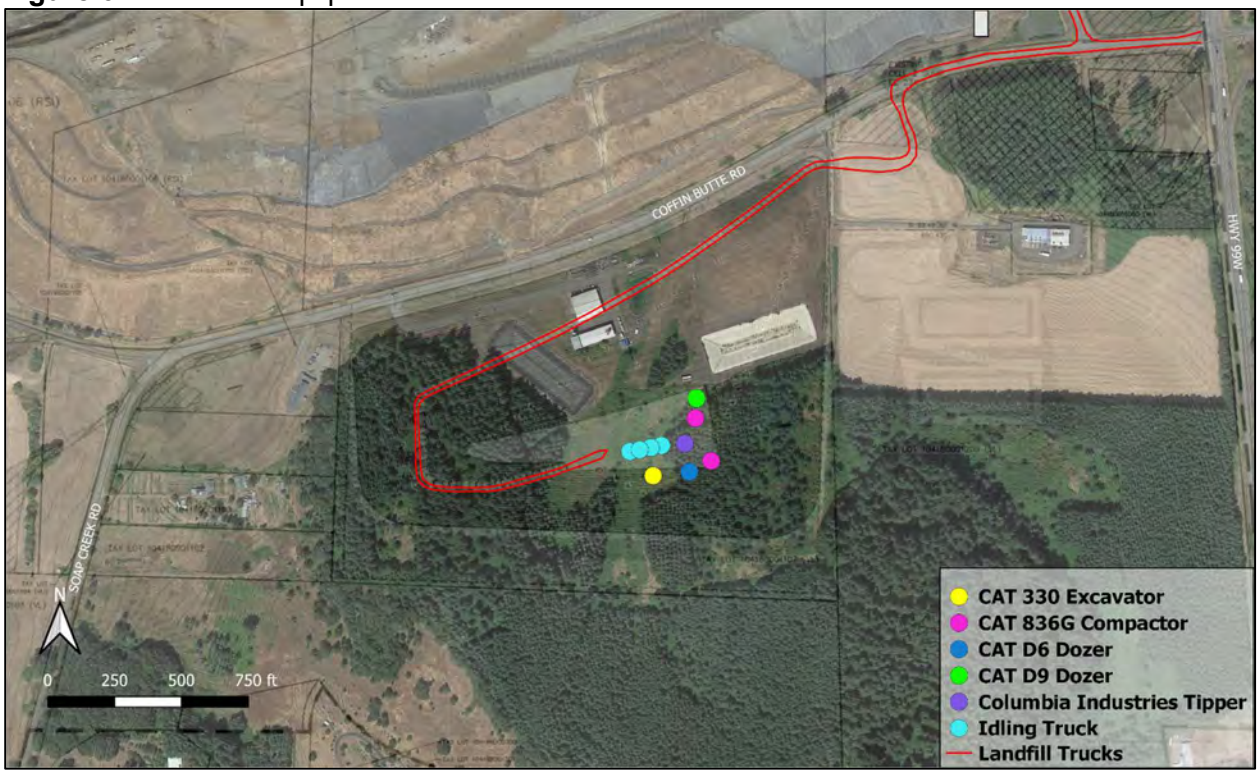


Figure 6.2 Modeled Equipment Locations – Scenario 2



7.0 MODELING RESULTS

Predicted sound levels included in this document represent the loudest sound levels anticipated at receiving noise sensitive properties and at the locations where existing sound levels were measured. The evaluation point locations are shown in Figure 7.1. These predicted sound levels represent on-site operations only and do not include contributions from off-site sound sources or safety devices such as backup alarms.

Figure 7.1 Evaluation Point Locations

Predicted unmitigated broadband sound levels from Scenario 1 are shown in Table 7.1 and predicted sound levels in each octave band are shown in Table 7.2.

Table 7.1 Predicted Unmitigated Broadband Sound Levels – Scenario 1, dBA

Location	Project Limits[1]		Predicted Sound Level		Satisfies OAR Limits?	
	L_{01}[3]	L_{50}	L_{01}	L_{50}	L_{01}	L_{50}
Location 1[2]	-	32	-	27	-	Yes
Location 2[2]	-	39	-	35		
Location 3[2]	-	46	-	39		
Location 4[2]	-	39	-	39		
North	60	50	44	42	Yes	Yes
South			36	35		
West			41	39		
East			42	40		
Southeast			38	36		

1. Based on nighttime OAR sound limits and 10 dB increase to existing sound levels
2. See Figure 5.1 for locations where existing sound levels were measured
3. OAR increases to existing sound levels only apply to L_{10} and L_{50} sound levels

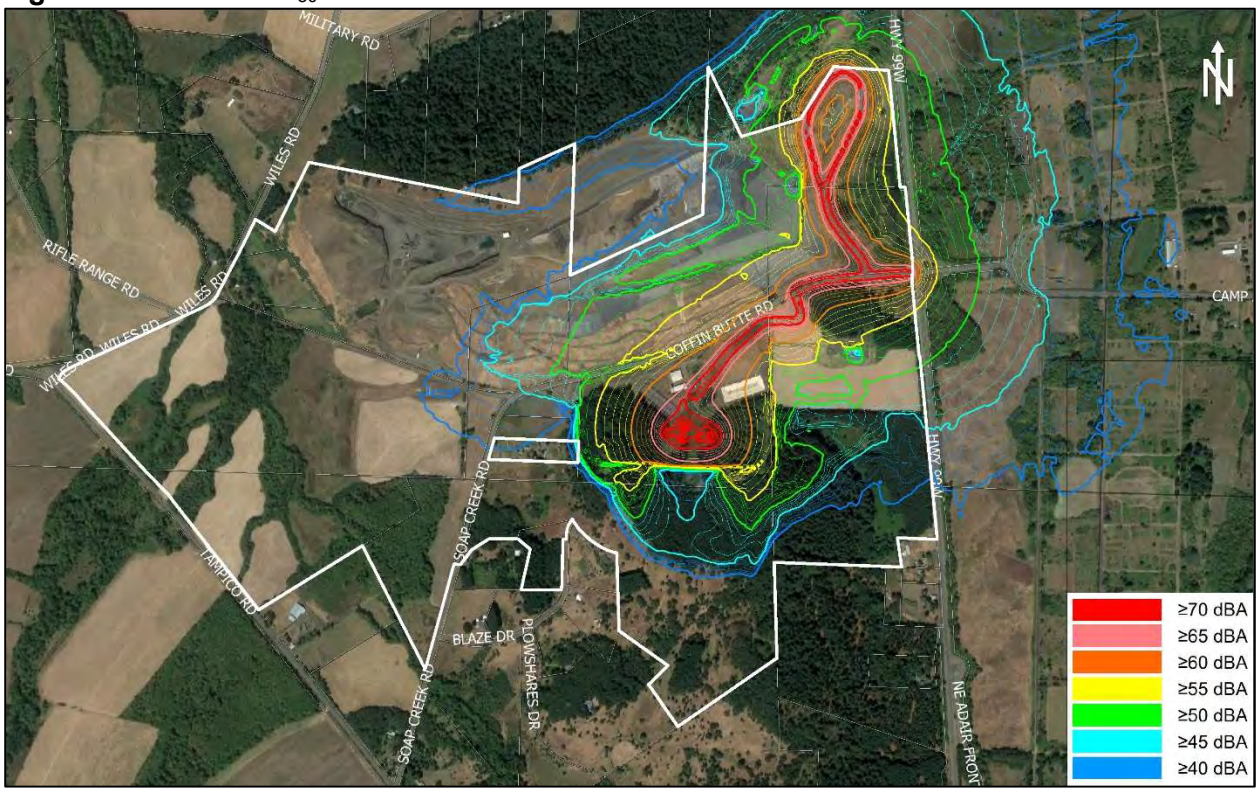
Table 7.2 Predicted Unmitigated L_{50} Octave Band Sound Levels – Scenario 1, dB

	Frequency, Hz								
	31.5	**63**	**125**	**250**	**500**	**1,000**	**2,000**	**4,000**	**8,000**
OAR Sound Limits[1]	**65**	**62**	**56**	**50**	**46**	**43**	**40**	**37**	**34**
Location									
Location 1	36	38	36	30	23	21	14	1	-
Location 2	44	46	44	39	32	27	20	10	-
Location 3	38	46	45	37	38	33	26	6	-
Location 4	47	49	48	43	35	30	21	10	-
North	41	47	44	39	39	39	30	7	-
South	41	44	43	37	33	28	19	1	-
West	46	48	47	43	35	30	23	13	-
East	42	53	42	37	39	37	29	2	-
Southeast	36	44	42	35	35	31	24	1	-
Satisfies OAR Limits?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

1. Based on OAR 340-35-035 Table 10

As shown in Table 7.1 and Table 7.2 sound levels from Scenario 1 are anticipated to comply with OAR sound limits at all nearby noise sensitive properties and locations where existing sound levels were measured. Predicted sound levels are also below the median ambient sound levels measured during times when existing landfill operations were taking place. Predicted sound contours five feet above grade from Scenario 1 are shown in Figure 7.2.

Figure 7.2 Predicted L_{50} Sound Level Contours – Scenario 1



Predicted broadband sound levels from Scenario 2 are shown in Table 7.3 and predicted sound levels in each octave band are shown in Table 7.4. Sound levels at the locations where existing sound levels were measured are not included because existing sound level when the site is filled are not known.

Table 7.3 Predicted Unmitigated Broadband Sound Levels – Scenario 2, dBA

Location	Project Limits[1]		Predicted Sound Level		Satisfies OAR Limits?	
	L_{01}	L_{50}	L_{01}	L_{50}	L_{01}	L_{50}
North	60	50	45	43	Yes	Yes
South			47	43		
West			51	45		
East			43	41		
Southeast			40	37		

1. Based on nighttime OAR sound limits

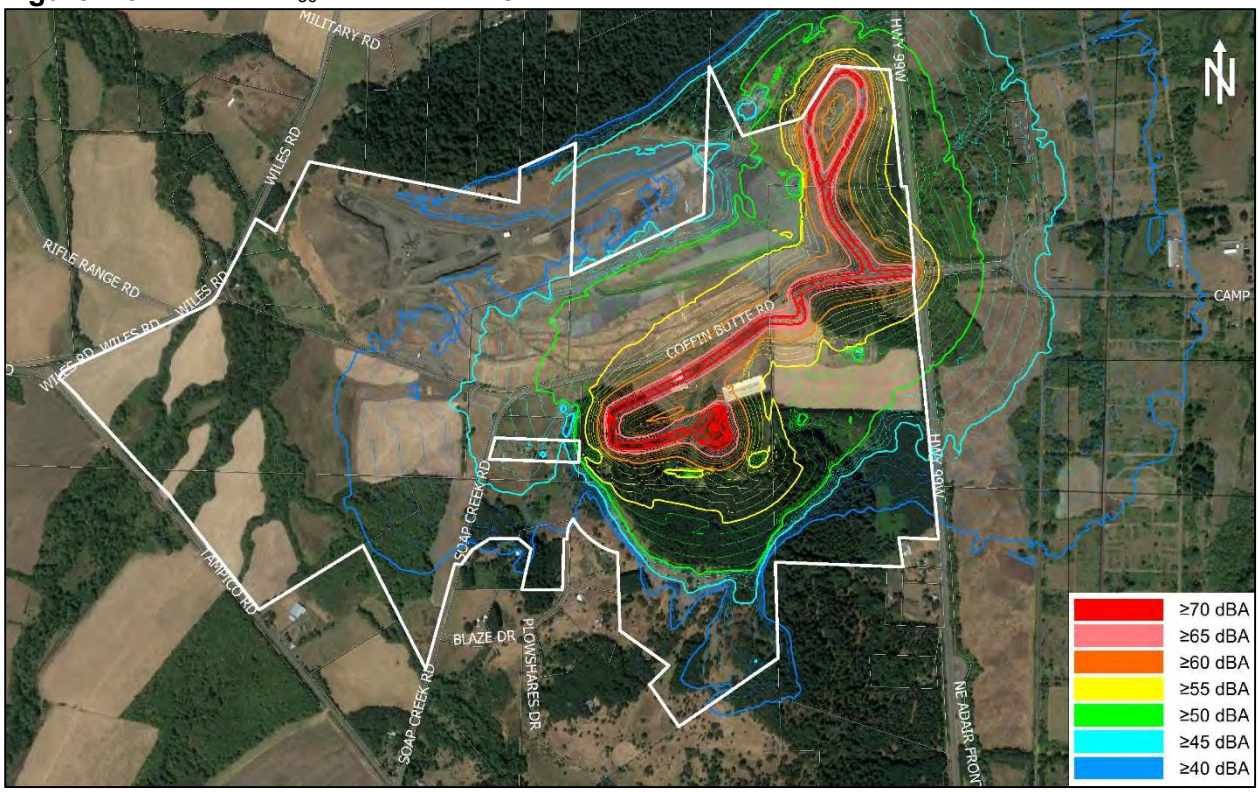
Table 7.4 Predicted Unmitigated L_{50} Octave Band Sound Levels – Scenario 2, dB

	Frequency, Hz								
	31.5	**63**	**125**	**250**	**500**	**1,000**	**2,000**	**4,000**	**8,000**
OAR Sound Limits[1]	**65**	**62**	**56**	**50**	**46**	**43**	**40**	**37**	**34**
Location									
North	42	48	45	40	40	40	32	9	-
South	45	52	49	43	40	38	33	20	-
West	45	52	52	44	44	40	35	26	4
East	47	54	43	38	39	38	29	2	-
Southeast	42	46	44	38	36	31	24	2	-
Satisfies OAR Limits?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

1. Based on OAR 340-35-035 Table 10

Sound levels from the end of operations are anticipated to comply with OAR sound limits at all nearby noise sensitive properties. Predicted unmitigated sound contours five feet above grade from Scenario 2 are shown in Figure 7.3.

Figure 7.3 Predicted L_{50} Sound Level Contours – Scenario 2



Predicted sound levels from trucks using the landfill and on-site equipment comply with OAR sound limits at all nearby noise sensitive properties under both modeling scenarios. Anticipated sound levels from landfill operations under Scenario 2 are higher than those from Scenario 1 due to the increased elevation of the site as it becomes filled, which decreases the effectiveness of the screening provided by the hillside south of the site, and rerouting trucks to travel up the

north, west, and south slopes of the expansion area. Although not required to comply with codified sound limits, it is recommended that all backup alarms used on the site be replaced with ambient sensing broadband backup alarms, if permitted by safety regulations.

8.0 APPENDIX

8.1 Location 1 Ambient Sound Levels

Bolded and underlined values shown in Table 8.1 and Table 8.2 represent hours when the landfill was operating.

Table 8.1 Hourly L_{10} Sound Levels - Location 1, dBA

Start of Hour	L_{10}				
	Friday 10/15/2021	Saturday 10/16/2021	Sunday 10/17/2021	Monday 10/18/2021	Tuesday 10/19/2021
12:00 AM		27	24	48	25
1:00 AM		26	23	42	27
2:00 AM		23	23	36	25
3:00 AM		22	24	33	25
4:00 AM		24	23	**33**	**32**
5:00 AM		30	26	**39**	**41**
6:00 AM		30	27	**40**	**42**
7:00 AM		**34**	34	**46**	**44**
8:00 AM		**40**	37	**45**	**46**
9:00 AM		**39**	43	**46**	**47**
10:00 AM		**40**	42	**44**	**46**
11:00 AM		**44**	36	**42**	**45**
12:00 PM		**41**	37	**43**	
1:00 PM	**43**	**38**	36	**45**	
2:00 PM	-	**39**	38	**44**	
3:00 PM	**41**	**42**	35	**44**	
4:00 PM	**42**	**38**	35	**44**	
5:00 PM	**39**	**41**	39	**45**	
6:00 PM	38	36	35	39	
7:00 PM	35	38	32	33	
8:00 PM	31	31	54	28	
9:00 PM	30	31	54	29	
10:00 PM	28	29	52	31	
11:00 PM	26	28	49	27	

Note: "-" denotes hours when a complete hour of data was not collected

Table 8.2 Hourly L_{50} Sound Levels - Location 1, dBA

Start of Hour	L_{50}				
	Friday 10/15/2021	Saturday 10/16/2021	Sunday 10/17/2021	Monday 10/18/2021	Tuesday 10/19/2021
12:00 AM		22	20	45	18
1:00 AM		21	20	37	20
2:00 AM		18	20	30	19
3:00 AM		15	20	27	18
4:00 AM		19	19	**26**	**23**
5:00 AM		21	21	**30**	**36**
6:00 AM		23	23	**32**	**38**
7:00 AM		**27**	26	**39**	**40**
8:00 AM		**33**	31	**40**	**39**
9:00 AM		**33**	37	**40**	**41**
10:00 AM		**34**	33	**38**	**39**
11:00 AM		**32**	31	**35**	**39**
12:00 PM		**31**	32	**37**	
1:00 PM	**34**	**31**	30	**37**	
2:00 PM	-	**31**	30	**37**	
3:00 PM	**34**	**32**	28	**33**	
4:00 PM	**33**	**32**	30	**32**	
5:00 PM	**31**	**31**	29	**29**	
6:00 PM	31	30	27	24	
7:00 PM	31	32	29	23	
8:00 PM	27	29	32	21	
9:00 PM	24	27	51	22	
10:00 PM	23	24	50	22	
11:00 PM	22	23	46	20	

Note: "-" denotes hours when a complete hour of data was not collected

Figure 8.1 Hourly L_{10} Sound Levels over Measurement Period - Location 1

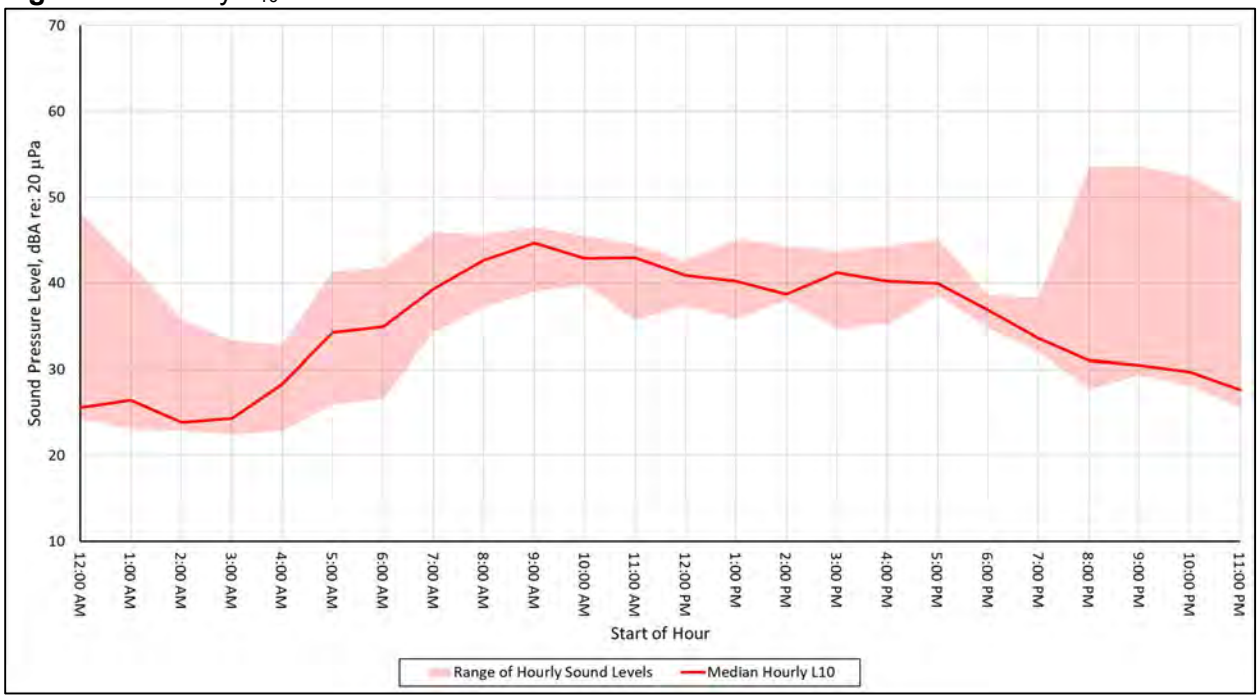
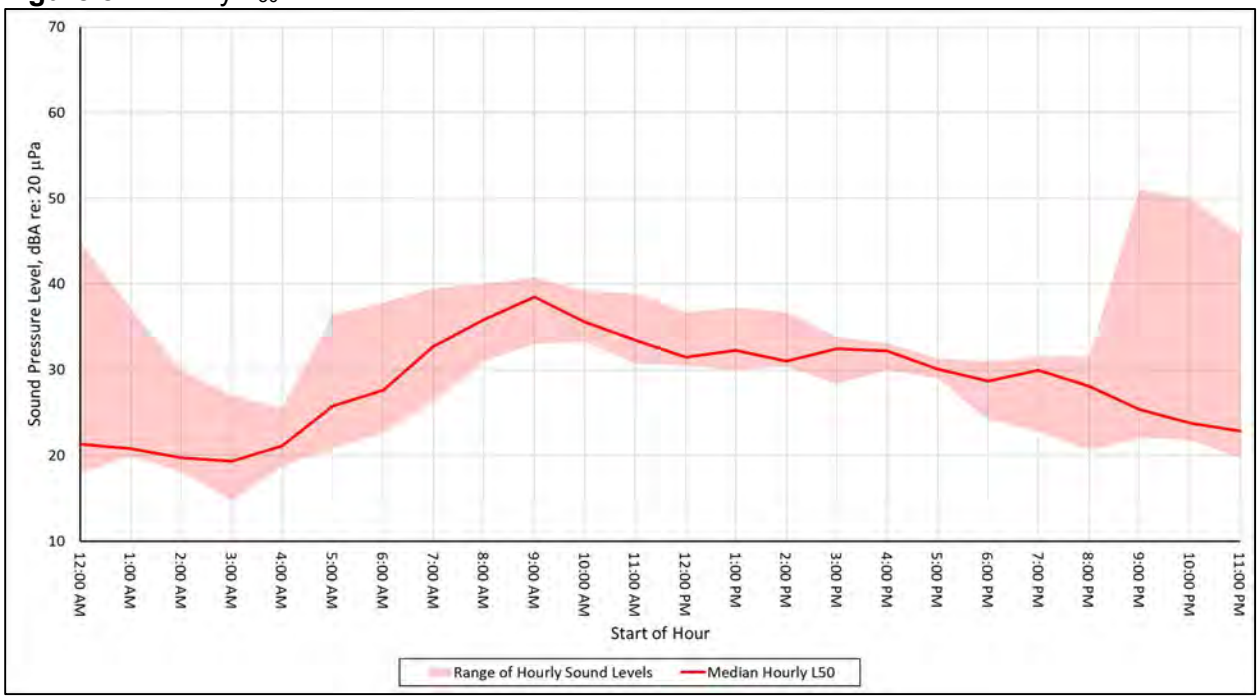


Figure 8.2 Hourly L_{50} Sound Levels over Measurement Period - Location 1



8.2 Location 2 Ambient Sound Levels

Bolded and underlined values shown in Table 8.3 and Table 8.4 represent hours when the landfill was operating.

Table 8.3 Hourly L_{10} Sound Levels - Location 2, dBA

Start of Hour	L_{10}				
	Friday 10/15/2021	Saturday 10/16/2021	Sunday 10/17/2021	Monday 10/18/2021	Tuesday 10/19/2021
12:00 AM		-	30	45	30
1:00 AM		34	30	37	33
2:00 AM		30	28	31	30
3:00 AM		27	30	29	29
4:00 AM		31	28	**31**	**33**
5:00 AM		37	33	**37**	**39**
6:00 AM		-	38	**40**	**41**
7:00 AM		**39**	41	**42**	**42**
8:00 AM		-	42	**42**	**42**
9:00 AM		-	41	**41**	**41**
10:00 AM		**41**	43	**41**	**43**
11:00 AM		-	46	**41**	**43**
12:00 PM		-	47	**41**	
1:00 PM	**44**	**43**	44	**41**	
2:00 PM	-	-	45	**41**	
3:00 PM	**39**	-	43	**43**	
4:00 PM	**40**	**42**	39	**45**	
5:00 PM	**39**	**43**	40	**44**	
6:00 PM	40	40	42	39	
7:00 PM	-	42	38	37	
8:00 PM	38	39	53	35	
9:00 PM	37	37	51	33	
10:00 PM	34	36	49	35	
11:00 PM	33	36	46	31	

Note: "-" denotes hours when a complete hour of data was not collected

Table 8.4 Hourly L_{50} Sound Levels - Location 2, dBA

Start of Hour	L_{50}				
	Friday 10/15/2021	Saturday 10/16/2021	Sunday 10/17/2021	Monday 10/18/2021	Tuesday 10/19/2021
12:00 AM		-	29	43	28
1:00 AM		28	29	35	30
2:00 AM		26	27	29	28
3:00 AM		26	29	27	28
4:00 AM		27	27	**28**	**30**
5:00 AM		29	29	**34**	**36**
6:00 AM		-	35	**38**	**39**
7:00 AM		**33**	38	**40**	**41**
8:00 AM		-	39	**40**	**40**
9:00 AM		-	38	**39**	**39**
10:00 AM		**37**	39	**38**	**41**
11:00 AM		-	43	**37**	**40**
12:00 PM		-	43	**38**	
1:00 PM	**37**	**38**	41	**38**	
2:00 PM	-	-	42	**39**	
3:00 PM	**34**	-	41	**39**	
4:00 PM	**35**	**36**	36	**40**	
5:00 PM	**34**	**35**	37	**40**	
6:00 PM	37	36	39	36	
7:00 PM	-	39	36	35	
8:00 PM	35	36	48	33	
9:00 PM	33	34	50	30	
10:00 PM	30	34	48	31	
11:00 PM	29	32	44	28	

Note: "-" denotes hours when a complete hour of data was not collected

Figure 8.3 Hourly L_{10} Sound Levels over Measurement Period - Location 2

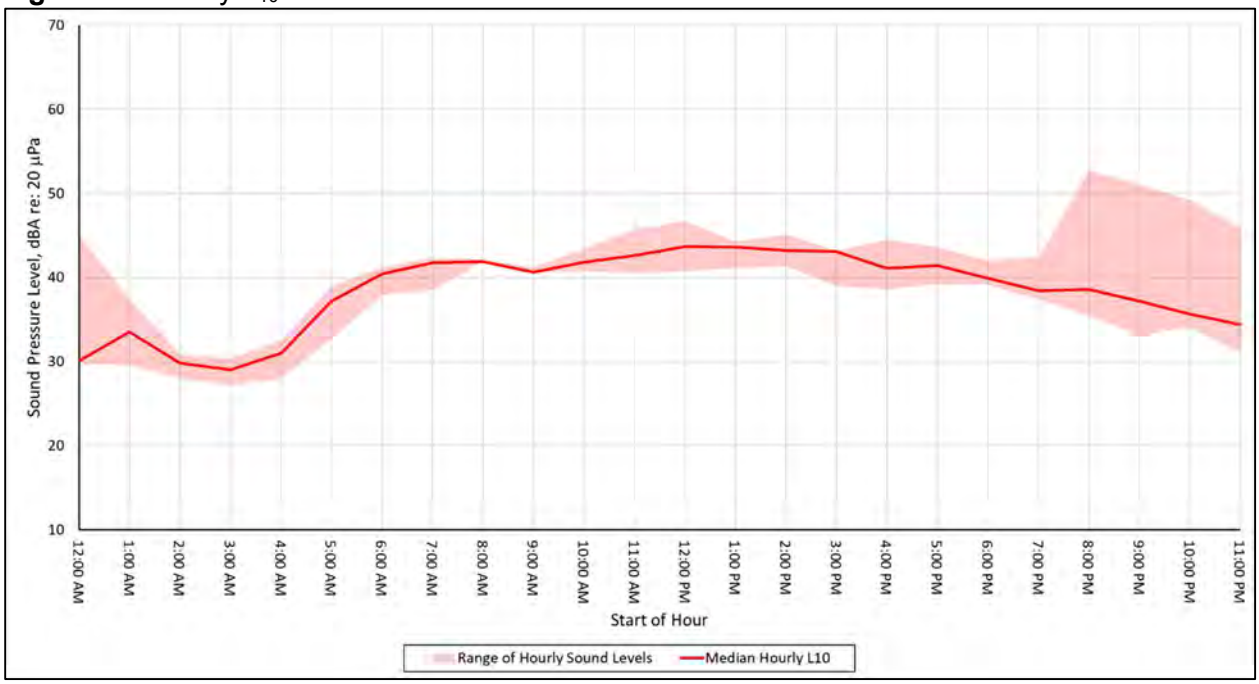
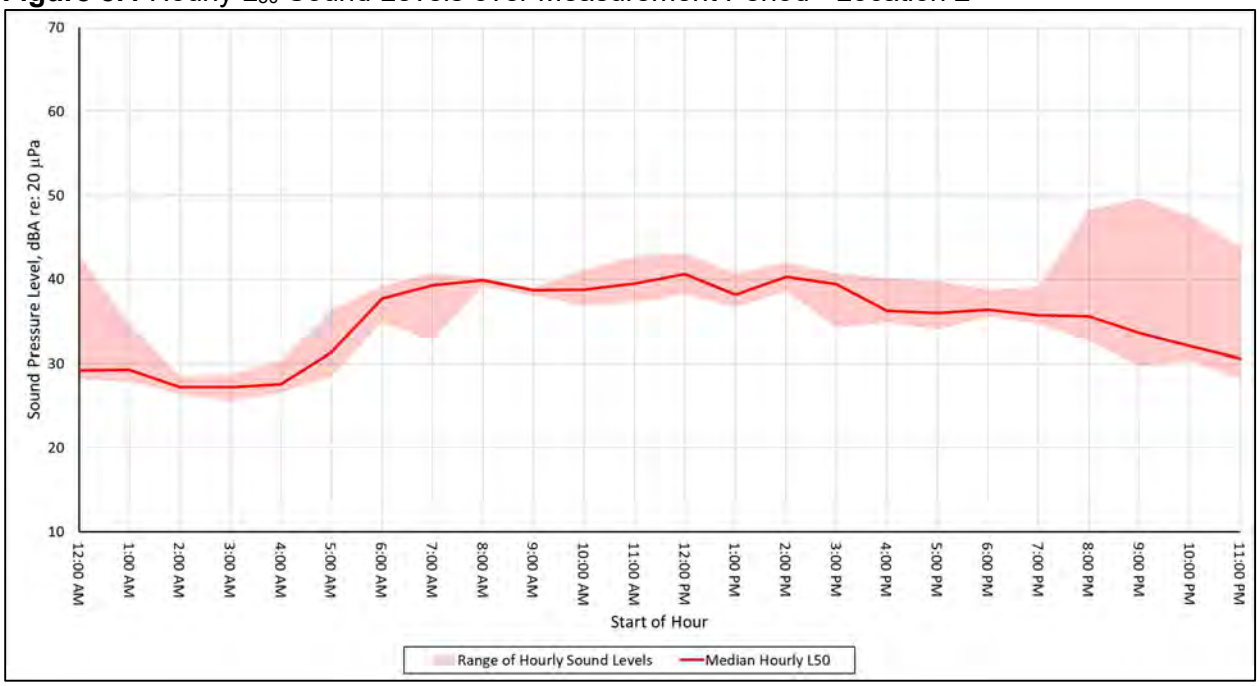


Figure 8.4 Hourly L_{50} Sound Levels over Measurement Period - Location 2



8.3 Location 3 Ambient Sound Levels

Bolded and underlined values shown in Table 8.5 and Table 8.6 represent hours when the landfill was operating.

Table 8.5 Hourly L_{10} Sound Levels - Location 3, dBA

Start of Hour	L_{10}				
	Friday 10/15/2021	Saturday 10/16/2021	Sunday 10/17/2021	Monday 10/18/2021	Tuesday 10/19/2021
12:00 AM		53	50	47	45
1:00 AM		51	48	43	48
2:00 AM		46	43	43	39
3:00 AM		42	38	48	46
4:00 AM		49	46	**53**	**51**
5:00 AM		51	50	**57**	**56**
6:00 AM		55	51	**59**	**58**
7:00 AM		**55**	54	**60**	**59**
8:00 AM		**57**	56	**59**	**58**
9:00 AM		-	56	**60**	**59**
10:00 AM		**59**	57	**60**	**58**
11:00 AM		**59**	58	**59**	
12:00 PM		**59**	58	**59**	
1:00 PM		**59**	58	**58**	
2:00 PM	**60**	**59**	58	**58**	
3:00 PM	**60**	**59**	58	**60**	
4:00 PM	-	**59**	58	**60**	
5:00 PM	**59**	**59**	57	**60**	
6:00 PM	-	57	57	58	
7:00 PM	56	56	56	56	
8:00 PM	-	55	54	55	
9:00 PM	56	53	53	54	
10:00 PM	55	52	51	52	
11:00 PM	52	51	50	49	

Note: "-" denotes hours when a complete hour of data was not collected

Table 8.6 Hourly L_{50} Sound Levels - Location 3, dBA

Start of Hour	L_{50}				
	Friday 10/15/2021	Saturday 10/16/2021	Sunday 10/17/2021	Monday 10/18/2021	Tuesday 10/19/2021
12:00 AM		42	34	41	29
1:00 AM		38	30	37	32
2:00 AM		28	27	34	29
3:00 AM		28	28	32	31
4:00 AM		34	29	**35**	**36**
5:00 AM		37	31	**49**	**47**
6:00 AM		46	35	**53**	**52**
7:00 AM		**47**	45	**55**	**55**
8:00 AM		**51**	48	**54**	**53**
9:00 AM		-	50	**54**	**52**
10:00 AM		**54**	52	**54**	**53**
11:00 AM		**55**	53	**54**	
12:00 PM		**56**	54	**54**	
1:00 PM		**54**	54	**53**	
2:00 PM	**55**	**55**	54	**53**	
3:00 PM	**56**	**55**	53	**54**	
4:00 PM	-	**55**	53	**56**	
5:00 PM	**56**	**55**	52	**56**	
6:00 PM	-	52	51	54	
7:00 PM	51	50	50	50	
8:00 PM	-	48	47	47	
9:00 PM	49	45	48	46	
10:00 PM	48	43	44	39	
11:00 PM	36	42	42	33	

Note: "-" denotes hours when a complete hour of data was not collected

Figure 8.5 Hourly L_{10} Sound Levels over Measurement Period - Location 3

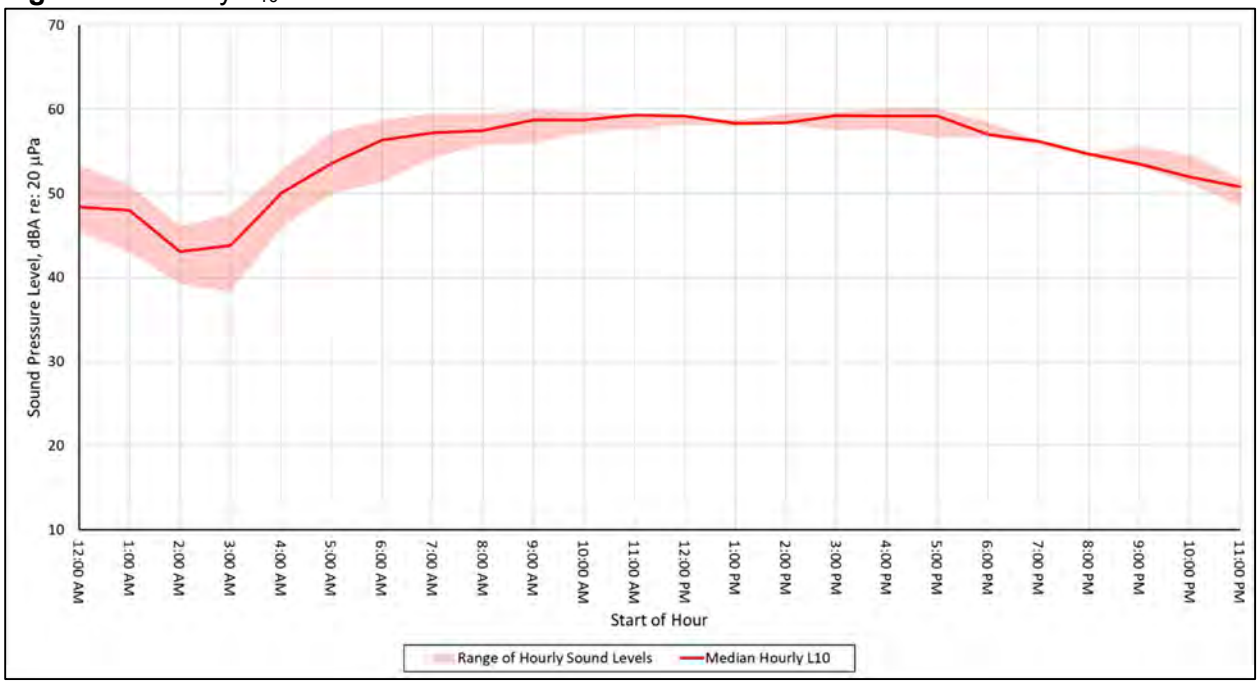
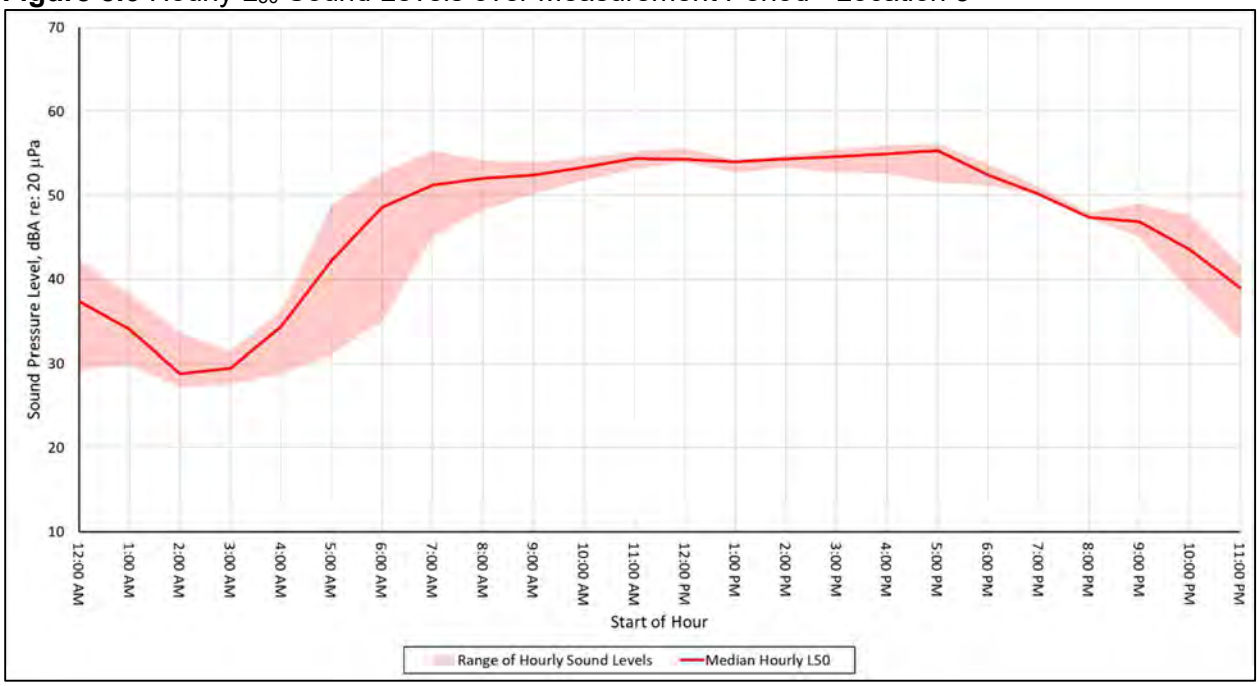


Figure 8.6 Hourly L_{50} Sound Levels over Measurement Period - Location 3



8.4 Location 4 Ambient Sound Levels

Bolded and underlined values shown in Table 8.5 and Table 8.6 represent hours when the landfill was operating.

Table 8.7 Hourly L_{10} Sound Levels - Location 4, dBA

Start of Hour	L_{10}									
	Thursday 1/13/2022	Friday 1/14/2022	Saturday 1/15/2022	Sunday 1/16/2022	Monday 1/17/2022	Tuesday 1/18/2022	Wednesday 1/19/2022	Thursday 1/20/2022	Friday 1/21/2022	Saturday 1/22/2022
12:00 AM		44	34	31	27	33	31	45	46	33
1:00 AM		41	36	28	27	36	31	44	43	30
2:00 AM		38	31	30	26	31	27	37	41	32
3:00 AM		38	30	32	27	33	28	35	39	33
4:00 AM		**39**	27	31	**29**	**33**	**37**	**42**	**41**	31
5:00 AM		**45**	27	32	**42**	**44**	**47**	**48**	**47**	29
6:00 AM		**44**	27	31	**46**	**46**	**51**	**46**	**48**	29
7:00 AM		**52**	**33**	33	**50**	**49**	**49**	**52**	**53**	**38**
8:00 AM		**55**	**42**	37	**54**	**51**	**51**	**51**	**54**	**46**
9:00 AM		**55**	**41**	36	**52**	**50**	**53**	**53**		**45**
10:00 AM		**55**	**40**	38	**53**	**48**	**51**	**54**	**53**	**46**
11:00 AM		**52**	**41**	36	**50**	**49**	**52**	**52**	**54**	**45**
12:00 PM		**53**	**42**	40	**50**	**47**	**51**	**52**	**54**	**43**
1:00 PM	**53**	**49**	**39**	38	**50**	**47**	**51**	**53**	**54**	**45**
2:00 PM	**53**	**51**	**42**	38	**50**	**47**	**52**	**52**	**50**	**46**
3:00 PM	**50**	**50**	**40**	39	**49**	**48**	**49**	**53**	**50**	
4:00 PM	**48**	**48**	**41**	39	**45**	**45**	**48**	**50**	**47**	
5:00 PM	**43**	**46**	**39**	39	**43**	**44**	**45**	**47**	**44**	
6:00 PM	44	47	40	36	40	38	39	49	46	
7:00 PM	41	47	40	34	36	30	40	48	43	
8:00 PM	46	45	41	33	32	30	41	48	43	
9:00 PM	43	41	38	32	35	37	41	46	39	
10:00 PM	40	39	35	28	33	28	40	45	35	
11:00 PM	45	37	30	33	37	32	42	45	33	

Note: "-" denotes hours when a complete hour of data was not collected

Table 8.8 Hourly L_{50} Sound Levels - Location 4, dBA

Start of Hour	L_{50}									
	Thursday 1/13/2022	Friday 1/14/2022	Saturday 1/15/2022	Sunday 1/16/2022	Monday 1/17/2022	Tuesday 1/18/2022	Wednesday 1/19/2022	Thursday 1/20/2022	Friday 1/21/2022	Saturday 1/22/2022
12:00 AM		40	30	27	24	26	27	42	42	29
1:00 AM		39	29	25	25	25	26	40	40	27
2:00 AM		34	27	26	24	25	25	35	38	29
3:00 AM		34	25	28	24	25	24	34	35	29
4:00 AM		**34**	24	27	**25**	**27**	**30**	**34**	**37**	28
5:00 AM		**40**	24	27	**34**	**34**	**38**	**43**	**41**	26
6:00 AM		**39**	24	27	**37**	**39**	**46**	**42**	**42**	26
7:00 AM		**44**	**28**	26	**40**	**41**	**41**	**41**	**46**	**30**
8:00 AM		**45**	**33**	28	**42**	**43**	**43**	**42**	**46**	**39**
9:00 AM		**45**	**32**	29	**42**	**42**	**44**	**43**		**38**
10:00 AM		**45**	**31**	30	**44**	**40**	**43**	**44**	**45**	**39**
11:00 AM		**43**	**31**	28	**41**	**41**	**41**	**42**	**45**	**35**
12:00 PM		**43**	**32**	29	**41**	**40**	**42**	**42**	**45**	**34**
1:00 PM	**47**	**40**	**31**	28	**41**	**39**	**42**	**43**	**45**	**37**
2:00 PM	**46**	**43**	**33**	30	**40**	**39**	**42**	**43**	**41**	**35**
3:00 PM	**45**	**41**	**33**	29	**38**	**39**	**41**	**43**	**41**	
4:00 PM	**40**	**36**	**31**	31	**35**	**38**	**37**	**40**	**39**	
5:00 PM	**36**	**38**	**30**	31	**30**	**33**	**34**	**39**	**38**	
6:00 PM	39	43	37	32	31	29	35	46	43	
7:00 PM	37	43	38	30	30	27	37	46	40	
8:00 PM	40	41	38	28	27	27	38	46	40	
9:00 PM	37	37	35	28	26	28	38	44	34	
10:00 PM	37	36	32	25	26	25	37	42	32	
11:00 PM	41	33	27	28	26	27	39	41	29	

Note: "-" denotes hours when a complete hour of data was not collected

Figure 8.7 Hourly L_{10} Sound Levels over Measurement Period - Location 4

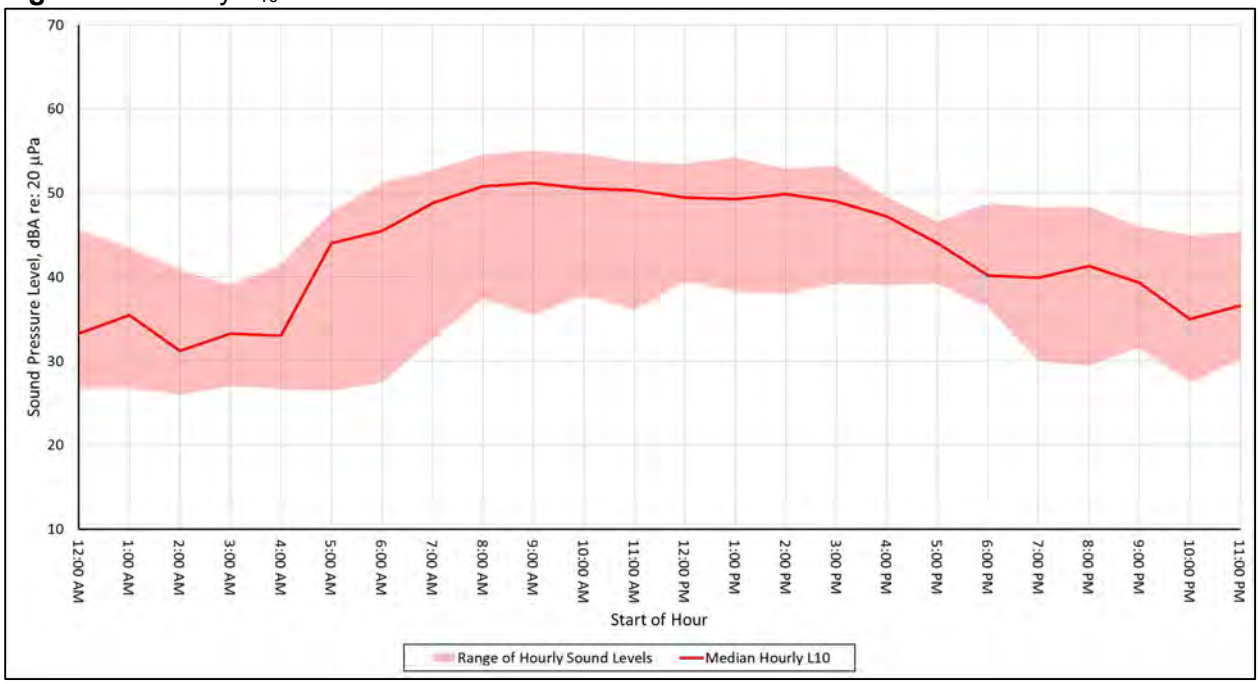


Figure 8.8 Hourly L_{50} Sound Levels over Measurement Period - Location 4

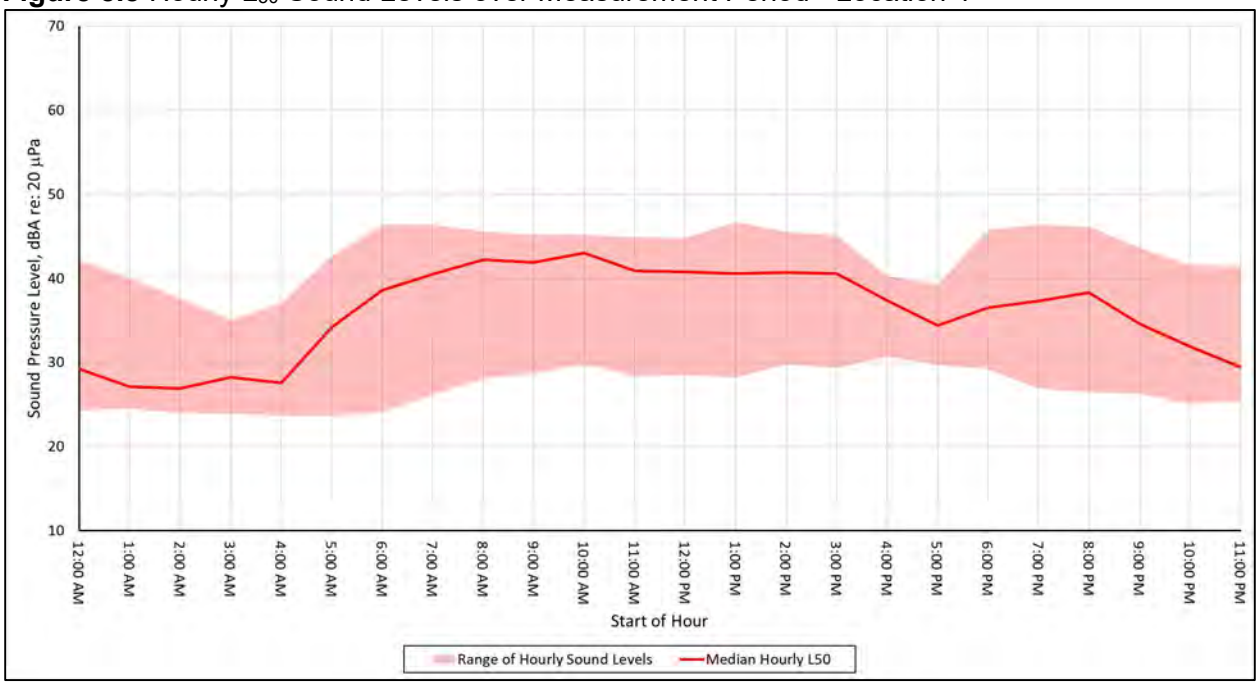


EXHIBIT 12
WEAVER CONSULTING GROUP FINDINGS ON ODOR

Weaver Consultants Group

7340 E. CALEY AVENUE, SUITE 110
CENTENNIAL, COLORADO 80111
PHONE: (720) 529-0132
FAX: (720) 529-0137

MEMORANDUM

To:	Ian Macnab Valley Landfills, Inc.	**Date:**	April 26, 2024
From:	Melissa Green Matt Stutz, P.E. Weaver Consultants Group	**Project No:**	0120-174-50-47-00
Re:	Findings on Odor Coffin Butte Landfill		

On December 7, 2021, the Planning Commission of the Benton County Community Development Department issued findings with respect to the proposed Coffin Butte Landfill (CBLF) Expansion. Valley Landfills, Inc. requested Weaver Consultants Group (WCG) to respond to the Planning Commission findings related to odor as it relates to air quality. WCG provides professional services to the solid waste industry across the nation, including the pacific northwest. WCG provides regulatory permitting and regulatory compliance services specific to air quality regulations at CBLF. CBLF is regulated under the US Environmental Protection Agency (USEPA) and the Oregon Department of Environmental Quality (ODEQ) and operates under an air quality permit issued by ODEQ. The purpose of this memorandum is to respond to the findings related to odor. WCG has provided the specific finding in ***italic bold*** font followed by WCG's response.

Planning Commission Findings:

Odor: Methane emission rules do not capture the impacts to the character and use of the area because many people testified that the smell inhibits them from going outside and enjoying the use of their property. Property owners within miles of the site stated they could smell the landfill. The current mitigation of an earthen cap over cells does not mitigate smell and smell reflects emissions of other gases such as Volatile Organic Compounds (VOCs) and hydrogen sulfide. The same mitigation is proposed for the expansion and if it currently does not mitigate the odor then it cannot be used as a mitigation for the future and be expected to minimize the concern.

Weaver Consultants Group offers the following to address landfill odors in general as well as providing site-specific data and information for CBLF, which documents metrics and submittals provided to the ODEQ.

Landfilling of solid waste is a generally accepted practice in the US. The practice is such that as waste is received at CBLF, it is immediately placed in the active area of the landfill. A landfill in total may have an area of 100 acres or more in overall size, but the area where the waste is placed

on a given day is much smaller. For CBLF, this day-to-day active area is less than ½-acre. Through the daily landfilling process, odors can be present in the active area and are similar to the odors of waste disposed of from residential households. To manage this, a 6-inch layer of soil or alternative daily cover (ADC) is spread at the end of each day over the top of the ½-acre active area. Typically, the active areas do not change in size with an expansion; rather, the active area will move depending on the operational need of the landfill. Therefore, the expansion should not increase the odor impacts of the active area as compared to the existing operation.

The reference to the use of "earthen cap over cells", also known as daily and intermediate soil cover, to mitigate odors has been proven in all climatic regions to be an effective means in mitigating odor. This 6-inch soil layer is found in the USEPA regulations, the ODEQ regulations, and is also referenced in the Solid Waste Association of North America (SWANA) Technical Policies Manual. SWANA is a non-profit organization who utilizes experts across North America to develop best practices for landfills. Additional information will be provided surrounding this soil cover layer later in this document.

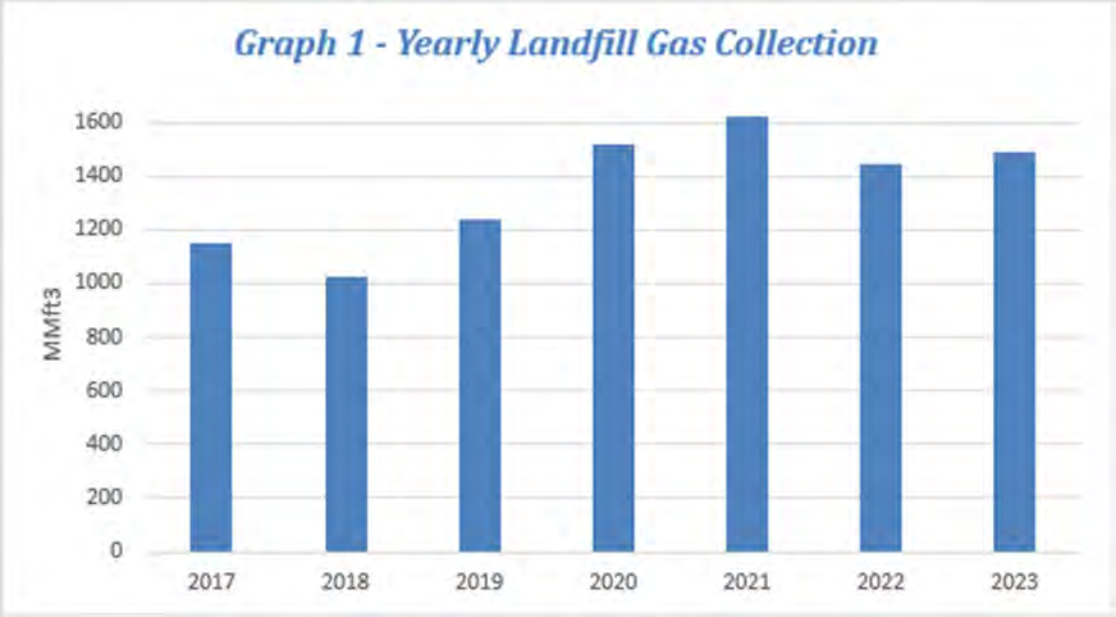
Landfill Gas Collection and Control

CBLF actively extracts landfill gas (LFG) out of the landfill in an effort to assist in controlling the mitigation of LFG. The following sections outline site-specific data related to this in addition to other odor control measures used at the landfill.

Over time, the waste placed in a landfill begins to decompose. One of the bi-products of this decomposition is a biogas referred to as LFG. LFG gas is generally considered to be 50% methane and 50% carbon dioxide. However, there are some trace compounds like hydrogen sulfide and VOCs generated within the landfill. To collect the LFG, the CBLF has a landfill gas collection and control system (GCCS). The GCCS is the main component and in conjunction with daily and intermediate soil cover is used for mitigating the potential odors. The installation of the GCCS is regulated by both the USEPA and the ODEQ. As outlined in the landfill expansion, the GCCS will continue to be used and expanded with the landfill.

Oregon currently has one of the most stringent landfill emissions standards in the United States. The current GCCS at the site includes over 350 collection points. Under the USEPA and ODEQ air regulations, landfills are required to install LFG extraction wells where waste is in place more than 5 years. However, CBLF installs LFG extraction wells every year typically in waste that is at most 1 year old to minimize off-site odors.

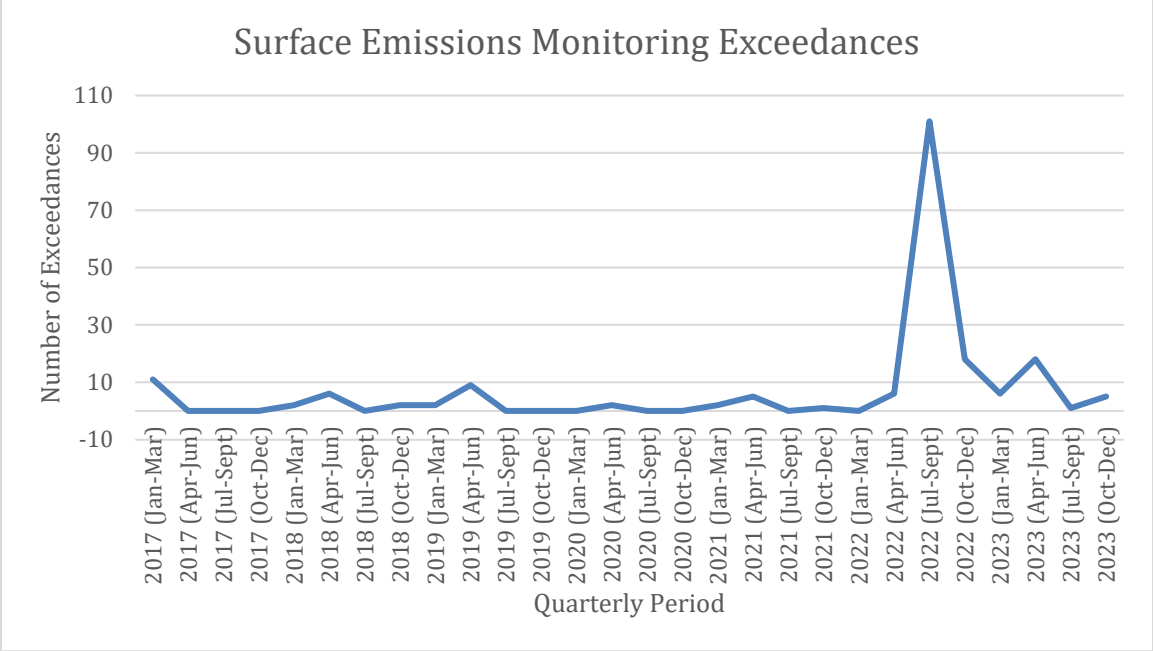
In an effort to understand the impact of the GCCS collection system on the landfill, WCG reviewed the LFG collection rates to look for trends. The following graph shows annual collected LFG.



As depicted in the graph, the gas collection has increased from 2018 to 2021. In 2022 the gas collection slightly decreased but then increased in 2023. These slight variances in gas collection are to be expected as gas generation and gas collection are dependent on several variables that include environmental and biological conditions.

Surface Emission Monitoring

To document the performance of the GCCS efficiency, CBLF has a comprehensive surface emissions monitoring (SEM) program. This SEM program consists of walking the surface of the landfill each quarter with a handheld meter which is held 2-4 inches from the landfill's surface. The meter continuously samples the air from the landfill surface to determine areas where LFG might be emitted. Should LFG be detected at 500 parts per million (ppm) methane above background, corrective action is taken, and the area is repaired and re-monitored. This method allows verification of how well CBLF is collecting and controlling LFG and reducing the potential of off-site odors. A review of the SEM data for CBLF shows that there have been very few instances where LFG was detected coming from the landfill's surface. The following graph provides data for each quarter since 2017 with the associated number of exceedances that occurred during the SEM. In the third quarter of 2022, the landfill commenced compiling with the new Oregon Administrative Rule Chapter 340 Division 239 for Landfill Gas Emissions that implemented new SEM requirements such as integrated monitoring. CBLF implemented corrective action on the exceedance locations and the quarterly exceedances have decreased in the SEM events since third quarter 2022.



Soil Cover

As mentioned previously, the landfill soil cover acts as a filter for LFG that are not collected by the GCCS. The portion of uncollected gas must first pass through the landfill's cover soils before being emitted. As it passes through these cover soils, the gases are reduced by oxidative and biological processes. Numerous studies have shown that a significant portion of the hydrogen sulfide (H_2S) in the uncollected gas is converted to sulfide minerals within the cover soils and therefore not released. [1]

USEPA has recognized the effects of methane oxidation in determining LFG emissions and has incorporated cover soil oxidation into calculations. These USEPA regulations recognize that up to 35% of methane in LFG that reaches the soil may be oxidized and therefore not emitted. A review of the soil cover logs for the facility indicate that soil covers or ADCs have been in continual use at the site.

[1] Cristine Plaza, Qiyong Xu, Timothy Townsend, Gabriel Bitton, Matthew Booth, *Evaluation of alternative landfill cover soils for attenuating hydrogen sulfide from construction and demolition (C&D) debris landfills*, Journal of Environmental Management, Volume 84, Issue 3(2007).

Y. Ding, Chaun Yu Cai, J. Xiong, A. Qian, J. Wei, B. Hu, W. Wu, Z. Han, H. Zhang, W. Ni, *Evaluation of Alternative Cover Materials for Reducing Hydrogen Sulfide Emission from Municipal Solid Waste (MSW) Landfills*, Transactions of the ASABE. 59. 949-957. 10.13031/trans.59.11711 (2016).

Ruo He , Fang-Fang Xia, Yun Bai, Jing Wang, Dong-Sheng Shen, *Mechanism of H2S removal during landfill stabilization in waste biocover soil, an alternative landfill cover*, Journal of Hazardous Materials, 217–218:67–75 (March 2012).

As an added measure, CBLF incorporates the use of a plastic liner over the top of various landfill areas which are not in use. The plastic liner provides an added measure of barrier against potential migrating odors.

CBLF has installed final cover in addition to the soil cover on nearly 40% of the landfill surface to assist in reducing off-site odors. Final cover is a multilayered system of various materials which are primarily used to reduce the amount of stormwater that will enter a landfill after closing and control the migrations of LFGs. Landfills are not required to install final cover until the landfill is no longer accepting waste. However, CBLF has installed final cover well before it is required regulatorily.

Site Odor Monitoring

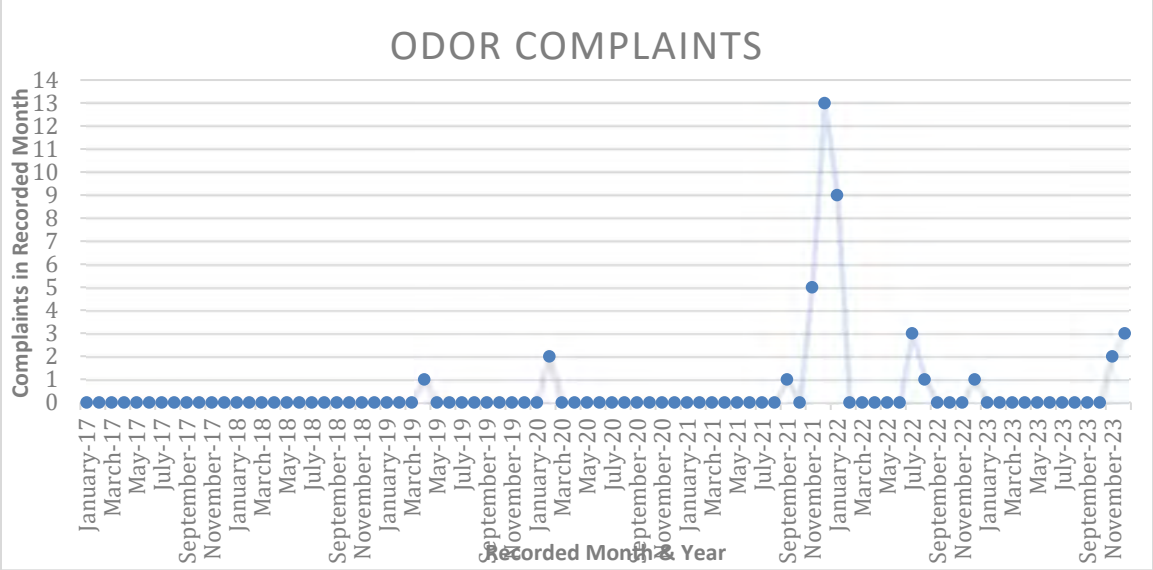
The site performs daily odor monitoring. This monitoring includes driving a loop starting at the office, travel west to Tampico, and then north of Coffin Butte Landfill, south on Highway 99, and then back to the site on Tampico. Landfill leaders complete an online Odor Management Training course and site employees complete annual training on odor monitoring. CBLF maintains a site-specific odor management plan that is updated annually or as needed. The plan includes, but is not limited to, information such as actions to take when odors are detected, identifying sources of odor, and methods for controlling odors at the site. A routine odor inspection is completed during every odor patrol. The inspections include, but are not limited to, information such as local weather data (temperature, wind direction, etc.), if any odors were detected, and odor details (such as location, type, distance from facility, possible sources, etc.). Complaints are documented and are investigated as soon as reasonably possible. Complaints and inspections are reviewed monthly by the Environmental Compliance Team.

In addition, the site also tracks and reports odor complaints it receives monthly. The following is a review of the odor complaints received at the site over time.

The following graph incorporates two sets of data:

1. Complaints received at the local level;
2. Complaints received at ODEQ.

One variable the graph does not show is the timing of the complaints.



Conclusion

Based on the review of the information above, CBLF's compliance with USEPA and ODEQ regulations, the implementation of industry best practices, and the data provided indicates that there has not been a significant impact to human health and environment related to LFGs or odors. An evaluation of key landfill control measures and data points do not indicate a widespread release of LFG or odors. The CBLF trends indicate the following:

- There was an increase in total gas collected from 2022 to 2023.
- Besides the spike that occurred in third quarter 2022 which appears to be related to the implementation of new SEM requirements, the surface emission exceedances are consistently low.
- The number of odor complaints from January 2017 until September 2021 was four, while there were 27 complaints from November 2021 until January 2022 which appear to be related to the public comment of the proposed landfill expansion From February 2022 through December 2023, the odor complaints once again ranged from 0 to 3 per month.
- The on-site data and the offsite data suggest that CBLF works to aggressively and actively implement measures to control potential off-site odors to the community.

EXHIBIT 13
NOVEMBER 19, 2021 MEMORANDUM FROM IAN MACNAB REGARDING ODOR, METHANE AND HYDROGEN SULFIDE

Date: November 19, 2021

To: Benton County Planning Department
From: Ian Macnab, Environmental Manager, Coffin Butte Landfill

Re: Coffin Butte Landfill Conditional Use Permit Application LU-21-047 – Odor, Methane and Hydrogen Sulfide

The purpose of this memorandum is to provide additional information on how odor, methane and hydrogen sulfide are controlled at Coffin Butte Landfill. These three items are highly interconnected and to a large degree act as one. They are all different constituents of landfill gas and are primarily regulated by the site's Title V air permit. See attachment A for a copy of the permit.

Beginning at Table 1, the permit lists the emissions units that are regulated at the landfill. Nuisance conditions, including odors or offsite dust, are regulated on page 5 of the permit.

Table 3 conditions 13.4 – 13.12 and 13.24 are all requirements to ensure landfill gas (methane) is collected and odors (hydrogen sulfide) reduced. It includes requirements for:

- Recordkeeping
- Installing a gas collection system sufficient for calculated gas flow rates
- Operation of the collection system
- Operation of the flare to destroy gas not utilized by the power plant

For each permit condition the table also references the appropriate federal regulations (40 CFR 60.75X) the landfill is subject to.

Beginning on the bottom of page 15 and continuing through page 19 the permit describes the Plant Site Emission Limits (PSELs). PSELs regulate how much can be emitted, how emissions are calculated and how emissions are monitored. Hydrogen sulfide is included with other sulfur compounds in the SO_2 category.

Finally, starting on page 20, the permit lists reporting requirements to DEQ and EPA. The expansion area would have all the same air permit requirements and limitations.

Additionally, regarding hydrogen sulfide, we have laboratory data from 2019 showing very low to non-detect levels of this compound in Coffin Butte's landfill gas. See attachment B for the laboratory report. The three samples taken directly from our gas collection system infrastructure measured:

- Sample 1 – 8.6 ppmv
- Sample 2 – non-detect
- Sample 3 – non-detect

As reference, EPA AP-42 Compilation of Air Pollutant Emission Factors, which is used for calculating landfill hydrogen sulfide emissions for Title V air permits uses an assumed value of 36 ppmv. Our emissions were well below this assumed value. Additionally, these samples were taken directly from the landfill gas pipeline. Actual emissions to the air from the surface of the landfill will be much lower as they would be highly diluted by ambient air.

As far as reduction in odors from the use of cover, that is addressed in our DEQ solid waste permit. See attachment C. The permit references that the permit is in accordance with ORS 459 and OAR Chapter 340.

Section 9.5 address daily cover and states:
"At the end of each working day the permittee must cover all solid waste with a six inch, or thicker, layer of compacted soil or DEQ-approved, alternative daily cover."

Section 9.6 addresses interim cover section and states:
"As specified in the DEQ-approved design and operation plans, the permittee must place and maintain interim cover over fill areas that will not receive additional waste for an extended period of time [i.e., greater than 120 days] and actively revegetate, in a DEQ-approved manner, any interim cover that will remain exposed for more than two years."

Coffin Butte is subject to regular DEQ inspections of the site and our compliance with permit conditions 9.5 and 9.6 are shown by our inspection

results. We have not been issued a violation for failure to properly cover with daily or intermediate cover.

Landfills are highly regulated by state and federal agencies. We submit reports on a monthly, quarterly, semi-annually, and annual basis depending on the permit requirements. Copies of these reports are provided to Benton County on a quarterly basis for their review.

Attachments:
A – Coffin Butte DEQ Title V Permit
B – 2019 Hydrogen Sulfide Test Report
C – Coffin Butte DEQ Solid Waste Permit

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Western Region-Salem Office
750 Front Street NE, Suite 120
Salem, OR 97301-1039
Telephone (503) 378-8240

Issued in accordance with the provisions of ORS 468A.040
and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

INFORMATION RELIED UPON:

Application Number: 23594
Received: 01/30/09

PLANT SITE LOCATION:

Coffin Butte Landfill
Highway 99 & Coffin Butte Road
Corvallis, OR 97330

LAND USE COMPATIBILITY STATEMENT:

Issued by: Benton County
Dated: 03/06/97

ISSUED BY THE DEPARTEMENT OF ENVIRONMENTAL QUALITY

Claudia Davis

Claudia Davis, Western Region Air Quality Manager

OCT 3 0 2009

Date

Nature of Business: Municipal Solid Waste Landfill

SIC: 4953

RESPONSIBLE OFFICIAL

Title: General Manager
Alternate: Vice President

FACILITY CONTACT PERSON

Name: Brian May
Title: General Manager
Phone: (541) 745-2018

TABLE OF CONTENTS

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT....3

PERMITTED ACTIVITIES....4

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION....4

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING, AND RECORDKEEPING REQUIREMENTS....4

Facility-wide Requirements....4
Emissions Units PIR and UPR Requirements....14
Emissions Unit TIP Requirements....15
Insignificant Activities Requirements....15

PLANT SITE EMISSION LIMITS....15

GENERAL TESTING REQUIREMENTS....18

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS....19

REPORTING REQUIREMENTS....20

EMISSION FEES....22

NON-APPLICABLE REQUIREMENTS....23

GENERAL CONDITIONS....24

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT

ACDP	Air Contaminant Discharge Permit	NA	Not applicable
Act	Federal Clean Air Act	NESHAP	National Emission Standard for Hazardous Air Pollutants
ASTM	American Society of Testing and Materials	NMOC	Nonmethane organic compounds
Btu	British thermal unit	NO_x	Nitrogen oxides
CFR	Code of Federal Regulations	NSPS	New Source Performance Standards
CO	Carbon monoxide	O_2	Oxygen
CPMS	Continuous parameter monitoring system	OAR	Oregon Administrative Rules
DEQ	Department of Environmental Quality	ODEQ	Oregon Department of Environmental Quality
dscf	Dry standard cubic feet	ORS	Oregon Revised Statutes
EF	Emission factor	O&M	Operation and maintenance
EPA	US Environmental Protection Agency	Pb	Lead
		PCD	Pollution control device
EU	Emissions unit	PM	Particulate matter
FCAA	Federal Clean Air Act	PM_{10}	Particulate matter less than 10 microns in size
FSA	Fuel sampling and analysis		
gr/dscf	Grain per dry standard cubic feet (1 pound = 7000 grains)	ppm	Parts per million
		PSEL	Plant Site Emission Limit
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040	SIP	State Implementation Plan
		SO_2	Sulfur dioxide
HCFC	Halogenated Chloro-Fluoro-Carbons	SSM	Startup, shutdown, malfunction
		ST	Source test
H_2S	Hydrogen sulfide	VE	Visible emissions
ID	Identification number or label	VMT	Vehicle miles traveled
I&M	Inspection and maintenance	VOC	Volatile organic compounds
LFG	Landfill gas		

Modified EPA Method 9: As used in this permit "Modified EPA Method 9" is defined as follows:

> Opacity must be measured in accordance with EPA Method 9. For all standards, the minimum observation period must be six minutes, though longer periods may be required by a specific rule or permit condition. Aggregate times (e.g., 3 minutes in any one hour) consist of the total duration of all readings during the observation period that are equal to or greater than the opacity percentage in the standard, whether or not the readings are consecutive. Each EPA Method 9 reading represents 15 seconds of time. [See also the definition of "Opacity" in OAR 340-208-0010]

PERMITTED ACTIVITIES

1. Until such time as this permit expires or is modified or revoked, the permittee is allowed to discharge air contaminants from those processes and activities directly related to or associated with air contaminant source(s) in accordance with the requirements, limitations, and conditions of this permit. [OAR 340-218-0010 and 340-218-0120(2)]

2. All conditions in this permit are federally enforceable except as specified below:

   2.a. Conditions 6 through 12, G5, and G9 (OAR 340-248-0005 through 0180) are only enforceable by the state. [OAR 340-218-0060]

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION

3. The emissions units regulated by this permit are the following [OAR 340-218-0040(3)]:

Table 1. EU and PCD IDENTIFICATION

Emission Unit Description	EU ID	Pollution Control Device Description	PCD ID
Landfill Gas Control System	Control	Open Flare	FL
Fugitive Landfill Gas, Cell 0	F-LFG1	None	NA
Fugitive Landfill Gas, Cells 1 to 4	F-LFG2	Landfill gas collection and extraction system	LFGCES-1
Vehicle traffic on paved roads	PIR	Water application	NA
Vehicle traffic on unpaved roads	UPR	Chemical suppressant and water application	NA
Tipper	TIP	None	NA
Petroleum contaminated soils	PCS	None	NA
Aggregate Insignificant activities:	AI		
Cell development, operation, and closing		None	NA
Wastewater treatment system operation		Baghouse	DC-1
Leachate collection and wastewater treatment		None	NA
Portable light plant		None	NA
Trash pumps		None	NA
Generator		None	NA

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING, AND RECORDKEEPING REQUIREMENTS

The following tables and conditions contain the applicable requirements along with the testing, monitoring, and recordkeeping requirements for the emissions units to which those requirements apply.

Facility-wide Requirements

Table 2. Facility wide emission limits and standards

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0210(2)	4	Fugitive emissions	Minimize	NA	NA	5
340-208-0300	6	Air contaminants	No nuisance	NA	NA	8
340-208-0450	7	PM >250μ	No fallout	NA	NA	8
340-248-0280(10)	9	Asbestos disposal	Handling procedures	Recordkeeping	NA	10
340-248-0280(11)	11	Asbestos cover	Maintain cover	Recordkeeping	NA	12

Fugitive Emissions

4. Applicable Requirement: The permittee must not allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. Such reasonable precautions must include, but not be limited to the following: [OAR 340-208-0210(2)]

   4.a. use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;
   4.b. application of asphalt, oil, water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts;
   4.c. full or partial enclosure of materials stockpiles in cases where application of oil, water, or chemicals are not sufficient to prevent particulate matter from becoming airborne;
   4.d. installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
   4.e. adequate containment during sandblasting or other similar operations; and,
   4.f. covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne.

5. Monitoring Requirement: At least once each week for a minimum period of 30 minutes, the permittee must visually survey the plant for any sources of excess fugitive emissions using EPA Method 22. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions generated by fugitive sources that leave the plant site boundaries. The person conducting the observation does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including using the proper location to observe visible emissions. If sources of visible emissions are identified, the permittee must: [OAR 340-218-0050(3)(a)]

   5.a. immediately take corrective action to minimize the fugitive emissions, including but not limited to those actions identified in Condition 4; or,
   5.b. conduct a Modified EPA Method 9 test within 24 hours;
   5.c. Recordkeeping: The permittee must maintain records of the fugitive emissions surveys, corrective actions (if necessary), and/or the results of any modified EPA Method 9 tests.

Nuisance Conditions

6. Applicable Requirement: The permittee must not cause or allow air contaminants from any source to cause a nuisance. Nuisance conditions will be verified by Department personnel. [OAR 340-208-0300] This condition is enforceable only by the State.

7. Applicable Requirement: The permittee must not cause or permit the emission of any particulate matter larger than 250 microns in size at sufficient duration or quantity, as to create an observable deposition upon the real property of another person. The Department will verify that the deposition exists and will notify the permittee that the deposition must be controlled. [OAR 340-208-0450] This condition is enforceable only by the State.

8. Monitoring Requirement: The permittee must maintain a log of each air quality complaint received by the permittee during the operation of the facility and must provide the Western Region-Salem Office of the Department with written notification within 5 days of all nuisance complaints regarding fugitive dust, odors, or particulate deposition received. Documentation shall include date of contact, time of observed nuisance condition, description of nuisance condition, location of receptor, status of plant operation during the observed period, and time of response to complainant. A plant representative must immediately investigate the condition following the receipt of the nuisance complaint and a plant representative must provide a response to the complainant within 24 hours, if possible. This condition is only enforceable by the State. [OAR 340-218-0050(3)(a)]

Asbestos Disposal and Cover

9. Applicable Requirement: The permittee must meet the asbestos-containing material handling and disposal requirements and procedures specified in OAR 340-248-0280(10) for active waste disposal sites. This condition is only enforceable by the state.

10. Monitoring Requirement: The permittee must monitor the asbestos-containing material handling and disposal procedures, provide notifications, and record the information required as specified in OAR 340-248-0280(10) for active waste disposal sites. This condition is only enforceable by the State.

11. Applicable Requirement: The permittee must meet the asbestos-containing material disposal and cover standards specified in OAR 340-248-0280(11) for inactive waste disposal sites. This condition is only enforceable by the State.

12. Monitoring Requirement: The permittee must monitor the asbestos-containing disposal and cover requirements and provide notifications as specified in OAR 340-248-0280(11) for inactive waste disposal sites. This condition is only enforceable by the State.

Facility Wide Requirements

13. The following requirements apply facility wide, including, but not limited to, the solid municipal waste landfill, unless an alternate requirement is specifically stated for a particular emissions unit.

Table 3. Summary of NSPS and NESHAP requirements:

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.1	40 CFR 60.7(a)(4); 40 CFR 60.7(b); 40 CFR 60.7(f)	Notification and recordkeeping.	Maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the affected facility. Maintain a file of all measurements and performance testing measurements and all other information required by this part recorded in a permanent form suitable for inspection.	Permittee shall furnish prior written or e-mail notification of any physical or operational change which may increase the emission rate of any air pollutant (such as taking operating gas collection wells off line) to which a standard applies to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 [40 CFR 60.4(a)]
13.2	40 CFR 60.11(d)	Maintain and operate any affected emission unit with good air pollution control practice for minimizing emissions.	None specified.	No additional monitoring required.
13.3	40 CFR 60.12	Circumvention.	None specified.	No additional monitoring required.
13.4	40 CFR 60.752(b)(2)(ii)(A); 40 CFR 60.753(a); 40 CFR 60.755(b) (Landfill NSPS Subpart WWW)	Install, within 60 days, and operate active collection system wells that collect gas from each area, cell, or group of cells in the landfill in which solid waste has been placed for: (1) 5 years or more if active, OR (2) 2 years or more if closed or at final grade.	None specified.	No additional monitoring required.

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.5	40 CFR 60.752(b)(2)(iii)(A) (Landfill NSPS Subpart WWW)	Install an active collection system that is designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment.	To calculate maximum expected gas flow rate: $Q_m = \sum_{i=1}^{n} 2kL_oM_i\left(e^{-kt_i}\right)$ where, Q_m=maximum expected gas generation flow rate, m^3/yr k=methane generation rate constant, $year^{-1}$ L_o=methane generation potential, m^3/Mg solid waste M_i=mass of solid waste in the ith section, Mg t_i=age of the ith section, years [40 CFR 60.755(a)(1)(ii)]	Submit monthly report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 Monthly report shall include the date of installation and the location of each well or collection system expansion added. [40 CFR 60.757(f)]
13.6	40 CFR 60.752(b); 40 CFR 60.754(a); 40 CFR 60.757(b); 40 CFR 60.4(a) (Landfill NSPS Subpart WWW)	Calculate the NMOC emission rate for the landfill. If the calculated NMOC emission rate is less than 50 Mg/yr, the permittee shall recalculate the NMOC emission rate and submit emission reports to the Department until such time as the calculated NMOC emission rate is ≥ 50 Mg/yr, or the landfill is closed.	Calculate the NMOC emission rate: $M_{NMOC} = \sum_{i=1}^{n} 2kL_oM_i(e^{-kti})(C_{NMOC})(3.6x10^{-9})$ where, M_{NMOC}=Total NMOC emission rate from the landfill (Mg/yr) k=methane generation rate constant=0.05 yr^{-1} or as determined using Tier 3 per 40 CFR 60.754 (a)(4) L_o=methane generation potential=170 m^3/Mg solid waste M_i=mass of solid waste in the ith section (Mg) t_i=age of the ith section (yr) C_{NMOC}=4000 ppm per 40 CFR 60.754(a)(3) $3.6x10^{-9}$=conversion factor The mass of the nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if properly documented. [40 CFR 60.754(a)(1)(i)]	The permittee shall submit an NMOC emission rate report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 (1) annually, OR (2) if the estimated NMOC emission rate as reported in the annual report is less than 50 Mg/yr in each of the next 5 consecutive years, the permittee may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. If option (2) is chosen, this estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to ODEQ at the address given above. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate. The NMOC emission rate report shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions. ODEQ may request such additional information as may be necessary to verify the reported NMOC emission rate. [40 CFR 60.4(a); 40 CFR 60.757(b)]
13.7	40 CFR 60.752(b)(2)(iii)(A); 40 CFR 60.759(a); 40 CFR 60.759(b) (Landfill NSPS Subpart WWW)	Install an activc collection system that is designed to collect gas at a sufficient extraction rate, sited at a sufficient density throughout all gas producing areas, and designed to minimize off-site migration of subsurface gas.	Nonc specified.	Keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector. Keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors. [40 CFR 60.758(d)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.8	40 CFR 60.753(b) (Landfill NSPS Subpart WWW)	Operate the LFG control system with negative pressure at each well-head except under the following conditions: (1) fire or increased well temperature; OR, (2) use of a geomembrane or synthetic cover; OR, (3) a decommissioned well. Passive gas collection wells do not have to meet this condition when approved in writing by the Department. Gas collection wells operating under an Alternative Operating and Monitoring Plan approved in writing by the Department do not have to meet this condition.	None specified.	Measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days. If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. [40 CFR 60.755(a)(3)] The annual report shall include record of instances when positive pressure occurred. [40 CFR 60.753(b)(1)]
13.9	40 CFR 60.753(c) (Landfill NSPS Subpart WWW)	Operate each interior wellhead in the LFG collection system with: (1) LFG temperature <55°C; AND, (2) either: (a) N_2 < 20%; OR, (b) O_2 < 5%. Passive gas collection wells do not have to meet this condition when approved in writing by the Department. Gas collection wells receiving a variance in writing from the Department concerning temperature do not have to meet this condition. Gas collection wells operating under an Alternative Operating and Monitoring Plan approved in writing by the Department do not have to meet this condition.	N_2 by RM 3C; O_2 by RM 3A, except that: (1) regulatory limit is between 20% and 50% of the span; AND, (2) data recorder not required; AND, (3) only 2 calibration gases are required; AND, (4) calibration error check not required; AND, (5) allowable sample bias, zero drift, and calibration draft are ±10%. Install a sampling port and a thermometer or other temperature measuring device at each wellhead. [40 CFR 60.756(a)]	Measure the N_2 or O_2 concentration in the LFG, and the temperature of the LFG at each individual well, on a monthly basis. If a well exceeds one of the operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. [40 CFR 60.756(a); 40 CFR 60.755(a)(5)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.10	40 CFR 60.753(d) (Landfill NSPS Subpart WWW)	Operate LFG collection system so that the methane concentration is <500 ppm above background at the surface of the landfill.	Conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of LFG, such as distressed vegetation and cracks or seeps in the cover per the surface monitoring design plan and topographical map of the monitoring route. Instrument specifications and procedures for surface monitoring devices: (1) portable analyzer shall meet the instrument specifications provided in section 3 of RM 21, except that "methane" shall replace all references to VOC; AND, (2) calibration gas shall be methane, diluted to a nominal concentration of 500 ppm in air; AND, (3) instrument evaluation procedures of section 4.4 of RM 21 shall be used; AND, (4) calibration procedures provided in section 4.2 of RM 21 shall be followed immediately before commencing a surface monitoring survey. [40 CFR 60.755(d)] Conduct surface monitoring with a portable monitor meeting the specifications provided. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells. Surface emission monitoring shall be performed in accordance with section 4.3.1 of RM 21, except that the probe inlet shall be placed within 5 to 10 cm of the ground. Monitoring shall be performed during typical meteorological conditions. [40 CFR 60.755(c)]	Monitor for cover integrity on a monthly basis. Implement cover repairs as necessary. [40 CFR 60.755(c)(5)] Conduct surface monitoring on a quarterly basis. Any reading of ≥500 ppm above background at any location shall be recorded as a monitored exceedance and actions below taken. As long as the specified actions are taken, the exceedance is not a violation of these operational requirements. The location of each monitored exceedance shall be marked and the location recorded. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance. Any location that initially showed an exceedance but has a methane concentration <500 ppm methane above background at the 10-day re-monitoring, shall be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration <500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance, OR an alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval. No further monitoring of that location is required until remedy has been taken. [40 CFR 60.755(c)] Submit monthly report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 Monthly report shall include the location of each exceedance of the 500 ppm methane concentration and the concentration recorded at each location for which an exceedance was recorded in the previous month. [40 CFR 60.757(f)]
13.11	40 CFR 60.753(e) (Landfill NSPS Subpart WWW)	Operate the collection system such that all collected gases are vented to the control system. In the event the LFG collection and control is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour.	None specified.	Records shall be kept of all periods when the LFG collection and control system is inoperable, the gas mover system is shut down, or the valves in the collection and control system are closed.

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.12	40 CFR 60.753(f) (Landfill NSPS Subpart WWW)	Operate the LFG control and treatment system at all times when the collected gas is routed to the system.	None specified.	No additional monitoring required.
13.13	40 CFR 60.755(e) (Landfill NSPS Subpart WWW)	The provisions of the NSPS apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems.	None specified.	No additional monitoring required.
13.14	40 CFR 60.757(a)(3); 40 CFR 60.4(a) (Landfill NSPS Subpart WWW)	An amended design capacity report shall be submitted to the Department providing notification of any increase in the design capacity of the landfill.	None specified.	If triggered, the permittee shall submit an amended design capacity report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 [40 CFR 60.4(a)]
13.15	40 CFR 60.758(a) (Landfill NSPS Subpart WWW)	Keep, for at least 5 years, up-to-date, readily accessible, on-site records of: (1) the maximum design capacity; AND, (2) the current amount of solid waste in-place; AND, (3) the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.	None specified.	No additional monitoring required.
13.16	40 CFR 60.758(b) (Landfill NSPS Subpart WWW)	Keep up-to-date, readily accessible records for the life of the control equipment of the following data, as measured during the initial performance test or compliance determination: (1) maximum expected gas generation flow rate as calculated in condition 15.5, AND, (2) the density of wells, horizontal collectors, surface collectors, or other gas extraction devices; And, (3) the average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test; AND, (4) the percent reduction of NMOC determined as specified in conditions 16 and 17. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removed.	None specified.	No additional monitoring required.
13.17	40 CFR 60.758(c) (Landfill NSPS Subpart WWW)	Keep for 5 years, up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in the NSPS as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.	None specified.	No additional monitoring required.

<table>
<tr><th>Condition</th><th>Applicable Requirement</th><th>Description (for clarification purposes only, enforceable as listed under 'applicable requirement')</th><th>Monitoring and Analysis Procedure or Test Method</th><th>Monitoring, Recordkeeping, and Reporting Requirement</th></tr>
<tr><td>13.18</td><td>40 CFR 61.154(a), (c), (d)

(Asbestos NESHAP Subpart M)</td><td>In any active waste disposal site where asbestos-containing waste material has been deposited: (1) no visible emissions to the outside air; OR, (2) cover with ≥6 inches of compacted nonasbestos-containing material at the end of each operating day; OR, (3) cover with a chemical dust suppression agent (not to include any used, spent, or other waste oil) at the end of each operating day.</td><td>None specified.</td><td>No additional monitoring required.</td></tr>
<tr><td>13.19</td><td>40 CFR 61.154(b)

(Asbestos NESHAP Subpart M)</td><td>Areas of disposal of asbestos-containing waste material must: (1) have a natural barrier that adequately deters access by the general public; OR, (2) cover with ≥6 inches of compacted nonasbestos-containing material at the end of each operating day; OR, (3) install warning signs and fencing that meet the following: (a) display signs at all entrances and at intervals of ≤330 feet; AND, (b) signs posted such that legend is easily read; AND, (c) 20" x 14" upright format signs; AND, (d) sign legend, size, and style at least equal to (spacing between lines must be at least equal to the height of the upper text line):
<table>
<tr><th>Legend</th><th>Notation</th></tr>
<tr><td>Asbestos Waste Disposal Site.</td><td>1 inch Sans Serif, Gothic, or Block</td></tr>
<tr><td>Do Not Create Dust</td><td>¾ inch Sans Serif, Gothic, or Block</td></tr>
<tr><td>Breathing Asbestos is Hazardous to Your Health.</td><td>14 point Gothic</td></tr>
</table>
AND, (e) fenced in a manner adequate to deter access by the general public.</td><td>None specified.</td><td>No additional monitoring required.</td></tr>
</table>

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.20	40 CFR 61.154(e) (Asbestos NESHAP Subpart M)	Maintain waste shipment records for all asbestos-containing waste material received.	None specified.	Waste shipment records shall include: (1) name, address, and telephone number of the waste generator; AND, (2) name, address, and telephone number of the transporter(s); AND, (3) volume of waste; AND, (4) presence of improperly enclosed (leak-tight containers) or uncovered; AND, (5) date of waste receipt. Send a copy of the signed waste shipment record to the waste generator within 30 days of receipt of the waste. If significant amount of improperly enclosed or uncovered waste, report in writing (with copy of waste shipment record) to the Department for the waste generator (as indicated in the waste shipment record), ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 by the following working day. Submit reports (with copy of waste shipment record) of unreconciled waste quantity discrepancies within 15 days of waste receipt to ODEQ, at the address listed above. [40 CFR 61.154(e)(1), (2)]
13.21	40 CFR 61.154(f) (Asbestos NESHAP Subpart M)	Maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal area on a map or diagram of the disposal area.	None specified.	No additional monitoring required.
13.22	40 CFR 61.154(i) (Asbestos NESHAP Subpart M)	Furnish upon request, and make available during normal business hours for inspection by ODEQ, all records required by the Asbestos NESHAP.	None specified.	No additional monitoring required.
13.23	40 CFR 61.154(j) (Asbestos NESHAP Subpart M)	Notify ODEQ in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at the site and is covered.	None specified.	Notification shall include: (1) scheduled starting and completion dates; AND, (2) reason for disturbing waste; AND, (3) emission control procedures to be implemented; AND, (4) location of any temporary storage site and the final disposal site. [40 CFR 61.154(j)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.24	40 CFR 60.752(b)(2)(iii)(A) and 40 CFR 60.18 (Landfill NSPS Subpart WWW)	1. Route excess landfill gas not utilized by IC engines to an open flare (Emissions Unit Control) designed and operated in accordance with 40 CFR 60.18. 2. The flare shall be designed for and operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. [40 CFR 60.18(c)(1)] 3. The flare shall be operated with a flame present at all times. [40 CFR 60.18(c)(2)] 4. The flare shall be designed for and operated with an exit velocity less than 60 ft/sec. [40 CFR 60.18(c)(4)(i)] 5. The flare shall be operated at all times when excess landfill gas not utilized by IC engines is being vented to it. [40 CFR 60.18(e)]	Install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment: (1) a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame; and (2) a device that records flow to or bypass of the flare. The owner or operator shall either: (i) install, calibrate, and maintain a gas flow measuring device that shall record the flow to the flare at least every 15 minutes; or (ii) secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. [40 CFR 60.756(c)] Reference Method 22 shall be used to determine the compliance with the visible emissions standard. The observation period is 2 hours. [40 CFR 60.18(f)(1)] The net heating value of the gas being combusted in the flare shall be calculated by the equation in 40 CFR 60.18 (f)(3). The actual exit velocity of the flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure) as determined by Reference Methods 2, 2A, 2C,or 2D as appropriate by the unobstructed (free) cross sectional area of the flare tip. [40 CFR 60.18(f)(4)]	Monitoring 1. Operate the heat sensing device or thermocouple. [40 CFR 60.756(c)(1)] 2. Record the gas flow to the flare at least every 15 minutes or visually inspect the seal or closure mechanism at least monthly. [40 CFR 60.756(c)(2)] Recordkeeping 1. Records of the flare vendor specifications until removal of the flare. [40 CFR 60.758(b)] 2. Up-to-date, readily accessible records for the life of the flare of: a. visible emissions readings b. heat content determinations c. flow rate or bypass flow rate measurements d. exit velocity determinations e. continuous records of the flare pilot flame or flare flame monitoring f. all periods of operations during which the pilot flame or the flare flame is absent [40 CFR 60.758(b((4) and (c)(4)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.25	40 CFR 63.6(e)(3) (Landfill NESHAP Subpart AAAA)	Develop and implement a written Startup, Shutdown, and Malfunction Plan (SSM Plan) by no later than January 16, 2004.	None specified.	Maintain written SSM Plan on site. If the SSM Plan fails to address, or inadequately addresses, a malfunction, revise the SSM Plan within 45 days after the event to include procedures for operating and maintaining the source during similar malfunctions, and a program of corrective actions for similar malfunctions. [40 CFR 63.6(e)((3)(viii)] Recordkeeping 1. Maintain records for each SSM Plan event which occurs. [40 CFR 63.10(b)(2)(i)] 2. Retain a copy of each previous (superceded) version of the SSM Plan for at least 5 years. [40 CFR 63.6(e)(3)(v)] Reporting 1. Report semiannually all SSM Plan actions that are consistent with the SSM Plan. [40 CFR 63.10(d)(5)(i)] 2. Notify DEQ within 2 days if an SSM event is not consistent with the SSM Plan and follow up with a letter within 7 days of the event. [40 CFR 63.6(e)(3)iv)]

EMISSIONS UNITS PIR AND UPR

Table 4. Summary of requirements for Emissions Units PIR and UPR:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0110(2)	14	Visible emissions	20% opacity	3 min. aggregate in 60 minutes	NA	15

14. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is equal to or greater than 20% opacity, excluding uncombined water, from emissions units PIR and UPR. [OAR 340-208-0110(2) and 340-208-0110(3)(a)]

15. Monitoring Requirement: At least weekly, the permittee must visually survey the facility using EPA Method 22 for any sources of excess fugitive emissions. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions that leave the down wind plant site boundaries. The person conducting this survey does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including using the proper location to observe visible emissions. If sources of excess fugitive emissions are identified during the survey, the permittee shall perform one of the following:

15.a. immediately take corrective action to minimize the fugitive emissions; or,

15.b. conduct a modified EPA Method 9 test on the device(s) causing the opacity problem within 24 hours.

15.c. Recordkeeping: The permittee must maintain records of all inspections and any corrective action performed.

EMISSIONS UNIT TIP

Table 5. Summary of requirements for Emissions Unit TIP:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0110(2)	16	Visible emissions	20% opacity	3 min. aggregate in 60 minutes	NA	20
340-226-0210(1)(b)	17	PM/PM_{10}	0.1 gr/dscf	Avg. of 3 test runs	NA	20

16. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is equal to or greater than 20% opacity, excluding uncombined water, from emissions unit TIP. [OAR 340-208-0110(2) and 340-208-0110(3)(a)]

17. Applicable Requirement: The permittee must not cause or allow the emission of particulate matter in excess of 0.1 grain per standard cubic foot from emissions unit TIP. [OAR 340-226-0210(1)(b)]

Insignificant Activities Requirements

18. The Department acknowledges that insignificant emissions units (IEUs) identified by rule as either categorically insignificant activities or aggregate insignificant emissions as defined in OAR 340-200-0020 exist at facilities required to obtain an Oregon Title V Operating Permit. IEUs must comply with all applicable requirements. In general, the requirements that could apply to IEUs are incorporated as follows:

18.a. OAR 340-208-0110 (20% opacity)
18.b. OAR 340-228-0210 (0.1 gr/dscf corrected to 12% CO_2 or 50% excess air for fuel burning equipment)
18.c. OAR 340-226-0210 (0.1 gr/dscf for non-fugitive, non-fuel burning equipment)
18.d. OAR 340-226-0310 (process weight limit for non-fugitive, non-fuel burning process equipment).

Unless otherwise specified in this permit or an applicable requirement, the Department is not requiring any testing, monitoring, recordkeeping, or reporting for the applicable emissions limits and standards that apply to IEUs. However, if testing were performed for compliance purposes, the permittee would be required to use the test methods identified in the definitions of "opacity" and "particulate matter" in OAR 340-208-0010 and perform the testing in accordance with the Department's Source Sampling Manual.

PLANT SITE EMISSION LIMITS

19. Applicable Requirement: The plant site emissions must not exceed the following limits for any 12 consecutive calendar month period: [OAR 340-222-0040 through OAR 340-222-0043]

Pollutant	Plant Site Emission Limit (Tons/yr)
PM	24
PM_{10}	14
CO	99
NO_x	39
SO_2	39
VOC	39
NMOC	49

19.a. The PSEL is based on the actual predicted emissions for the current operating conditions at the facility. A permit modification is required before the PSEL may be increased.

20. Monitoring Requirement: The permittee must determine compliance with the Plant Site Emission Limits established in Condition 19 of this permit by conducting monitoring in accordance with the following procedures, test methods, and frequencies: [OAR 340-218-0050(3)]

20.a. The permittee must monitor and maintain records of the following process parameters:

Table 6. PSEL Monitoring

Emissions Unit(s)	Process Parameter	Units	Measurement Frequency	Measurement Method
F-LFG1	Municipal solid waste in place in Cell 0	Mg or tons	Annually	Records
F-LFG2	Municipal solid waste in place in Cells 1, 2A/2B, 2C/2D, and 3	Mg or tons	Annually	Records
Landfill	Municipal solid waste accepted at landfill	Mg or tons	Annually	Records
F-LFG1 & F-LFG2	Landfill gas generated in each system	$MMft^3$/month, $MMft^3$/yr	Annually using EPA model calculation	Records
F-LFG2	Landfill gas collected and sent to IC engines and % methane	$MMft^3$/month, $MMft^3$/yr	Monthly/Annually	Records
PIR	Number of total vehicles on paved roads	Number	Monthly/Annually	Records
UPR 1	Number of total vehicles on unpaved road 1	Number	Monthly/Annually	Records
UPR 2	Number of commercial vehicles on unpaved road 2	Number	Monthly/Annually	Records
TIP	Number of hours operated	Hours	Monthly/Annually	Records
PCS	Petroleum contaminated soil received	Tons	Monthly/Annually	Records
Open Flare	Landfill gas collected and sent to open flare and % methane	$MMft^3$/month, $MMft^3$/yr	Monthly/Annually	Records

20.b. Emission factors for calculating pollutant emissions:

Table 7. Emission Factors

Emission Units(s)	Pollutant	Emission Factor	Emission Factor Units	Emission Factor Verification Testing	
				Yes/no	Test Method
F-LFG1	CO	10.3	lb/MMft^3 fugitive landfill gas	No	NA
	VOC	51.9	lb/MMft^3 fugitive landfill gas	No	NA
	NMOC	133.2	lb/MMft^3 fugitive landfill gas	No	NA
F-LFG2	CO	10.3	lb/MMft^3 fugitive landfill gas	No	NA
	VOC	51.9	lb/MMft^3 fugitive landfill gas	No	NA
	NMOC	133.2	lb/MMft^3 fugitive landfill gas	No	NA
PIR	PM	0.140	lb/vehicle	No	NA
	PM_{10}	0.027	lb/vehicle	No	NA
UPR 1	PM	0.010	lb/vehicle	No	NA
	PM_{10}	0.004	lb/vehicle	No	NA
UPR 2	PM	0.098	lb/vehicle	No	NA
	PM_{10}	0.021	lb/vehicle	No	NA
Open Flare	PM/PM_{10}	8.5	lb/MMft^3 combusted landfill gas	No	NA
	CO	110.0	lb/MMft^3 combusted landfill gas	No	NA
	NO_x	20.0	lb/MMft^3 combusted landfill gas	No	NA
	SO_2	8.4	lb/MMft^3 combusted landfill gas	No	NA
	VOC	1.16	lb/MMft^3 combusted landfill gas	No	NA
	NMOC	2.71	lb/MMft^3 combusted landfill gas	No	NA
TIP	PM/PM_{10}	0.253	lb/hr	No	NA
	CO	0.768	lb/hr	No	NA
	NO_x	3.57	lb/hr	No	NA
	SO_2	0.236	lb/hr	No	NA
	VOC/ NMOC	0.289	lb/hr	No	NA
PCS	VOC/ NMOC	0.033	lb/ton PCS	No	NA

20.c. For the emissions unit F-LFG1 listed in Table 8, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (F-LFG1 generated) * EF *K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.d. For the emissions unit F-LFG2 listed in Table 8, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (F-LFG2 generated – F-LFG2 collected to IC engines and flare) * EF * K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.e. For the emissions unit Open Flare listed in Table 7, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (Open flare collected) * EF *K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.f. For the emissions units PIR, UPR 1, UPR 2, TIP, and PCS listed in Table 7, the permittee must calculate monthly and 12-month rolling emission by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = MP * EF * K

where:

E = Emissions, tons
MP = Monitored parameter, units/month or units/year
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.g. The emission factors listed in Condition 20.b. are not enforceable limits unless otherwise specified in this permit. Compliance with PSELs must only be determined by the calculations contained in Conditions 20.c. through 20.f of this permit using the measured process parameters recorded during the reporting period and the emission factors contained in Condition 20.b.

21. The permittee must determine compliance with Condition 19 (Plant Site Emission Limits) by summing the emissions calculated in Condition 20 for each emissions unit for each month and each 12-month rolling period, and adding the Aggregate Insignificant emissions of 1 ton per year by pollutant, and comparing the resulting emissions to the Plant Site Emission Limits in Condition 19.

GENERAL TESTING REQUIREMENTS

22. Unless otherwise specified in this permit, the permittee must conduct all testing in accordance with the Department's Source Sampling Manual. [OAR 340-212-0120 and 40 CFR 60.8]

22.a. Unless otherwise specified by a state or federal regulation, the permittee must submit a source test plan to the Department at least 30 days prior to the date of the test. The test plan must be prepared in accordance with the Source Sampling Manual and address any planned variations or alternatives to prescribed test methods. The permittee should be aware that if significant variations are requested, it may require more than 30 days for the Department to grant approval and may require EPA approval in addition to approval by the Department.

22.b. Only regular operating staff may adjust the processes or emission control device parameters during a compliance source test and within two (2) hours prior to the tests. Any operating adjustments made during a compliance source test, which are a result of consultation during the tests with source testing personnel, equipment vendors, or consultants, may render the source test invalid.

22.c. Unless otherwise specified by permit condition or Department approved source test plan, all compliance source tests must be performed as follows:

22.c.i. at least 90% of the design capacity for new or modified equipment;
22.c.ii at least 90% of the maximum operating rate for existing equipment; or
22.c.iii. at 90 to 110% of the normal maximum operating rate for existing equipment. For purposes of this permit, the normal maximum operating rate is defined as the 90th percentile of the average hourly operating rates during a 12 month period immediately preceding the source test. Data supporting the normal maximum operating rate must be included with the source test report.

22.d. Each source test must consist of at least three (3) test runs and the emissions results must be reported as the arithmetic average of all valid test runs. If for reasons beyond the control of the permittee a test run is invalid, the Department may accept two (2) test runs for demonstrating compliance with the emission limit or standard.

22.e. Source test reports prepared in accordance with the Department's Source Sampling Manual must be submitted to the Department within 45 days of completing any required source test, unless a different time period is approved in the source test plan submitted prior to the source test.

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS

General Monitoring Requirements:

23. The permittee must not knowingly render inaccurate any required monitoring device or method. [OAR 340-218-0050(3)(a)(E)]

24. Methods used to determine actual emissions for fee purposes must also be used for compliance determination and can be no less rigorous than the requirements of OAR 340-218-0080. [OAR 340-218-0050(3)(a)(F)]

25. Monitoring requirements must commence on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(a)(G)]

General Recordkeeping Requirements

26. The permittee must maintain the following general records of testing and monitoring required by this permit: [OAR 340-218-0050(3)(b)(A)]

26.a. the date, place as defined in the permit, and time of sampling or measurements;
26.b. the date(s) analyses were performed;
26.c. the company or entity that performed the analyses;
26.d. the analytical techniques or methods used;
26.e. the results of such analyses;
26.f. the operating conditions as existing at the time of sampling or measurement; and
26.g. the records of quality assurance for continuous monitoring systems (including but not limited to quality control activities, audits, calibration drift checks).

27. Unless otherwise specified by permit condition, the permittee must make every effort to maintain 100 percent of the records required by the permit. If information is not obtained or recorded for legitimate reasons (e.g., the monitor or data acquisition system malfunctions due to a power outage), the missing record(s) will not be considered a permit deviation provided the amount of data lost does not exceed 10% of the averaging periods in a reporting period or 10% of the total operating hours in a reporting period, if no averaging time is specified. Upon discovering that a required record is missing, the permittee must document the reason for the missing record. In addition, any missing record that can be recovered from other available information will not be considered a missing record. [OAR 340-214-0110, 340-212-0160, and 340-218-0050(3)(b)]

28. Recordkeeping requirements must commence on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(b)(C)]

29. Unless otherwise specified, the permittee must retain records of all required monitoring data and support information for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings (or other original data) for continuous monitoring instrumentation, and copies of all reports required by the permit. All existing records required by the previous Oregon Title V Operating Permit must also be retained for five (5) years from the date of the monitoring sample, measurement, report, or application. [OAR 340-218-0050(b)(B)]

REPORTING REQUIREMENTS

General Reporting Requirements

30. Excess Emissions Reporting The permittee must report all excess emissions as follows: [OAR 340-214-0300 through 340-214-0360]

30.a. Immediately (within 1 hour of the event) notify the Department of an excess emission event by phone, e-mail, or facsimile; and

30.b. Within 15 days of the excess emissions event, submit a written report that contains the following information: [OAR 340-214-0340(1)]

30.b.i. The date and time of the beginning of the excess emissions event and the duration or best estimate of the time until return to normal operation;

30.b.ii. The date and time the owner or operator notified the Department of the event;

30.b.iii. The equipment involved;

30.b.iv. Whether the event occurred during planned startup, planned shutdown, scheduled maintenance, or as a result of a breakdown, malfunction, or emergency;

30.b.v. Steps taken to mitigate emissions and corrective action taken, including whether the approved procedures for a planned startup, shutdown, or maintenance activity were followed;

30.b.vi. The magnitude and duration of each occurrence of excess emissions during the course of an event and the increase over normal rates or concentrations as determined by continuous monitoring or best estimate (supported by operating data and calculations);

30.b.vii. The final resolution of the cause of the excess emissions; and

30.b.viii. Where applicable, evidence supporting any claim that emissions in excess of technology-based limits were due to any emergency pursuant to OAR 340-214-0360.

30.c. In the event of any excess emissions which are of a nature that could endanger public health and occur during non-business hours, weekends, or holidays, the permittee must immediately notify the Department by calling the Oregon Accident Response System (OARS). The current number is 1-800-452-0311.

30.d. If startups, shutdowns, or scheduled maintenance may result in excess emissions, the permittee must submit startup, shutdown, or scheduled maintenance procedures used to minimize excess

emissions to the Department for prior authorization, as required in OAR 340-214-0310 and 340-214-0320. New or modified procedures must be received by the Department in writing at least 72 hours prior to the first occurrence of the excess emission event. The permittee must abide by the approved procedures and have a copy available at all times.

30.e. The permittee must notify the Department of planned startup/shutdown or scheduled maintenance events.

30.f. The permittee must continue to maintain a log of all excess emissions in accordance with OAR 340-214-0340(3). However, the permittee is not required to submit the detailed log with the semi-annual and annual monitoring reports. The permittee is only required to submit a brief summary listing the date, time, and the affected emissions units for each excess emission that occurred during the reporting period. [OAR 340-218-0050(3)(c)]

31. Permit Deviations Reporting: The permittee must promptly report deviations from permit requirements that do not cause excess emissions, including those attributable to upset conditions, as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. "Prompt" means within 15 days of the deviation. Deviations that cause excess emissions, as specified in OAR 340-214-0300 through 340-214-0360 must be reported in accordance with Condition 23.

32. All required reports must be certified by a responsible official consistent with OAR 340-218-0040(5);[OAR 340-218-0050(3)(c)(D)]

33. Reporting requirements must commence on the date of permit issuance unless otherwise specified in the permit. [OAR 340-218-0050(3)(c)(E)]

Addresses of regulatory agencies are the following, unless otherwise instructed:

DEQ – Western Region
750 Front Street NE, Suite 120
Salem, OR 97310
(503) 378-8240

DEQ – Air Quality Division
811 SW Sixth Avenue
Portland, OR 97204
(503) 229-5359

Air Operating Permits
US Environmental Protection Agency
Mail Stop OAQ-108
1200 Sixth Avenue
Seattle, WA 98101

Semi-annual and Annual Reports

34. The permittee must submit three (3) copies of reports of any required mon ring at least every 6 months, completed on forms approved by the Department. Six month periods are uary 1 to June 30, and July 1 to December 31. One copy of the report must be submitted to the EPA a two copies to the DEQ regional office. All instances of deviations from permit requirements must be cl rly identified in such reports: [OAR 340-218-0050(3)(c)(A) and 340-218-0080(6)(d)]]

34.a. The first semi-annual report is be due on July 30 and must include the semi-annual compliance certification, OAR 340-218-0080.

34.b. The annual report is due on February 15 and must consist of the following:

34.b.i. the emission fee report; [OAR 340-220-0100]
34.b.ii. a summary of the excess emissions upset log; [OAR 340-214-0340]
34.b.iii. the second semi-annual compliance certification; [OAR 340-218-0080]
34.b.iv. the annual emission inventory report for the prior calendar year;
34.b.v. greenhouse gas emissions in accordance with Division 215 of OAR Chapter 340. [OAR 340-215-0040(3)(a)]

35. The semi-annual compliance certification must include the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable): [OAR 340-218-0080(6)(c)]

35.a. The identification of each term or condition of the permit that is the basis of the certification;

35.b. The identification of the method(s) or other means used by the owner or operator for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means must include, at a minimum, the methods and means required under OAR 340-218-0050(3). *Note: Certification of compliance with the monitoring conditions in the permit is sufficient to meet this requirement, except when the permittee must certify compliance with new applicable requirements that are incorporated by reference into the permit. When certifying compliance with new applicable requirements that are not yet in the permit, the permittee must provide the information required by this condition.* If necessary, the owner or operator also must identify any other material information that must be included in the certification to comply with section 113(c)(2) of the FCAA, which prohibits knowingly making a false certification or omitting material information;

35.c. The status of compliance with terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification must be based on the method or means designated in OAR 340-218-0040(6)(c)(B). The certification must identify each deviation and take it into account in the compliance certification. The certification must also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance, as defined under OAR 340-200-0020, occurred; and

35.d. Such other facts as the Department may require to determine the compliance status of the source.

36. Notwithstanding any other provision contained in any applicable requirement, the owner or operator may use monitoring as required under OAR 340-218-0050(3) and incorporated into the permit, in addition to any specified compliance methods, for the purpose of submitting compliance certifications. [OAR 340-218-0080(6)(e)]

Monthly Reports

37. The permittee must report the following information for the preceding month within 30 days of the end of each calendar month to the Western Region-Salem office of the Department:

37.a. The cover integrity monitoring results and repairs, if necessary, as required by Condition 13.10;

37.b. The results of the quarterly surface methane monitoring, if conducted during the month, and corrective actions taken as required by Condition 13.10;

37.c. Any other information regarding upsets, maintenance required, or operational problems encountered during the month on the landfill gas collection or control systems;

37.d. Information concerning the installation date and location of any newly installed wells or expansion of the landfill gas collection system as required by Condition 13.7;

37.e. The amount of landfill gas collected and treated in both the IC engines and the flare;

37.f. The total operating hours of the IC engines and flare during the month; and,

37.g. Log of air quality complaints received during the month under Condition 8.

EMISSION FEES

38. Emission fees will be based on the Plant Site Emission Limits in Condition 19, unless the permittee elects to report actual emissions for one or more permitted processes/pollutants using the procedures in OAR 340 Division 220. If the permittee reports actual emissions for one or more permitted processes/pollutants, the permitted emissions for the remaining permitted processes/pollutants will be based on the following table: [OAR 340-220-0090]

Emission Source Description	Permitted Process Code (DEQ Codes)	PM_{10} (tons)	SO_2 (tons)	NO_x (tons)	VOC (tons
Roads	FS-1	3.1			
Open Flare	GS-1	2.2	2.2	5.2	0.3
Fugitive LFG	FS-2				11.0
Petroleum Cont. Soil	FS-2				0.8
Tipper	GS-1	0.3	0.2	3.6	0.3
AI	GS-1	1.0	1.0	1.0	1.0

NON-APPLICABLE REQUIREMENTS

39. State and Federal air quality requirements (e.g., rules and regulations) currently determined not applicable to the permittee are listed below along with the reason for the non-applicability: [OAR 340-218-0110]

Applicable Requirement	Reason Code
OAR Chapter 340:	
Division 202	
All rules	I
Division 204	
All rules	I
Division 206	
0050	C
0060 through 0070	I
Division 208	
0500 through 0610	D
Division 210	
0100 through 0120	B
Division 212	
0200 through 0280	J
Division 214	
0200 and 0220	C
0400 through 0430	B
Division 218	
0050(4)	B
0050(8)	H
0060	I
0070	I
0090	B
0100	B
0250	I
Division 222	
0042	C
0060	H
Division 224	
0050	C
0060	C
Division 225	
0045	C
Division 226	
0400	H
Division 228	
0100 through 0130	F
0300 through 0530	B
0600 through 0678	B
Division 230	
All rules	E
Division 232	
All rules	C
Division 234	
All rules	B
Division 236	
All rules	B
Division 240	
All rules	C
Division 242	
All rules	C
Division 248	
0210 through 0230	B
Division 250	
All rules	I
Division 252	
All rules	I
Division 254	
All rules	E
Division 256	
All rules	B
Division 257	
All rules	E
Division 258	
All rules	B
Division 260	
All rules	B
Division 262	
All rules	B
Division 264	
0100	D
0120 through 0170	D
0190	E
Division 266	
All rules	B
40 CFR	
Part 55	B
Part 57	B
Part 60, except subparts A, WWW, and appendixes	B
Part 61, except subparts A, M, and appendices	B
Part 63, except subparts A, AAAA, and appendices	B
Part 68	B
Part 72 through 76	B
Part 77	B
Part 78	B
Part 82, except subpart F	B
Part 85 through 89	B

Reason code definitions:

A this pollutant is not emitted by the facility
B the facility is not in this source category
C the facility is not in a special control/nonattainment area
D the facility is not in this county
E the facility does not have this emissions unit
F the facility does not use this fuel type

G the rule does not apply because no changes have been made at the facility that would trigger these procedural requirements
H this method/procedure is not used by the facility
I this rule applies only to DEQ and regional authorities
J there are no emissions units with add-on control devices or the pre-controlled potential emissions are less than 100 tons per year or the emissions units with add-on control devices and pre-controlled emissions greater than 100 tons per year are subject to emissions standards promulgated after November of 1990

GENERAL CONDITIONS

G1. General Provision

Terms not otherwise defined in this permit have the meaning assigned to such terms in the referenced regulation.

G2. Reference materials

Where referenced in this permit, the versions of the following materials are effective as of the dates noted unless otherwise specified in this permit:

a. Source Sampling Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A4;
b. Continuous Monitoring Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A6; and
c. All state and federal regulations as in effect on the date of issuance of this permit.

G3. Applicable Requirements [OAR 340-218-0010(3)(b)]

Oregon Title V Operating Permits do not replace requirements in Air Contaminant Discharge Permits (ACDP) issued to the source even if the ACDP(s) have expired. For a source operating under a Title V permit, requirements established in an earlier ACDP remain in effect notwithstanding expiration of the ACDP or Title V permit, unless a provision expires by its terms or unless a provision is modified or terminated following the procedures used to establish the requirement initially. Source specific requirements, including, but not limited to TACT, RACT, BACT, and LAER requirements, established in an ACDP must be incorporated into the Oregon Title V Operating Permit and any revisions to those requirements must follow the procedures used to establish the requirement initially.

G4. Compliance [OAR 340-218-0040(3)(n)(C), 340-218-0050(6), and 340-218-0080(4)]

a. The permittee must comply with all conditions of this permit. Any permit condition noncompliance constitutes a violation of the Federal Clean Air Act and/or state rules and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. Any noncompliance with a permit condition specifically designated as enforceable only by the state constitutes a violation of state rules only and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application.
b. Any schedule of compliance for applicable requirements with which the source is not in compliance at the time of permit issuance is supplemental to, and does not sanction noncompliance with the applicable requirements on which it is based.
c. For applicable requirements that will become effective during the permit term, the source must meet such requirements on a timely basis unless a more detailed schedule is expressly required by the applicable requirement.

G5. Masking Emissions:

The permittee must not install or use any device or other means designed to mask the emission of an air contaminant that causes or is likely to cause detriment to health, safety, or welfare of any person or otherwise violate any other regulation or requirement. [OAR 340-208-0400] This condition is enforceable only by the State.

G6. Credible Evidence:

Notwithstanding any other provisions contained in any applicable requirement, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any such applicable requirements. [OAR 340-214-0120]

G7. Certification [OAR 340-214-0110, 340-218-0040(5), 340-218-0050(3)(c)(D), and 340-218-0080(2)]

Any document submitted to the Department or EPA pursuant to this permit must contain certification by a responsible official of truth, accuracy and completeness. All certifications must state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and, complete. The permittee must promptly, upon discovery, report to the Department a material error or omission in these records, reports, plans, or other documents.

G8. Open Burning [OAR Chapter 340, Division 264]

The permittee is prohibited from conducting open burning, except as may be allowed by OAR 340-264-0020 through 340-264-0200.

G9. Asbestos [40 CFR Part 61, Subpart M (federally enforceable), OAR Chapter 340-248-0005 through 340-248-0180 (state-only enforceable) and 340-248-0205 through 340-248-0280]

The permittee must comply with OAR Chapter 340, Division 248, and 40 CFR Part 61, Subpart M when conducting any renovation or demolition activities at the facility.

G10. Stratospheric Ozone and Climate Protection [40 CFR 82 Subpart F, OAR 340-260-0040]

The permittee must comply with the standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F, Recycling and Emissions Reduction.

G11. Permit Shield [OAR 340-218-0110]

a. Compliance with the conditions of the permit is deemed compliance with any applicable requirements as of the date of permit issuance provided that:

i. such applicable requirements are included and are specifically identified in the permit, or
ii. the Department, in acting on the permit application or revision, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

b. Nothing in this rule or in any federal operating permit alters or affects the following:

i. the provisions of ORS 468.115 (enforcement in cases of emergency) and ORS 468.035 (function of department);
ii. the liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;

iii. the applicable requirements of the national acid rain program, consistent with section 408(a) of the FCAA; or

iv. the ability of the Department to obtain information from a source pursuant to ORS 468.095 (investigatory authority, entry on premises, status of records).

c. Sources are not shielded from applicable requirements that are enacted during the permit term, unless such applicable requirements are incorporated into the permit by administrative amendment, as provided in OAR 340-218-0150(1)(h), significant permit modification, or reopening for cause by the Department.

G12. Inspection and Entry [OAR 340-218-0080(3)]

Upon presentation of credentials and other documents as may be required by law, the permittee must allow the Department of Environmental Quality, or an authorized representative (including an authorized contractor acting as a representative of the EPA Administrator), to perform the following:

a. enter upon the permittee's premises where an Oregon Title V Operating Permit program source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;

b. have access to and copy, at reasonable times, any records that must be kept under conditions of the permit;

c. inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and

d. as authorized by the FCAA or state rules, sample or monitor, at reasonable times, substances or parameters, for the purposes of assuring compliance with the permit or applicable requirements.

G13. Fee Payment [OAR 340-220-0010, and 340-220-0030 through 340-220-0190]

The permittee must pay an annual base fee and an annual emission fee for particulates, sulfur dioxide, nitrogen oxides, and volatile organic compounds. The permittee must submit payment to the Department of Environmental Quality, Business Office, 811 SW 6th Avenue, Portland, OR 97204, within 30 days of the date the Department mails the fee invoice or August 1 of the year following the calendar year for which emission fees are paid, whichever is later. Disputes must be submitted in writing to the Department of Environmental Quality. Payment must be made regardless of the dispute. User-based fees will be charged for specific activities (e.g., computer modeling review, ambient monitoring review, etc.) requested by the permittee.

G14. Off-Permit Changes to the Source [OAR 340-218-0140(2)]

a. The permittee must monitor for, and record, any off-permit change to the source that:

i. is not addressed or prohibited by the permit;
ii. is not a Title I modification;
iii. is not subject to any requirements under Title IV of the FCAA;
iv. meets all applicable requirements;
v. does not violate any existing permit term or condition; and
vi. may result in emissions of regulated air pollutants subject to an applicable requirement but not otherwise regulated under this permit or may result in insignificant changes as defined in OAR 340-200-0020.

b. A contemporaneous notification, if required under OAR 340-218-0140(2)(b), must be submitted to the Department and the EPA.

c. The permittee must keep a record describing off-permit changes made at the facility that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those off-permit changes.
d. The permit shield of Condition G9 does not extend to off-permit changes.

G15. Section 502(b)(10) Changes to the Source [OAR 340-218-0140(3)]

a. The permittee must monitor for, and record, any section 502(b)(10) change to the source, which is defined as a change that would contravene an express permit term but would not:

i. violate an applicable requirement;
ii. contravene a federally enforceable permit term or condition that is a monitoring, recordkeeping, reporting, or compliance certification requirement; or
iii. be a Title I modification.

b. A minimum 7-day advance notification must be submitted to the Department and the EPA in accordance with OAR 340-218-0140(3)(b).
c. The permit shield of Condition G9 does not extend to section 502(b)(10) changes.

G16. Administrative Amendment [OAR 340-218-0150]

Administrative amendments to this permit must be requested and granted in accordance with OAR 340-218-0150. The permittee must promptly submit an application for the following types of administrative amendments upon becoming aware of the need for one, but no later than 60 days of such event:

a. legal change of the registered name of the company with the Corporations Division of the State of Oregon, or
b. sale or exchange of the activity or facility.

G17. Minor Permit Modification [OAR 340-218-0170]

The permittee must submit an application for a minor permit modification in accordance with OAR 340-218-0170.

G18. Significant Permit Modification [OAR 340-218-0180]

The permittee must submit an application for a significant permit modification in accordance with OAR 340-218-0180

G19. Staying Permit Conditions [OAR 340-218-0050(6)(c)]

Notwithstanding conditions G16 and G17, the filing of a request by the permittee for a permit modification, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

G20. Construction/Operation Modification [OAR 340-218-0190]

The permittee must obtain approval from the Department prior to construction or modification of any stationary source or air pollution control equipment in accordance with OAR 340-210-0200 through OAR 340-210-0250.

G21. New Source Review Modification [OAR 340-224-0010]

The permittee may not begin construction of a major source or a major modification of any stationary source without having received an air contaminant discharge permit (ACDP) from the Department and having satisfied the requirements of OAR 340, Division 224.

G22. Need to Halt or Reduce Activity Not a Defense [OAR 340-218-0050(6)(b)]

The need to halt or reduce activity will not be a defense. It will not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G23. Duty to Provide Information [OAR 340-218-0050(6)(e) and OAR 340-214-0110]

The permittee must furnish to the Department, within a reasonable time, any information that the Department may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee must also furnish to the Department copies of records required to be retained by the permit or, for information claimed to be confidential, the permittee may furnish such records to the Department along with a claim of confidentiality.

G24. Reopening for Cause [OAR 340-218-0050(6)(c) and 340-218-0200]

a. The permit may be modified, revoked, reopened and reissued, or terminated for cause as determined by the Department.
b. A permit must be reopened and revised under any of the circumstances listed in OAR 340-218-0200(1)(a).
c. Proceedings to reopen and reissue a permit must follow the same procedures as apply to initial permit issuance and affect only those parts of the permit for which cause to reopen exists.

G25. Severability Clause [OAR 340-218-0050(5)]

Upon any administrative or judicial challenge, all the emission limits, specific and general conditions, monitoring, recordkeeping, and reporting requirements of this permit, except those being challenged, remain valid and must be complied with.

G26. Permit Renewal and Expiration [OAR 340-218-0040(1)(a)(D) and 340-218-0130]

a. This permit expires at the end of its term, unless a timely and complete renewal application is submitted as described below. Permit expiration terminates the permittee's right to operate.
b. Applications for renewal must be submitted at least 12 months before the expiration of this permit, unless the Department requests an earlier submittal. If more than 12 months is required to process a permit renewal application, the Department must provide no less than six (6) months for the owner or operator to prepare an application.
c. Provided the permittee submits a timely and complete renewal application, this permit will remain in effect until final action has been taken on the renewal application to issue or deny the permit.

G27. Permit Transference [OAR 340-218-0150(1)(d)]

The permit is not transferable to any person except as provided in OAR 340-218-0150(1)(d).

G28. Property Rights [OAR 340-200-0020 and 340-218-0050(6)(d)]

The permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations, except as provided in OAR 340-218-0110.

G29. Permit Availability [OAR 340-200-0020 and 340-218-0120(2)]

The permittee must have available at the facility at all times a copy of the Oregon Title V Operating Permit and must provide a copy of the permit to the Department or an authorized representative upon request.

ALL INQUIRIES SHOULD BE DIRECTED TO:

Department of Environmental Quality
Air Quality Division
Western Region-Salem Office
750 Front Street NE, Suite 120
Salem, OR 97301-1039
(503) 378-8240

AirTECHNOLOGY Laboratories, Inc.

September 18, 2019

Weaver Consultants Group
ATTN: Melissa Green
7340 E. Caley Ave., Ste. 110
Centennial, CO 80111

LA Cert #04140
EPA Methods TO3, TO14A, TO15, 25C/3C, RSK-175
TX Cert T104704450-14-6
EPA Methods TO14A, TO15
UT Cert CA0133332015-3
EPA Methods TO3, TO14A, TO15, RSK-175

LABORATORY TEST RESULTS

Project Reference: Total Sulfur Content Composition and Heat Value Testing
Project Number: 0120-174-50-20-02
Lab Number: K080707-01/04

Enclosed are **revised** results for sample(s) received 8/07/19 by Air Technology Laboratories. This revision replaces the report dated 8/26/19 in its entirety. Samples were received intact. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

Report Narrative:

- Report revised to include a Level 4 raw data package, per client's request.
- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

Preliminary results were e-mailed to Melissa Green on 8/22/19.

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

Mark Johnson
Operations Manager
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

AirTECHNOLOGY Laboratories, Inc.
18501 E. Gale Ave., Suite 130
City of Industry, CA 91748
Ph: 626-964-4032
Fx: 626-964-5832

CHAIN OF CUSTODY RECORD

TURNAROUND TIME				DELIVERABLES		PAGE:	OF
Standard	☑	48 hours	☐	EDD	☐	Condition upon receipt:	
Same Day	☐	72 hours	☐	EDF	☐	Sealed Yes ☐	No ☐
24 hours	☐	96 hours	☐	LEVEL 3	☐	Intact Yes ☐	No ☐
Other:				LEVEL 4	☐	Chilled _____	deg C

Project No.: 0120-174-50-20-02
Project Name: Total Sulfur content, composition and heat Value testing
Report To: Melissa Green
Company: Weaver Consultants Group
Street: 7340 E Caley Ave Suite 110
City/State/Zip: Centennial, CO 80111
Phone& Fax: 720-529-0132
e-mail: MGreen@WCGrp.com

BILLING
P.O. No.: Same
Bill to:

ANALYSIS REQUEST

LAB USE ONLY	SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	CONTAINER TYPE	D5504 (extended list)	D1945				
K080707-01	1 canister 5948	8/6/19	12:35	G	C	x	x				
-02	2 " 5960	8/6/19	12:49	G	C	x	x				
-03	3 " 6010	8/6/19	1:02	G	C	x	x	8/7/19			
-04	4 " 7131	8/6/19	1:15	G	C						

AUTHORIZATION TO PERFORM WORK: Corey Harkness	COMPANY: WCG	DATE/TIME: 8/6/19 11:00AM		
SAMPLED BY: Corey Harkness	COMPANY: WCG	DATE/TIME: 8/6/19 12:35 pm		
RELINQUISHED BY: Corey Harkness	DATE/TIME: 8/6/19 2:30pm	RECEIVED BY: FedEx	DATE/TIME: 8/6/19 2:30PM	
RELINQUISHED BY: FedEx	DATE/TIME: 8/7/19	RECEIVED BY: [signature]	DATE/TIME: 8/7/19 0912	
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	

METHOD OF TRANSPORT (circle one): Walk-In (FedEx) UPS Courier ATLI Other _____

COMMENTS
only test sample 4 as a back-up

DISTRIBUTION: White & Yellow - Lab Copies / Pink - Customer Copy

Preservation: **H**=HCL **N**=None / Container: **B**=Bag **C**=Can **V**=VOA **O**=Other *Rev. 03 - 5/7/09*

Client: Weaver Consultants Group
Attn: Melissa Green
Project Name: Total Sulfur Content Composition and Heat Value Testing
Project No.: 0120-174-50-20-02
Date Received: 08/07/19
Matrix: Air
Reporting Units: ppmv

ASTM D5504

Lab No.:	K080707-01		K080707-02		K080707-03			
Client Sample I.D.:	1		2		3			
Date/Time Sampled:	8/6/19 12:35		8/6/19 12:49		8/6/19 13:02			
Date/Time Analyzed:	8/8/19 14:54		8/8/19 15:12		8/8/19 15:29			
QC Batch No.:	190808GC3A1		190808GC3A1		190808GC3A1			
Analyst Initials:	CM/AS		CM/AS		CM/AS			
Dilution Factor:	4.2		4.6		4.6			
ANALYTE	Result ppmv	RL ppmv	Result ppmv	RL ppmv	Result ppmv	RL ppmv		
Hydrogen Sulfide	8.6	0.84	ND	0.92	ND	0.92		
Sulfur Dioxide	ND	0.84	ND	0.92	ND	0.92		
Carbonyl Sulfide	ND	0.84	ND	0.92	ND	0.92		
Methyl Mercaptan	2.3	0.84	ND	0.92	ND	0.92		
Ethyl Mercaptan	ND	0.84	ND	0.92	ND	0.92		
Dimethyl Sulfide	2.1	0.84	2.5	0.92	2.4	0.92		
Carbon Disulfide	ND	0.84	ND	0.92	ND	0.92		
Isopropyl Mercaptan	2.5	0.84	ND	0.92	ND	0.92		
t-Butylmercaptan	ND	0.84	ND	0.92	ND	0.92		
n-Propyl Mercaptan	ND	0.84	ND	0.92	ND	0.92		
Ethyl Methyl Sulfide	ND	0.84	ND	0.92	ND	0.92		
sec-Butyl Mercaptan	ND	0.84	ND	0.92	ND	0.92		
Thiophene	ND	0.84	ND	0.92	ND	0.92		
Isobutyl Mercaptan	ND	0.84	ND	0.92	ND	0.92		
Diethyl Sulfide	ND	0.84	ND	0.92	ND	0.92		
n-Butyl Mercaptan	ND	0.84	ND	0.92	ND	0.92		
Dimethyl Disulfide	ND	0.84	ND	0.92	ND	0.92		
2-Methylthiophene	ND	0.84	ND	0.92	ND	0.92		
3-Methylthiophene	ND	0.84	ND	0.92	ND	0.92		
Tetrahydrothiophene	ND	0.84	ND	0.92	ND	0.92		
2-Ethylthiophene	ND	0.84	ND	0.92	ND	0.92		
2,5-Dimethylthiophene	ND	0.84	ND	0.92	ND	0.92		
Diethyl Disulfide	ND	0.84	ND	0.92	ND	0.92		
Dimethyl Trisulfide	ND	0.84	2.5	0.92	ND	0.92		
Total Reduced Sulfur	15	0.84	5.0	0.92	2.4	0.92		

ND = Not Detected (below RL)
RL = Reporting Limit

Reviewed/Approved By: _____ Date 8/12/19
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

AirTECHNOLOGY Laboratories, Inc.
18501 E. Gale Avenue, Suite 130 ♦ City of Industry, CA 91748 ♦ Ph: (626) 964-4032 ♦ Fx: (626) 964-5832

Client: Weaver Consultants Group
Attn: Melissa Green
Project Name: Total Sulfur Content Composition and Heat Value Testing
Project No.: 0120-174-50-20-02
Date Received: 08/07/19
Matrix: Air
Reporting Units: ppmv

ASTM D5504

Lab No.:	Method Blank							
Client Sample I.D.:	-							
Date/Time Sampled:	-							
Date/Time Analyzed:	8/8/19 10:57							
QC Batch No.:	190808GC3A1							
Analyst Initials:	CM/AS							
Dilution Factor:	1.0							
ANALYTE	**Result ppmv**	**RL ppmv**						
Hydrogen Sulfide	ND	0.20						
Sulfur Dioxide	ND	0.20						
Carbonyl Sulfide	ND	0.20						
Methyl Mercaptan	ND	0.20						
Ethyl Mercaptan	ND	0.20						
Dimethyl Sulfide	ND	0.20						
Carbon Disulfide	ND	0.20						
Isopropyl Mercaptan	ND	0.20						
t-Butylmercaptan	ND	0.20						
n-Propyl Mercaptan	ND	0.20						
Ethyl Methyl Sulfide	ND	0.20						
sec-Butyl Mercaptan	ND	0.20						
Thiophene	ND	0.20						
Isobutyl Mercaptan	ND	0.20						
Diethyl Sulfide	ND	0.20						
n-Butyl Mercaptan	ND	0.20						
Dimethyl Disulfide	ND	0.20						
2-Methylthiophene	ND	0.20						
3-Methylthiophene	ND	0.20						
Tetrahydrothiophene	ND	0.20						
2-Ethylthiophene	ND	0.20						
2,5-Dimethylthiophene	ND	0.20						
Diethyl Disulfide	ND	0.20						
Dimethyl Trisulfide	ND	0.20						
Total Reduced Sulfur	ND	0.20						

ND = Not Detected (below RL)
RL = Reporting Limit

Reviewed/Approved By: _____ Date 8/12/19
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

AirTECHNOLOGY Laboratories, Inc.
18501 E. Gale Avenue, Suite 130 ♦ City of Industry, CA 91748 ♦ Ph: (626) 964-4032 ♦ Fx: (626) 964-5832

QC Batch No.: 190808GC3A1
Matrix: Air
Reporting Units: ppmv

ASTM D5504

Lab No.:	METHOD BLANK		LCS		LCSD			
Date/Time Analyzed:	8/8/19 10:57		8/8/19 10:22		8/8/19 10:40			
Analyst Initials:	CM/AS		CM/AS		CM/AS			
Date File:	08aug003		08aug001		08aug002			
Dilution Factor:	1.0		1.0		1.0			
ANALYTE	Result ppmv	RL ppmv	% Rec.	Criteria	% Rec.	Criteria	% RPD	Criteria
Hydrogen Sulfide	ND	0.20	73	70-130%	73	70-130%	0.2	<30
Carbonyl Sulfide	ND	0.20	102	70-130%	102	70-130%	0.1	<30
Methyl Mercaptan	ND	0.20	97	70-130%	99	70-130%	1.8	<30
Ethyl Mercaptan	ND	0.20	102	70-130%	103	70-130%	0.9	<30
Dimethyl Sulfide	ND	0.20	90	70-130%	90	70-130%	0.1	<30
Carbon Disulfide	ND	0.20	87	70-130%	86	70-130%	0.8	<30
Dimethyl Disulfide	ND	0.20	96	70-130%	94	70-130%	1.4	<30

ND = Not Detected (below RL)
RL = Reporting Limit

Reviewed/Approved By: _____ Date 8/22/19
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

AirTECHNOLOGY Laboratories, Inc.
18501 E. Gale Avenue, Suite 130 ♦ City of Industry, CA 91748 ♦ Ph: (626) 964-4032 ♦ Fx: (626) 964-5832

Client: Weaver Consultants Group
Attn: Melissa Green

Client's Project: Total Sulfur Content Composition and Heat Value Testing
Project Number: 0120-174-50-20-02
Date Received: 8/7/2019
Matrix: Vapor
Units: % v/v

Natural Gas Analysis by ASTM-D1945/3588

Lab No.:		K080707-01		K080707-02		K080707-03					
Client Sample I.D.:		1		2		3					
Date/Time Sampled:		8/6/19 12:35		8/6/19 12:49		8/6/19 13:02					
Fixed Gas Date/Time Analyzed:		8/15/19 11:39		8/15/19 11:58		8/15/19 12:21					
Hydrocarbon Date/Time Analyzed:		8/8/19 10:01		8/8/19 10:23		8/8/19 11:08					
Analyst Initials:		CM/AS		CM/AS		CM/AS					
QC Batch #:		190808GC11A1		190808GC11A1		190808GC11A1					
Dilution Factor:		4.2		4.6		4.6					
ANALYTE	PQL	Results	RL	Results	RL	Results	RL				
Methane	0.0010	53	0.0042	53	0.0046	51	0.0046				
Ethylene	0.010	ND	0.042	ND	0.046	ND	0.046				
Ethane	0.010	ND	0.042	ND	0.046	ND	0.046				
Propane	0.010	ND	0.042	ND	0.046	ND	0.046				
Isobutane	0.010	ND	0.042	ND	0.046	ND	0.046				
n-Butane	0.010	ND	0.042	ND	0.046	ND	0.046				
Isopentane	0.010	ND	0.042	ND	0.046	ND	0.046				
n-Pentane	0.010	ND	0.042	ND	0.046	ND	0.046				
Hexanes	0.010	ND	0.042	ND	0.046	ND	0.046				
Heptanes	0.010	ND	0.042	ND	0.046	ND	0.046				
Oxygen/Argon	0.50	ND	2.1	ND	2.3	2.3	2.3				
Nitrogen	1.0	8.4	4.2	9.0	4.6	11	4.6				
Carbon Dioxide	0.010	37	0.042	37	0.046	35	0.046				
Gross Heat of combustion (BTU/FT3)	1.0	540	4.2	534	4.6	514	4.6				
Net Heat of combustion (BTU/FT3)	1.0	486	4.2	481	4.6	463	4.6				

PQL = Practical Quantitation Limit
ND = Not Detected (Below RL)
RL = PQL X Dilution Factor

Reviewed/Approved By: _____ Date: 8/20/19
Mark J. Johnson
Operations Manager

The cover letter is an integral part of this analytical report.

Client: Weaver Consultants Group
Attn: Melissa Green

Client's Project: Total Sulfur Content Composition and Heat Value Testing
Project Number: 0120-174-50-20-02
Date Received: 8/7/2019
Matrix: Vapor
Units: % v/v

Natural Gas Analysis by ASTM-D1945/3588

Lab No.:		K080707-01		K080707-02		K080707-03	
Client Sample I.D.:		1		2		3	
Date/Time Sampled:		8/6/19 12:35		8/6/19 12:49		8/6/19 13:02	
Fixed Gas Date/Time Analyzed:		8/15/19 11:39		8/15/19 11:58		8/15/19 12:21	
Hydrocarbon Date/Time Analyzed:		8/8/19 10:01		8/8/19 10:23		8/8/19 11:08	
Analyst Initials:		CM/AS		CM/AS		CM/AS	
QC Batch #:		190808GC11A1		190808GC11A1		190808GC11A1	
Dilution Factor:		4.2		4.6		4.6	
ANALYTE	PQL	Results	RL	Results	RL	Results	RL
Methane	0.0010	53	0.0042	53	0.0046	51	0.0046
Ethylene	0.010	ND	0.042	ND	0.046	ND	0.046
Ethane	0.010	ND	0.042	ND	0.046	ND	0.046
Propane	0.010	ND	0.042	ND	0.046	ND	0.046
Isobutane	0.010	ND	0.042	ND	0.046	ND	0.046
n-Butane	0.010	ND	0.042	ND	0.046	ND	0.046
Isopentane	0.010	ND	0.042	ND	0.046	ND	0.046
n-Pentane	0.010	ND	0.042	ND	0.046	ND	0.046
Hexanes	0.010	ND	0.042	ND	0.046	ND	0.046
Heptanes	0.010	ND	0.042	ND	0.046	ND	0.046
Oxygen/Argon	0.50	ND	2.1	ND	2.3	2.3	2.3
Nitrogen	1.0	8.4	4.2	9.0	4.6	11	4.6
Carbon Dioxide	0.010	37	0.042	37	0.046	35	0.046
Gross Heat of combustion (BTU/FT3)	1.0	540	4.2	535	4.6	514	4.6
Net Heat of combustion (BTU/FT3)	1.0	486	4.2	481	4.6	463	4.6

PQL = Practical Quantitation Limit
ND = Not Detected (Below RL)
RL = PQL X Dilution Factor

Reviewed/Approved By: _____ Date: 8/22/19
Mark J. Johnson
Operations Manager

The cover letter is an integral part of this analytical report.

QC Batch # 190808GC11A1
Matrix: Air
Units: % v/v

QC for Natural Gas Analysis by ASTM-D1945

Lab No.:	Blank		LCS		LCSD			
Fixed Gas Date/Time Analyzed:	8/15/19 9:56		8/15/19 10:16/15:40		8/15/19 10:35/15:55			
Hydrocarbon Date/Time Analyzed:	8/8/19 9:39		8/8/19 8:54		8/8/19 9:16			
Analyst Initials:	CM/AS		CM/AS		CM/AS			
Dilution Factor:	1.0		1.0		1.0			
ANALYTE	Results	RL	%Rec	Criteria	%Rec	Criteria	RPD	Criteria
Methane	ND	0.0010	102	70-130	101	70-130	0.6	<20
Ethane	ND	0.010	102	70-130	102	70-130	0.7	<20
Propane	ND	0.010	109	70-130	104	70-130	4.5	<20
Isobutane	ND	0.010	111	70-130	104	70-130	6.1	<20
n-Butane	ND	0.010	111	70-130	103	70-130	7.3	<20
Neopentane	ND	0.010	110	70-130	104	70-130	5.5	<20
Isopentane	ND	0.010	111	70-130	100	70-130	10.8	<20
n-Pentane	ND	0.010	110	70-130	100	70-130	9.8	<20
n-Hexane	ND	0.010	103	70-130	96	70-130	7.6	<20
n-Heptane	ND	0.010	113	70-130	88	70-130	25.0	<20
Oxygen/Argon	ND	0.50	101	70-130	100	70-130	0.8	<20
Nitrogen	ND	1.0	101	70-130	100	70-130	0.6	<20
Carbon Dioxide	ND	0.010	95	70-130	95	70-130	0.2	<20

ND = Not Detected (Below RL)
RL = PQL X Dilution Factor

Reviewed/Approved By: _____ Date: 8/22/19
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report.

SOLID WASTE DISPOSAL SITE PERMIT:

Municipal Solid Waste Landfill

Oregon Department of Environmental Quality
165 E. Seventh Ave., Suite 100
Eugene, OR 97401-3049
541-687-7465

Issued as authorized by ORS 459.245 and in accordance with the provisions of Oregon Revised Statutes Chapter 459, 459A, Oregon Administrative Rules 340 Divisions 64, 90, 93, 95, 96 and 97 and subject to the Land Use Compatibility Statement referenced below.

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

541-745-5792

FACILITY NAME AND LOCATION:

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

Section 13&18, T10S, R5&4W, Benton County

OWNER:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

541-745-5792

OPERATOR:

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

541-230-5546

ISSUED IN RESPONSE TO:

- Solid waste permit renewal application received Dec 6, 2019
- Land Use Compatibility Statement from Benton County dated Dec. 20, 2000.

The determination to issue this permit is based on findings and technical information included in the permit record.

ISSUED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Brian Fuller
Material Management Manager
Western Region

July 28, 2020
Date

Permitted Activities

Until this permit expires or is modified or revoked, the permittee is authorized to establish, operate, and maintain a solid waste land disposal site in conformance with the requirements, limitations, and conditions set forth in this document, including all attachments.

TABLE OF CONTENTS

INTRODUCTION

This document is a solid waste permit issued by the Oregon Department of Environmental Quality in accordance with Oregon Revised Statutes (ORS) 459 and Oregon Administrative Rules (OAR), Chapter 340.

SECTION	TOPIC	SEE PAGE
PERMIT ADMINISTRATION		**3**
1.0	PERMIT ISSUANCE	3
2.0	DISCLAIMERS	4
3.0	AUTHORITY	4
4.0	PERMIT MODIFICATION	4
5.0	AUTHORIZATIONS	5
6.0	PROHIBITIONS	6
7.0	OPERATIONS PLAN	7
8.0	RECORDKEEPING AND REPORTING – OPERATIONS	8
9.0	SPECIFIC OPERATING CONDITIONS	9
10.0	SITE DEVELOPMENT AND DESIGN	12
11.0	RECYCLING REQUIREMENTS	13
12.0	CLOSURE CONSTRUCTION AND MAINTENANCE	14
13.0	FINANCIAL ASSURANCE	15
14.0	SITE CHARACTERIZATION	16
15.0	ENVIRONMENTAL MONITORING PLAN	16
16.0	ENVIRONMENTAL SAMPLING REQUIREMENTS	18
17.0	ESTABLISHING PERMIT-SPECIFIC CONCENTRATION LIMITS (PSCLs), ACTION LIMITS (ALs), CONCENTRATION LIMIT VARIANCES (CLVs) AND SITE-SPECIFIC LIMITS (SSLs)	18
18.0	ENVIRONMENTAL MONITORING STANDARDS	19
19.0	RECORDKEEPING AND REPORTING – ENVIRONMENTAL MONITORING	20
20.0	ENVIRONMENTAL MONITORING NETWORK	21
21.0	SUMMARY OF DUE DATES	22
22.0	ATTACHMENT	24

PERMIT ADMINISTRATION

1.0 PERMIT ISSUANCE

1.1 Permittee

This permit is issued to Valley Landfills, Inc.

1.2 Permit number

This permit is DEQ Solid Waste Permit Number 306.

1.3 Permit term

The permit is issued on the date it is signed. The permit's expiration date is June 30, 2030.

1.4 Facility type

The facility is permitted as a municipal solid waste landfill.

1.5 Facility owner/ operator

The owner of this facility is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

The operator of this facility is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

1.6 Basis for permit issuance:

This permit is issued based upon the following documents submitted by the permittee:

- Solid waste permit application received Dec. 6, 2019
- Land Use Compatibility Statements from Benton County dated Dec. 20, 2000

1.7 Definitions

Unless otherwise specified, all terms are as defined in OAR 340-093-0030.

1.8 Legal control of property

The permittee shall at all times maintain legal control of the disposal site property; including maintaining a current permit, contract or agreement that allows the operation of the facility if the site is not owned by the permittee.

1.9 Submittal & notification address

Unless otherwise specified, all submittals and notifications to DEQ under this permit must be sent to:

Oregon Department of Environmental Quality
Manager, Materials Management Program
165 E Seventh Ave., Suite 100
Eugene, OR 97401-3049

Telephone: 541-687-7465

All submittals must include, at a minimum, one paper copy and one electronic copy in a format that is approved by the DEQ project manager. Note that some submittals may require more paper copies. Therefore, the permittee must confirm with the permit manager how many copies are necessary prior to submittal of a document.

Note: Whenever possible, the permittee should submit two-sided paper copies of all reports. DEQ may accept electronic submittals for portions of some reports, as approved in the Environmental Monitoring Plan or by DEQ.

2.0 DISCLAIMERS

2.1 Property rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights.

2.2 Department liability

DEQ, its officers, agents or employees do not sustain any liability on account of the issuance of this permit or on account of the construction, maintenance or operation of facilities pursuant to this permit.

3.0 AUTHORITY

3.1 Ten year permit

This permit is issued for a maximum of 10 years as authorized by Oregon Revised Statutes 459.245 (2).

3.2 Documents superseded

This document is the primary solid waste permit for the facility, superseding all of other solid waste permits issued for Coffin Butte Landfill by DEQ.

3.3 Permittee responsibility and liability

Conditions of this permit are binding upon the permittee. The permittee must conduct all facility activities in compliance with the provisions of the permit. The permittee is liable for all acts and omissions of the permittee's contractors and agents in carrying out the operations and other responsibilities pursuant to this permit.

3.4 Other compliance

This permit's issuance does not relieve the permittee from the responsibility to comply with all other applicable federal, state, or local laws or regulations, including the following solid waste requirements, and any future updates or additions to these requirements:

- Solid waste permit application received Dec. 6, 2019
- Oregon Revised Statutes, Chapters 459 and 459A
- Oregon Administrative Rules Chapter 340
- Any documents submitted by the permittee and approved by DEQ

3.5 DEQ access to disposal site

The permittee shall allow representatives of DEQ access to the disposal facility at all reasonable times for the purpose of making inspections, surveys, collecting samples, obtaining data and carrying out other necessary functions related to this permit.

Reference: OAR 340-093-0050(6).

3.6 Penalties

Violation of permit conditions will subject the permittee to civil penalties of up to $25,000 for each day of each violation.

Reference: ORS 459.995(1)(a)

4.0 PERMIT MODIFICATION

4.1 Five year review

In the permit's 4th to 6th year, DEQ will review the permit and amend it if necessary. DEQ will consider the following factors in making this determination:

- Compliance history of the facility
- Changes in volume, waste composition, or operations at the facility
- Changes in state or federal rules which should be incorporated into the permit

- A significant release of leachate or landfill gas to the environment from the facility
- Significant changes to a DEQ-approved site development plan, and/or conceptual design
- Other significant information or events

4.2 Permit modification

DEQ or the permittee may, at any time during the permit's term, propose to change the permit.

Once approved by DEQ, any permit-required plans become part of the permit by reference. DEQ may provide notice and opportunity for review of permit-required plans.

4.3 Modification and revocation by DEQ

DEQ may, at any time before the expiration date, modify, suspend or revoke this permit in whole or in part, in accordance with Oregon Revised Statutes 459.255, for reasons including but not limited to the following:

- Violation of any terms or conditions of this permit or any applicable statute, rule, standard or order of the Commission;
- Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts
- A significant change in the quantity or character of solid waste received or in the operation of the disposal site

4.4 Modification by permittee

The permittee must apply for a modification to this permit if there is a significant change in facility operations or a deviation from permitted activities.

4.5 Public participation

DEQ will issue a public notice to inform the public of any significant changes to the permit.

4.6 Changes in ownership or address

At least 10 days in advance, the permittee must report to DEQ any change in the facility's ownership or the permittee's or operator's name and/or address.

Reference: OAR 340-093-0070(6)(a)(A)

ALLOWABLE ACTIVITIES

5.0 AUTHORIZATIONS

5.1 Wastes authorized for receipt

This permit authorizes the facility to accept:

- Solid waste as defined in OAR 340-093-0030(91)
- The following waste, when special handling and management requirements for their disposal are included in a special waste management plan approved by DEQ:
  - Cleanup Materials Contaminated with Hazardous Substances as defined in OAR 340-093-0030(19), in accordance with OAR 340-093-0170
  - Waste requiring special management as defined in OAR 340-093-0190
  - Industrial solid wastes as defined in OAR 340-093-0030(53)

5.2 Authorization of other wastes

DEQ may authorize the permittee to accept other waste if:

- The permittee develops a Special Waste Management Plan and submits it to DEQ for review and approval;
- DEQ approves the Special Waste Management Plan
- The permittee can demonstrate that the materials are not hazardous waste, as defined by state and federal regulations or otherwise a threat to human health or waters of the state.

5.3 Tires for recycling

This permit authorizes the permittee to accept up to 100 whole tires at this facility for storage and removal.

This permit authorizes the permittee to accept up to 2,000 whole tires at this facility for storage and removal if the permittee maintains a continuous contract with a waste tire carrier to remove the tires from the site.

5.4 Salvaging and recycling

This permit authorizes the permittee to conduct salvaging and recycling in a controlled and orderly manner. The permittee must notify DEQ prior to changing salvaging and recycling operations. These operations must be described in the site Operations Plan.

6.0 PROHIBITIONS

6.1 Hazardous waste disposal

The permittee must not accept any regulated hazardous waste.

Reference: 40 CFR 258.20 (b).

In the event discovered waste is hazardous or suspected to be hazardous, the permittee must, within 24 hours, notify DEQ and initiate procedures to identify and remove the waste. Hazardous waste must be removed within 90 days, unless DEQ approves otherwise. The permittee's temporary storage and transportation practices must comply with DEQ rules.

6.2 Liquid waste disposal

The permittee must not accept liquid waste for disposal.

Definition: Liquid waste is waste that does not pass the paint filter test performed in accordance with EPA Method 9095B.

6.3 Vehicle disposal

The permittee must not accept discarded or abandoned motor vehicles, including trailers or mobile homes, for disposal.

6.4 Used oil disposal

The permittee must not accept used oil for disposal.

6.5 Battery disposal

The permittee must not accept lead-acid batteries for disposal.

6.6 Tire disposal

The permittee must not accept waste tires for disposal.

6.7 Recyclable material disposal

The permittee must not landfill or dispose of any source separated recyclable material brought to the disposal site.

Exception: If the source separated material is unusable or not recyclable it may be landfilled. DEQ must agree to such disposal and pre-approve the identified sources of unusable source separated material prior to its disposal.

6.8 Open burning

The permittee must not conduct any open burning at the site.

6.9 Electronic waste disposal

The permittee must not knowingly accept the following covered electronic devices for disposal:

- Computer monitors having a viewable area greater than four inches diagonally
- Televisions having a viewable area greater than four inches diagonally

- Desktop computers
- Portable computers

Reference: Oregon Revised Statutes 459.247 and 459A.300-365.

OPERATIONS AND DESIGN

7.0 OPERATIONS PLAN

7.1 Operations plan submittal

Within 270 days of the permit issue date, the permittee must review and submit any necessary updates to the site Operations Plan to DEQ for review and approval. The updated plan must be consistent with the conditions of this permit. A DEQ-approved plan becomes an integral part of the permit.

7.2 Plan content

The Operations Plan must describe facility operations, including the elements listed below, and demonstrate how the facility will comply with all regulatory and permit requirements:

General Topics	Describe plans or procedures for:
General operations	• Screening incoming waste to detect unauthorized or prohibited waste as required by 40 CFR 258.20(a) • Handling and removing unauthorized wastes discovered at the facility • Managing landfill gas • Managing landfill leachate in compliance with Subsection 9.15 • Recirculating landfill leachate & gas condensate in compliance with Subsections 5.5 and 9.15 • Monitoring landslide stability in compliance with Subsection 9.22 • Designing surface water and erosion control structures • Responding to non-compliance events or situations
Disposal operations	• Placing daily and interim cover • Detecting and preventing the disposal of regulated hazardous waste, and any other DEQ-prohibited waste • Disposing of putrescible waste • Disposal, handling and recordkeeping of cleanup materials contaminated with hazardous substances • Waste unloading and handling • Disposing of special waste • Using, stockpiling and tracking the receipt and use of waste approved for use as alternative daily cover • Reducing and controlling the risk of a landfill fire • Fill progression and phasing that is consistent with landslide stability recommendations, and takes into account other operational considerations
Special Waste Management Plan	• Identifying and characterizing special waste (i.e., waste which requires special management or waste streams not otherwise authorized by this permit) • Identifying the source of all special waste • Determining appropriate handling and disposal procedures • Documenting plan implementation, including waste characterization and location of waste disposition References: OAR 340-093-0190, OAR 340-094-0040[11][b][J]
Ancillary operations	• Waste unloading and handling • Solidifying liquid waste prior to disposal

General Topics	Describe plans or procedures for:
	• Handling and removal of waste tires • Placing and maintaining interim cover over inactive landfill areas • Managing transfer containers
Inspection and maintenance	• Washing equipment • Maintaining leachate and gas collection systems • Maintaining monitoring stations and devices • Periodically inspecting the continuity and integrity of primary leachate collection pipes • Maintaining surface water control structures
Operating record	• Establishing and maintaining the operating record
Contingency	• Backup methods for storing and/or disposing of leachate • Providing fire protection equipment, and arrangements made with local fire control agency • Notifying DEQ about emergencies and fires

7.3 Operations and maintenance manual

Within 60 days of the Operations Plan's approval the permittee must prepare and submit an updated Operations and Maintenance Manual which includes detailed inspection and maintenance procedures and an associated schedule for all facility components that require periodic inspection. The manual must include specific procedures for routine preventative maintenance and repairs and for response to emergency situations. The preventative inspection and maintenance program should address the following equipment and facilities: personnel safety equipment, operating equipment, support facilities, environmental control systems, environmental monitoring systems, and the transportation system. The permittee must keep a copy of the Operations and Maintenance Manual with the Operating Record, readily available for DEQ inspection and review.

7.4 Plan and manual updates

The permittee must update and revise both the Operations Plan and the Operations and Maintenance Manual as necessary to reflect current and future facility conditions and procedures.

The permittee must submit any associated revisions or updates to DEQ for review and approval.

7.5 Plan and manual compliance

The permittee must operate the facility in accordance with the approved Operations Plan and Operations and Maintenance Manual, and any amendments to these documents.

8.0 RECORDKEEPING AND REPORTING – OPERATIONS

8.1 Non-compliance reporting

The permittee must take immediate corrective action for any violations of permit conditions or DEQ rules and notify DEQ.

DEQ response: DEQ may investigate the nature and extent of the compliance problem and evaluate the adequacy of the permittee's corrective action plans.

8.2 Permit display

The permittee must display this permit where operating personnel can easily refer to it.

8.3 Access to records

DEQ must have access, when requested, to all records and reports related to the permitted facility.

8.4 Procedures

The permittee's recordkeeping and reporting procedures are as follows:

Step	Action
1	Keep the Operating Record at the facility or at another DEQ-approved location.
2	Place information required by 40 CFR 258.29 and this permit in the Operating Record.
3	During facility operations, record the daily amount of each waste type received and approved alternative daily cover - qualified waste used for daily cover. Record 0 if the waste is not received. *Identify the following waste types received and categorize them as either in- or out-of-state waste:* • Domestic solid waste and construction and demolition waste • Industrial solid waste • Asbestos • Contaminated cleanup materials (except materials counted as alternative daily cover qualified waste) • Approved alternative daily cover qualified waste received • Other (i.e., specify any waste type not included in the above list).
4	If applicable, every quarter, record the amount of each material recovered for recycling or other beneficial purpose.
5	Submit the information collected in Step 3 above on the Solid Waste Disposal Report/Fee Calculation form provided by DEQ. Pay solid waste fees as required by OAR 340-097. Date due: last day of the month following the end of the calendar quarter.
6	Submit the information collected in Steps 3 & 4 above to the Wasteshed Representative on DEQ provided or approved form. Date due: Jan. 25 of each year.
7	Retain copies of all records and reports for 10 years after their creation.
8	Update all records to reflect current conditions at the facility.

8.5 Submittal address

Send required submittals to:

Oregon Department of Environmental Quality
Materials Management Section
Environmental Solutions Division
700 NE Multnomah St., Suite 600
Portland OR 97232

503-229-5913

9.0 SPECIFIC OPERATING CONDITIONS

9.1 Discovery of prohibited waste

If the permittee discovers prohibited wastes, the permittee must notify DEQ within 24 hours and begin to isolate or remove the waste. In addition, the permittee must take digital photos of the prohibited waste to document its quantity, nature, identity and source.

Within 60 days following the discovery, the permittee must transport non-putrescible, non-hazardous prohibited waste to a disposal or recycling facility authorized to accept such waste, unless otherwise approved or restricted by DEQ. The permittee must obtain DEQ's written approval to store putrescible, non-hazardous, prohibited waste.

9.2 Spills notification

Oregon Revised Statue 466.635 and Oil and Hazardous Materials Emergency Response Requirements, Chapter 340, Division 142 require immediate notification to Oregon Emergency Response System (OERS) after taking any required emergency actions to protect human health and the environment when

oil or hazardous materials are spilled. The spill must be immediately reported to OERS at 1-800-452-0311 if the spill is of a reportable quantity. Reportable quantities include:

- *Any* amount of oil spilled to waters of the state
- Oil spills on land in excess of 42 gallons
- Two hundred pounds (25 gallons) or more of spilled pesticide residue
- Spills of hazardous materials that are equal to, or greater than, the quantity listed in the Code of Federal Regulations, 40 CFR Part 302 (List of Hazardous Substances and Reportable Quantities), and amendments adopted before July 1, 2002.

For a complete list of hazardous materials required to be reported, please refer to OAR 340-142-0050.

9.3 Access roads

The permittee must provide all-weather access roads from the landfill property line to the active operational area and the environmental monitoring stations, and maintain them in a manner that prevents traffic hazards, dust and mud.

The permittee must use appropriate means, including truck washing, as needed to prevent haul trucks from tracking mud on external roadways outside the landfill boundaries. Any truck washing activities must be conducted on a hard surface and any disposal of wastewater must be accomplished in a manner approved by DEQ.

9.4 Unloading area

The area(s) for unloading incoming waste must be clearly defined by signs, fences, barriers or other devices. The permittee must minimize width of the unloading area to the maximum extent practicable.

9.5 Daily cover

At the end of each working day the permittee must cover all solid waste with a six inch, or thicker, layer of compacted soil or with a DEQ-approved, alternative daily cover.

9.6 Interim cover

As specified in DEQ-approved design and operations plans, the permittee must place and maintain interim cover over fill areas that will not receive additional waste for an extended period of time [i.e., greater than 120 days] and actively revegetate, in a DEQ-approved manner, any interim cover that will remain exposed for more than two years.

9.7 Surface water structures

The permittee must maintain all stormwater drainage structures in good functional condition, report to DEQ any significant malfunctions or damage and complete repairs within 60 days of discovery the problem.

9.8 Stormwater pollution control plan

The permittee must update and implement the Storm Water Pollution Control Plan consistent with site conditions and the stormwater permit requirements. Refer to the National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 1200-Z. In addition, the permittee must keep a current copy of the permit in the facility Operating Record.

9.9 Asbestos waste management

The permittee must offload and dispose of friable asbestos-containing solid waste as specified in DEQ-approved Operations Plan, Operations & Maintenance Manual, and in OAR 340-248.

9.10 Leachate management systems

The permittee must operate the disposal site in a manner that deters leachate production to the maximum extent practicable, and construct, operate and maintain in good functional condition all DEQ-approved leachate containment, collection, detection, removal, storage and treatment systems. The permittee must remove leachate continuously from all landfill leachate collection systems, to minimize fluid buildup on the bottom liner and prevent the hydraulic head (fluid depth) from exceeding one foot.

9.11 Leachate surface impoundments

The permittee must: 1) completely contain leachate stored within lined surface impoundments; 2) maintain a minimum dike freeboard of two (2) feet above the maximum leachate level in those impoundments unless otherwise approved by DEQ; 3) fence the impoundments to control public access; and 4) lock all gates when no attendant is on duty. In addition, the permittee must post clearly legible, visible signs that describe the surface impoundment's contents and display the words "no trespassing".

9.12 Litter control

The permittee must at all times minimize windblown litter and collect it quickly and effectively to prevent scattering, nuisance conditions and unsightliness.

9.13 Vector control

The permittee must minimize vectors in the active disposal area, including insects, rodents and birds.

9.14 Air emissions

The permittee must control air emissions, including dust, malodors, air toxics, etc. related to disposal site construction, operation and other activities, and comply with DEQ air quality standards.

9.15 Access control

The permittee must control public access to the landfill as necessary to prevent unauthorized entry and dumping.

9.16 Landfill entrance sign

A prominently displayed sign must indicate the following:

- The name of facility
- The emergency telephone number
- The days and hours of operation
- The authorized and prohibited waste
- The Solid Waste Permit number
- The operator's address
- The consequences to haulers if they attempt to dispose of prohibited materials
- Any other information critical to the safe and efficient operation of the facility.

9.17 Fire protection and reporting

The permittee must provide complete and sufficient protection equipment and facilities in accordance with DEQ-approved Operations Plan.

Arrangements must be made with the local fire control agency to immediately acquire their services when needed. The permittee must implement preventative measures to ensure adequate on-site fire control, as determined by the local fire control agency. Fires must be immediately and thoroughly extinguished.

Fires shall be reported to DEQ within 24 hours.

9.18 Water supply

The permittee must provide water in sufficient quantities for fire protection, dust suppression, establishment of vegetation, and other site operations requiring water.

9.19 Landfill gas management

The permittee must control landfill gas in accordance with the requirements of 40 CFR Parts 51, 52 and 60 and OAR 340-094-0060(4).

9.20 Landfill gas control system operation and maintenance

The permittee must operate and maintain the landfill gas control and monitoring systems in good working order as required to prevent nuisance odors, air emissions and landfill gas migration (see methane compliance limits in Section 18).

If critical landfill gas equipment is significantly damaged or compromised, the permittee must replace or repair that equipment, within 60 days of discovering the problem, and submit a written inspection report to DEQ.

10.0 SITE DEVELOPMENT AND DESIGN

10.1 Site development plan

Within 360 days of the permit issue date, the permittee must submit any necessary update to the long-term Site Development Plan to DEQ for review and approval. Once approved, the plan becomes an integral part of this permit.

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes the basic elements of a Site Development Plan. Organizing the plan in accordance with the Guidance will expedite DEQ's review.

10.2 Baseline design criteria

New municipal landfill waste landfill disposal units must include the following engineering controls:

- A composite liner system, including a DEQ-approved geomembrane liner (at least 60 mils thick for high density polyethylene, and at least 30 mils thick for approved alternative geomembranes) and at least two feet of compacted soil with an in-place permeability of 1×10^{-7} cm/sec or less, or a DEQ-approved alternative liner pursuant to 40 CFR Part 258.40(a)(1);
- A primary leachate collection and removal system (LCRS) which fully covers the liner system and maintains a leachate depth of less than a one foot above the liner, per 40 CFR 258.40(a)(2). All leachate collection pipes must be serviceable by clean outs;
- A secondary leachate collection and removal system(s) designed to effectively monitor the overlying composite-liner system's performance and (1) detect and collect leachate at locations of maximum leak probability; and (2) prevent groundwater intrusion and related monitoring biases;
- A leachate collection sump(s) with a double composite liner system and a leak detection and removal system. Each composite liner must meet the minimum design criteria previously cited in this subsection;
- An operations layer that covers and protects the primary LCRS and liner system from physical damage; and
- A leachate surface impoundment (if applicable) with a double liner and leak detection and removal system. One liner must meet the minimum composite liner criteria described above.

10.3 Design plans

At least six months prior to the anticipated construction date for new disposal units, closure of existing units, or development of other ancillary facilities, the permittee must submit engineering design plans to DEQ for review and approval. The design plans must be prepared and stamped by a qualified Professional Engineer with current Oregon registration and specify and/or provide the following:

- All applicable performance criteria, construction material properties and characteristics, dimensions and slopes
- The design basis and all relevant engineering analyses and calculations

10.4 Construction requirements

The permittee must construct all improvements in accordance with:

- The approved plans and specifications
- Any DEQ imposed conditions of approval
- Any future DEQ approved amendments to the plans and specifications
- Construction work must begin within 18 months of plan approval

10.5 Construction documents

Prior to constructing any landfill engineering controls (e.g., final cover, new disposal unit, or other waste containment facilities or improvements), the permittee must submit complete construction documents and receive DEQ's written approval. The construction documents must:

- Define the construction project team
- Specify material and workmanship requirements to guide the constructor in executing work and furnishing products
- Include a Construction Quality Assurance Plan that describes how the project team will monitor the quality of materials and the constructor's work performance and assure compliance with project specifications and contract requirements.

Reference: Follow the current *Solid Waste Guidance* to expedite DEQ review of the construction documents.

10.6 Construction inspection

During construction of a new landfill disposal unit, final cover system, or any other landfill controls or engineered features, the permittee must provide DEQ with a summary and schedule of planned construction activities to facilitate DEQ's inspection and oversight.

10.7 Construction report submittal

Within 90 days of completing construction of a new landfill disposal unit, a final cover system, or other engineering controls, the permittee must submit to DEQ a Construction Certification Report prepared by a qualified independent party. The report must document and certify that the construction of all required components and structures complies with this permit and DEQ-approved design specifications.

10.8 Construction report content

The construction report must include:

- An executive summary describing the construction project and any major problems encountered
- A list of the governing construction documents
- A summary of all construction and construction quality assurance activities
- The manufacturer's written certifications that all geosynthetic materials conform with project specifications
- Test data documenting that soil materials conform with project specifications
- A summary of all construction quality assurance observations, including daily inspection records and test data sheets documenting that materials deployment and installation conform with project specifications
- A description of the problems encountered and the corrective measures implemented
- The designer's acceptance reports for errors and inconsistencies
- A list/description of any deviations from the design and material specifications, including justification for the deviations, copies of change orders and recorded field adjustments, and copies of DEQ's written approvals for deviations and change orders
- Signed certificates for subgrade acceptance prior to placement of soil liner and for acceptance of the soil liner prior to deployment of geomembrane liner
- Photographs and as-constructed drawings, including record surveys of the subgrade, soil liner, granular drainage layer and protective soil layer
- The certification statement(s) and signatures of the construction quality assurance consultant, designer, and facility owner. One of these representatives must be a professional engineer with current Oregon registration.

10.9 Approval to use new disposal units

The permittee must not dispose of solid waste in newly constructed disposal units until DEQ has accepted the Construction Certification. If DEQ does not respond to the Construction Certification Report within 30 days of its receipt, the permittee may place waste in the unit.

11.0 RECYCLING REQUIREMENTS

11.1 Materials

The permittee must provide a place for receiving the following recyclable materials:

☒	ferrous scrap metal	☒	mixed paper
☒	motor oil	☒	non-ferrous scrap metal (including aluminum)

☒	newspaper	☒	corrugated cardboard and kraft paper (brown paper bags)
☒	container glass	☒	tin cans

11.2 Receiving location

The place for receiving recyclable material must be located at the disposal site or at another location more convenient to the population served by the disposal site. The recycling center must be available to every person whose solid waste enters the disposal site.

11.3 Material use

All source separated recyclable materials must be reused or recycled.

11.4 Recycling information

The permittee must provide, to disposal site users, the following recycling information on printed handbills:

- The on-site or off-site location of the recycling center
- The recycling center's hours of operation
- A list of acceptable materials for recycling
- Instructions for preparing source separated recyclable material
- Reasons why people should recycle

11.5 Sign

A prominently displayed sign must indicate the following:

- The availability of recycling at the disposal site or another location

Note: The sign must indicate the recycling center location, if not at the disposal site

- The materials accepted at the recycling center
- The recycling center's hours of operation (if different than disposal site hours)

11.6 Storage

Unless DEQ approves otherwise, all recyclable materials, except car bodies, white goods and other bulky items must be stored in containers.

SITE CLOSURE

12.0 CLOSURE CONSTRUCTION AND MAINTENANCE

12.1 Worst-case closure plan development

Within 90 days of permit issuance, the permittee must develop a conceptual "worst-case" closure plan and a conceptual post-closure plan(s), obtain DEQ approval of the plan(s), and maintain up-to-date copies of these plan(s) in the facility file.

Reference: The plans must comply with 40 CFR, Part 258, Subpart F, and OAR 340-094-0110.

12.2 Notification

The permittee must notify DEQ and receive DEQ approval when the conceptual "worst-case" closure and conceptual post-closure care plans are updated and placed in the file.

12.3 Closure permit

In accordance with OAR 340-094-0100, the permittee must apply for a closure permit at least five years prior to the landfill's anticipated final closure.

12.4 Closure plan approval

At least six months prior to final closure of any portion of the landfill, the permittee must submit detailed engineering plans, specifications, and a closure schedule to DEQ for review and approval.

The design plans must be prepared and stamped by a qualified professional engineer with a current Oregon registration and specify and/or provide the following:

- All applicable performance criteria, construction material properties and characteristics, dimensions and slopes
- The design basis and all relevant engineering analyses and calculations

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes Closure Plan preparation. Following that format will expedite DEQ review of the plan.

12.5 Closure schedule

The permittee must initiate and complete closure of each landfill disposal unit in accordance with 40 CFR 258.60(f)&(g), or an alternate schedule approved by DEQ.

12.6 Final cover

Unless DEQ approves otherwise, the final landfill cover must be:

- At least three feet thick {OAR 340-094-0120(2)(a)}
- Designed to minimize infiltration of precipitation as required by 40 CFR Part 258.60
- Graded to compensate for estimated differential settlement and maintain positive drainage. Final (post-settlement) slopes must range between two percent and 30 percent.

12.7 Vegetation

The permittee must establish and maintain a dense, healthy growth of native vegetation over the closed areas of the landfill consistent with the proposed final use.

12.8 Final cover maintenance.

The permittee must maintain the final surface contours of the landfill cover such that:

- Erosion is minimized and ponding of water is prevented
- The integrity of the cover system is preserved in accordance with the approved plans

The permittee must reconstruct the cover system with approved materials and grade and seed all areas that have settled or where water ponds, and all areas where the cover soil has been damaged or thinned by cracking or erosion. Areas where vegetation has not been fully established shall be fertilized, re-seeded and maintained. Any damage repair or other reconstruction of a geomembrane barrier component in the final cover system shall be conducted in accordance with a construction quality assurance plan approved by the DEQ.

12.9 Slope stability

The permittee must maintain the stability of the landfill slopes and the overall structural integrity of the landfill.

12.10 Deed record

Within 30 days after the disposal site's final closure, the permittee must record a notation on the deed to the facility property as required by 40 CFR 258.60(i) and OAR 340-094-0130(1)(a), and submit a copy of the notation on the deed to DEQ.

13.0 FINANCIAL ASSURANCE

13.1 Financial assurance plan

The permittee must submit an updated financial assurance plan to the DEQ for review and approval and provide financial assurance for the costs of site closure, post-closure care, and potential corrective action. In addition, the permittee must place the plan in the facility file.

Reference: The plan must be prepared in accordance with OAR 340-094-0140. Acceptable mechanisms are described in OAR 340-094-0145.

13.2 Financial assurance required.

The permittee must comply with applicable financial assurance criteria requirements prescribed by OAR 340-094-0140. The permittee must maintain an up-to-date Financial Assurance Plan in the facility Operating Record, and provide financial assurance for landfill closure, post-closure care and, if required, corrective action. The financial assurance provided must:

- Be in the amount required by OAR 340-094-0140(5)
- Be updated, annually, in accordance with OAR 340-094-0140(6)(e)
- Consist of a financial assurance mechanism complying with OAR 340-094-0145

13.3 Recertification of financial assurance.

The permittee must annually review and update their financial assurance in accordance with OAR 340-094-0140(6)(e).

By April 1 of each year, a notarized annual recertification of financial assurance must be submitted to DEQ demonstrating that this review has been completed. If a discount rate is used to estimate costs, the annual update must also include the certifications listed in OAR 340-094-0140(6)(d).

13.4 Use of financial assurance

The permittee must not use the financial assurance for any purpose other than to finance the permitted facility's approved closure, post-closure, and corrective action activities or to guarantee that those activities will be completed.

13.5 Continuous nature

The permittee must continuously maintain financial assurance for the facility until the permittee or other person owning or controlling the site is no longer required by DEQ to demonstrate financial responsibility for closure, post-closure care or corrective action.

ENVIRONMENTAL MONITORING

14.0 SITE CHARACTERIZATION

14.1 Workplan

At least 270 days prior to any new landfill construction or expansion beyond the currently characterized and approved footprint, the permittee must submit two (or more) copies of a detailed workplan to DEQ for review and approval. The workplan must summarize all site characterization completed to date, describe further site characterization that will be accomplished and include at least the following elements:

- A description of the landfill expansion
- A proposal for monitoring all relevant media within the expansion area
- An update to the Environmental Monitoring Plan that reflects all approved changes to the facility
- A detailed description of the planned investigation
- A detailed project schedule

14.2 Site characterization report

Within 180 days of DEQ's approval of the workplan, the permittee must submit at least two copies of the report to DEQ for review and approval. This report must be based on DEQ-approved workplan and any conditions of the approval. The report must be prepared and stamped an Oregon registered geologist or an Oregon registered engineering geologist. The permittee must submit the report and receive DEQ's approval before starting construction or operation of the new landfill area. Once approved, this report and any conditions of approval become an integral part of the permit.

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes the applicable elements of a Site Characterization Report. Organizing the report in that manner will expedite DEQ's review of the plan.

15.0 ENVIRONMENTAL MONITORING PLAN

15.1 Environmental Monitoring Plan Submittal

Within 120 days when requested by DEQ, the permittee must submit an updated Environmental Monitoring Plan to DEQ for approval.

Major changes in updates to the original plan require that the entire plan be submitted as a stand-alone document; at a minimum, this must be done at least once every 10 years. The plan, or any updates to the plan, must be prepared and stamped by an Oregon registered geologist or an Oregon registered engineering geologist. Upon approval, this plan is incorporated into this permit by reference.

15.2 Environmental Monitoring Plan contents

The updated plan must include plans (other than monitoring that is already handled by an NPDES permit) implementing an environmental monitoring program that will characterize potential facility impacts, including leachate collection, containment, treatment and disposal. The updated plan may incorporate parts of the previous approved plan with any changes or additions since that time (i.e., approved permit-specific concentration limits, revised parameter lists, revised schedules and new wells).

The updated plan must include the following contents, as well as applicable elements from the reference document:

- Monitoring Network Design and Construction
- Sampling and Analysis Plan
- Field QA/QC Procedures
- Lab QA/QC Procedures
- Data Analysis and Evaluation
- Report Format and Executive Summary

Reference: The *Solid Waste Landfill Guidance, September 1996,* provides information on applicable elements of an Environmental Monitoring Plan. Following the organizational format provided in the Guidance will expedite DEQ review of the plan.

15.3 Environmental Monitoring Plan revisions and updates

The permittee must revise the current plan as necessary to reflect current and future environmental conditions, facility development and regulatory requirements. A geologist or certified engineering geologist, with current Oregon registration, must prepare and stamp the plan revisions and submit two copies (one printed and one electronic) to DEQ for review and approval.

15.4 Environmental Monitoring Plan public comment period

Plan changes may require a public comment period.

15.5 Long-term monitoring plan

After DEQ approves any Risk-Based Concentration Limits (RBCs), Permit-Specific Concentration Limits (PSCLs), Concentration Limit Variances (CLVs), Action Limits (ALs), or Site-Specific Limits (SSLs), the permittee must update the EMP to reflect the long-term monitoring program and submit the updated plan for DEQ review and approval.

Note: Also see this permit's requirements for establishing PSCLs, ALs, or SSLs and OAR 340-040-0030(4) for procedures to establish CLVs.

15.6 Leak Detection System

Any significant increase in flow rate in the leak detection system (or degradation of water quality) that have not been corrected (or significant progress made) within two years, also require an updated plan submittal. This plan update is required if a statistical analysis indicates that normal monitoring of detection and compliance sampling points have shown a degradation of water quality. The analysis should cover the period of time from before the changes to after the increased leakage (or degradation of water quality) occurred. The updated plan submittal must detail any proposed increases in frequency or parameter monitoring, as well as any additional monitoring points.

15.7 Additional monitoring points

The permittee must incorporate any new or replacement monitoring point or device into the Environmental Monitoring Plan and submit the updated plan to DEQ for review and approval.

15.8 Environmental Monitoring Plan Compliance

The permittee must conduct all environmental monitoring at the facility in accordance with the approved plan, including any conditions of approval, amendments and updates.

16.0 ENVIRONMENTAL SAMPLING REQUIREMENTS

16.1 Notification of sampling events

The permittee must notify DEQ, in writing, at least 10 working days prior to a scheduled sampling event.

16.2 Split sampling events

The permittee must split samples with DEQ at DEQ's request, and schedule split-sampling events with DEQ's laboratory at least 45 days ahead of time.

Oregon Department of Environmental Quality
Laboratory, Groundwater Monitoring Section
7202 NE Evergreen Parkway, Suite 150
Hillsboro, OR 97124
Phone: 503-693-5700 Fax: 503-693-4999

The permittee must conduct the following split sampling events with DEQ:

Fall or Spring 2024 (TBD)
Fall or Spring 2029 (TBD)
Other sampling events if requested by DEQ

16.3 Monitoring schedule

The permittee must refer to the approved EMP for environmental monitoring procedures. Quarterly monitoring benchmarks are defined below:

If sampling in the...	Schedule the sampling event	
	On, or after....	But on, or before...
Winter	Jan. 1	Feb. 28
Spring	April 1	May 31
Summer	July 1	Aug. 31
Fall	Oct. 1	Nov. 30

16.4 Monitoring after Environmental Monitoring Plan approval

The permittee must monitor the facility in accordance with: 1) the approved plan; 2) any conditions of DEQ's approval; and 3) any DEQ-approved amendments and updates.

16.5 Changes in sampling or split sampling

The permittee must submit a written request and obtain DEQ's written approval before changing the sampling program, including sampling frequency, parameters, or locations. Approved changes will become an integral part of the plan.

DEQ reserves the right to add to or delete from the list of scheduled sampling events, sampling locations, and sampling parameters, and to conduct unscheduled sampling or split sampling events.

If the split-sampling schedule changes, DEQ will try to notify the permittee at least 30 days prior to the next scheduled event.

17.0 ESTABLISHING PERMIT-SPECIFIC CONCENTRATION LIMITS (PSCLs), ACTION LIMITS (ALs), CONCENTRATION LIMIT VARIANCES (CLVs) AND SITE-SPECIFIC LIMITS (SSLs)

17.1 Gathering data

The permittee must monitor the designated background wells in accordance with the approved Environmental Monitoring Plan or propose an alternative intrawell approach. Site specific limits (SSLs) exist for several parameters at two wells and remedial action concentration limits exist for additional parameters at some other wells. Background monitoring shall continue until all necessary data sets have been collected, and may be used for creation of additional PSCLs, ALs and/or SSLs for parameters of concern. The permittee then must demonstrate to DEQ's satisfaction that the selected background-data set is valid and unaffected by facility releases.

17.2 Future disposal units or cells

Before using a new landfill unit or cell for waste disposal, the permittee must collect enough samples to determine background groundwater quality. Alternatively, the permittee may develop a program, to be approved by DEQ, for determining background groundwater quality with wells installed at the time of landfill cell construction.

17.3 Statistical analysis

To establish compliance concentration limits (PSCLs, ALs, and SSLs), the permittee must perform statistical evaluations of the monitoring results for each sampling event.

Use methods outlined in 40 CFR 258.53 or other DEQ accepted statistical methods.

References:

The permittee should use methods outlined in Environmental Protection Agency's "Statistical Analysis of Groundwater Monitoring at RCRA facilities" (March 2009) or other DEQ accepted statistical methods. DEQ's 2011 Guidance Document "Developing Concentration Limits at Permitted Solid Waste Facilities" provides some examples of acceptable methods.

17.4 Proposing PSCLs, ALs, and/or SSLs

The permittee must propose for DEQ's review and approval, a PSCL, AL or SSL pursuant to the guidelines specified in OAR 340-040. The proposal must address all required parameters. Once a statistically valid data set (at least nine acceptable data points) are established from the appropriate background well(s), the permittee may generate a PSCL, AL, or SSL for each designated, long-term monitoring parameter.

17.5 Changing PSCLs, ALs, and/or SSLs

If the permittee demonstrates to DEQ's satisfaction that background groundwater quality has significantly changed since the PSCL, AL or SSL was established, and if the change is unrelated to the permitted facility's influence, the permittee can propose to DEQ a revised level for the affected PSCL(s), AL(s) or SSL(s).

17.6 Establishing and changing CLVs

The permittee should refer to DEQ's Groundwater Quality Protection Rules [OAR 340-040-0030(4)] for guidance in establishing and changing Concentration Limit Variances (CLVs).

18.0 ENVIRONMENTAL MONITORING STANDARDS

18.1 Applicable regulatory standard

The permittee must not allow the release of any substance from the landfill into groundwater, surface water, or any other media which will result in a violation of any applicable federal or state air or water limit, drinking water rules, or regulations, beyond the solid waste boundary of the disposal site or an alternative boundary specified by DEQ. Refer to OAR 340-094-0080.

18.2 Compliance points

Compliance wells are defined in the most current site Environmental Monitoring Plan.

18.3 Review of results

The permittee must review the analytical results after each monitoring event according to the protocols established in the most currently approved site-specific Environmental Monitoring Plan.

18.4 Resampling results

Upon receipt of data from resampling, the permittee must review the analytical results according to the protocols established in the most currently approved site-specific Environmental Monitoring Plan.

18.5 Secondary leachate collection system (SLCS)

If the permittee observes liquids in the leak detection system, the permittee must respond in accordance with the approved plan procedures for sampling, analysis and reporting. If testing confirms landfill impacts

in the leak detection or secondary leachate collection system, and that system is compromised as a compliance point, DEQ may require the permittee to install additional detection or compliance wells and conduct further investigations.

The permittee must design each secondary leachate collection system-equipped landfill cell or sub-unit to allow for discrete sampling of the secondary leachate collection system without mixing, co-mingling or compositing of samples with other leachate sources.

18.6 Methane limits

The methane concentration must not exceed:

- Twenty-five percent of methane's Lower Explosive Limit in onsite structures (excluding gas control structures or gas recovery system components)
- Methane's Lower Explosive Limit at the facility property boundary

Note: Methane's Lower Explosive Limit is equal to a concentration of five percent by volume in air.

18.7 Methane exceedance

If methane levels exceed the specified limits, the permittee must:

1. Take immediate steps to protect human health and safety and notify DEQ within 24 hours
2. Within seven days of detection, confirm the measures taken to protect human health and safety (unless DEQ approves an alternative schedule), and describe the methane test results and response measures in the facility operating record
3. Within 60 days of the methane exceedance, develop and implement a remediation plan, incorporate the plan into the monitoring records, and submit a progress report to DEQ.

18.8 Certified environmental laboratory data

To assure the best possible data quality, DEQ requests that the permittee contract with environmental labs certified under the Oregon Environmental Laboratory Accredited Program (ORELAP) or the National Environmental Laboratory Accreditation Program (NELAP). The permittee should include a copy of the lab's certification with every data submittal. Use of an ORELAP or NELAP approved lab will facilitate DEQ's future review of Environmental Monitoring Plan updates, Annual Environmental Monitoring Reports, and RI/FS documents.

19.0 RECORDKEEPING AND REPORTING – ENVIRONMENTAL MONITORING

19.1 Annual Environmental Monitoring Report (AEMR)

Prior to March 31 of each year, the permittee must submit to DEQ two copies (one paper copy and one electronic copy) of an annual monitoring report for the previous calendar year's monitoring period. The report must conform to the format detailed in the approved plan and be prepared and stamped by a geologist or a certified engineering geologist, with current Oregon registration. Extensive ancillary information such as laboratory reports, and the historical analytical database, may be provided only in the electronic copy and not in the printed copy.

Note: The permittee should submit two-sided copies of all reports and may submit electronic submittals of reports.

19.2 Statement of compliance

The Annual Environmental Monitoring Report must include a brief (approximately one-page) cover letter that:

- Compares the analytical results with the relevant monitoring standards (RBCs, PSCLs, CLVs, ALs, or SSLs)
- Documents any exceedances of or federal or state standards for relevant media
- Documents any significant change in water quality, land quality, air quality or methane levels in monitored media

19.3 Annual Environmental Monitoring Report contents

The Annual Environmental Monitoring Report must reflect the facility's current conditions, present accurate data that correspond with the original field and lab data, and include the elements presented in the most recently approved plan.

19.4 Annual leachate treatment report

Prior to March 31 of each year, the permittee must submit an annual leachate monitoring report.

Reference: The report format should reflect DEQ's guidance: *Solid Waste Landfill Guidance*, September 1996, or the format presented in the most recently approved plan.

19.5 Annual leachate treatment report contents

This annual report must include the elements presented in the most recently approved plan.

Reference: The report format should reflect DEQ's guidance: *Solid Waste Landfill Guidance*, September 1996, or the format presented in the most recently approved plan.

19.6 Split sampling submittal

Within 90 days of any split sampling event, the permittee must submit the following information to DEQ's laboratory:

- A copy of all information pertinent to the sample collection handling, transport and storage, including field notes
- Copies of all laboratory analytical reports
- Copies of all laboratory Quality Assurance Quality Control reports
- A copy of the lab certification (ORLAP or NVLAP, see Certified Environmental Lab Data condition above)
- A hydrogeologic map of the site showing groundwater flow directions and water table contours
- Any other data or reports requested by DEQ

19.7 Lab address

Report all required split sampling information to:

Oregon Department of Environmental Quality
Laboratory, Groundwater Monitoring Section
7202 NE Evergreen Parkway, Suite 150
Hillsboro, OR 97124

Phone: 503-693-5700 Fax: 503-693-4999

19.8 DEQ response to split samples

If the permittee submits all required split sampling data and requests DEQ's results, DEQ's lab may provide, to the permittee, copies of the following information:

- DEQ's analysis of the split sample
- The QA/QC report
- The analytical report
- The field data sheets

20.0 ENVIRONMENTAL MONITORING NETWORK

20.1 Monitoring device installation

For future disposal units or cells, the permittee must install DEQ-approved background and detection and/or compliance wells at least 12 months before refuse disposal occurs in the new cells. A Site Characterization Report may also be required for any proposed new cell. DEQ may waive or modify this requirement if the permittee provides adequate justification for an alternative approach.

20.2 Monitoring stations and equipment

To assure that every sample is representative of the site's environmental conditions, the permittee must protect, operate, and maintain all environmental monitoring stations and equipment in accordance with DEQ's requirements.

20.3 Access to monitoring stations and equipment

To facilitate sample collection and/or inspection and maintenance activities, the permittee must maintain reasonable all-weather access to all monitoring stations and associated equipment.

20.4 Reporting equipment damage

Within 14 days of discovering any damaged monitoring equipment or station, the permittee must submit to DEQ a report describing the damage, the proposed repair or replacement measures, and the schedule to complete this work.

Example: a well's impaired function or altered position/location.

20.5 Monitoring well construction

The permittee must complete any monitoring well or gas monitoring probe abandonment (decommissioning), replacement, repair, or installation in a manner that complies with the Water Resources Rules, OAR 690-240, and with DEQ's *Guidelines for Groundwater Monitoring Well Drilling, Construction, and Decommissioning*, dated August 1992.

20.6 Reporting well construction and repairs

The permittee must document all monitoring well or gas probe repair and construction activities, including driller's logs, well location information, and construction information in a report prepared and stamped by a geologist or certified engineering geologist, with current Oregon registration. The permittee must submit the report to DEQ within 30 days of the action and include this documentation in the next Annual Environmental Monitoring Report.

20.7 Well decommissioning or replacement

The permittee must submit a written recommendation to DEQ prior to decommissioning or replacing any well or gas monitoring probe in the monitoring network. After receiving DEQ's approval, the permittee must decommission or replace any well or gas probe that meets the following criteria:

- The well or gas probe was installed in a borehole that hydraulically intersects two saturated stratas
- The permittee lacks supporting documentation demonstrating that the well or gas probe was properly installed and constructed
- The well or gas probe was damaged beyond repair or destroyed
- Other reasons as determined by either the permittee or DEQ

COMPLIANCE SCHEDULE

21.0 SUMMARY OF DUE DATES

21.1 Summary

The permittee must comply with the event-driven schedule shown below. This compliance schedule does not apply to many of the routine reporting requirements specified in other sections of the permit.

Due Date	Activity	See section...
120 days prior to new landfill construction or expansion	Submit updated Environmental Monitoring Plan	15.1 Environmental Monitoring Plan submittal
Within 90 days of permit issuance	Review and submit conceptual "worst-case" closure and post closure plan	12.1 Worst case closure plan development

April 1st of each year	Submit financial assurance plan and mechanism	13.3 Recertification of financial assurance
Within 360 days of permit issuance	Review and submit site development plan update	10.1 Site development plan
Within 270 days of permit issuance	Submit updated Operations Plan	7.1 Operations plan submittal
Within 60 days of Operations Plan approval	Submit updated Operations and Maintenance Manual	7.3 Operations and Maintenance Manual
By March 31 for each year	Submit an Annual Environmental Monitoring Report	19.1 Annual Environmental Monitoring Plan
By March 31 for each year	Submit an Annual Leachate Treatment Report	19.4 Annual leachate treatment report
SAMPLING:		
At least 10 working days prior to scheduled sampling event	Notify DEQ	16.1 Notification of sampling events
At least 45 days prior to split sampling event	Schedule split sampling event with DEQ laboratory	16.2 Split sampling events
Within 90 days of split sampling event	Submit required data/documents to DEQ laboratory	19.6 Split sampling submittal
EVENTS:		
Within 30 days of DEQ notification of need to install monitoring well or probe	Install groundwater monitoring well and/or probe	20.1 Monitoring device Installation
Within 30 days of any well construction	Submit well construction report	20.6 Reporting well construction and repairs
At least 6 months before any new disposal unit and/or closure construction	Submit engineering design plans and, if applicable, closure schedule	10.3 Design plans 12.4 Closure plan approval
At least 270 days prior to new construction or expansion	Submit a Site Characterization Report Workplan	14.1 Workplan
Within 180 days of DEQ approval of SCR workplan	Submit a Site Characterization Report	14.2 Site characterization report
Within 90 days after completion of any major construction	Submit Construction Certification Report	10.7 Construction report submittal
Within 18 months of plan approval	Begin construction	10.4 Construction requirements

ATTACHMENTS

22.0 ATTACHMENT

Attachments to the permit include:

Number	Description
1	Parameter Groups
2	Permit-specific concentration limits

22.1 Attachment 1: Parameter Groups

Overview

This attachment describes the environmental-monitoring parameter groups and associated requirements

Due to the duration of this permit, suggested analytical methods may change. If that is the case, use the most currently promulgated EPA method or DEQ-approved equivalent.

Note: Method means EPA SW 846 Method [suggested methods are in square brackets].

Group 1a: Field indicators

The field indicators parameter group includes the following parameters:

Elevation of water level
pH
Temperature
Specific Conductance
Dissolved Oxygen
Eh

With instruments calibrated to relevant standards, measure these parameters in the field when collecting samples. Acceptable methods include:

- Down-hole in situ
- In a flow-through well
- Immediately following sample recovery

Group 1b: Leachate indicators

The laboratory indicators parameter group includes the following parameters:

Total Dissolved Solids (TDS)
Total Suspended Solids (TSS)
Total Organic Carbon (TOC)
Chemical Oxygen Demand (COD)

Proper techniques for sample handling, preservation, and analysis are specific to each individual analyte: Follow appropriate EPA techniques or AWWA Standard Methods.

Group 2a: Common anions and cations

The common anions and cations parameter group includes the following parameters:

Calcium (Ca)
Sulfate (SO_4)
Total Ammonia (NH_3+NH_4)
Sodium (Na)
Nitrate (NO_3)
Silicon (Si)
Iron (Fe)
Manganese (Mn)
Magnesium (Mg)
Chloride (Cl)
Carbonate (CO_3)
Potassium (K)
Bicarbonate (HCO_3)

Dissolved concentrations must be measured. Field-filter and field-preserve samples according to standard DEQ and/or EPA guidelines and analyze by appropriate EPA or AWWA Standard Methods techniques. Report results in mg/L and meq/L.

Group 2b: Trace metals

The trace metals parameter group includes the following parameters:

Antimony (Sb)	Chromium (Cr)	Selenium (Se)
Arsenic (As)	Cobalt (Co)	Silver (Ag)
Barium (Ba)	Copper (Cu)	Thallium (Tl)
Beryllium (Be)	Lead (Pb)	Vanadium (V)
Cadmium (Cd)	Nickel (Ni)	Zinc (Zn)

If the Total Suspended Solids concentration is...	analyze for...
less than or equal to 100.0 mg/L in the sample	total concentrations (unfiltered)
Greater than 100.0 mg/L in the sample	both total (unfiltered) and dissolved (field-filtered)

Field-preserve samples according to standard DEQ and/or EPA guidelines and analyze by EPA Method 6010C or DEQ-approved equivalent.

Group 3: Volatile organic constituents

Analyze for all compounds detectable by EPA Method 8260B (C- other method 8/06) or EPA Method 524.2, include a library search to identify any unknown compounds present. The volatile-organic-compounds parameter group is equivalent to the EPA Method 8260B list.

DEQ must pre-approve alternative methods like EPA Method 8021B

Group 4: Assessment monitoring

The assessment monitoring parameter group includes the following parameters:

Semi-volatile Organic Constituents, including Phenols, EPA Method 8270D
Mercury, EPA Method 7470A
Cyanide, EPA Method 9010C (manual distillation) or 9012B (automated distillation)
Nitrite

All Method 8270D analyses must include a library search to identify any unknown compounds present.

Group 5: Surface water and leachate

The surface water parameter group includes the following parameters:

Total Kjeldahl Nitrogen (TKN)	Total Coliform Bacteria [EPA Method 9131]
Total Phosphorus (P)	Fecal Coliform Bacteria [EPA Method 9131]
Orthophosphate (PO_4)	E. Coli
Biological Oxygen Demand (BOD)	

22.2 Attachment 2: Remedial Action Concentration Limits and Permit Specific Concentration Limits

In accordance with OAR 340-040-0050(2) and as defined in the site Record of Decision (dated October 2004); Remedial Action Concentration Limits are established for the "west side" monitoring points specified in Section 18.2 of this permit as follows:

Compound	RACL	Basis	COPC
Volatile Organic Compounds (µg/L)			
1,4-Dichlorobenzene (1,4-DCB)	75	MCL/RL	Yes
Tetrachloroethene (PCE)	5	MCL	Yes
Trichloroethene (TCE)	5	MCL/RL	Yes
Vinyl chloride	2	MCL/RL	Yes
Trace Metals (µg/L)			
Antimony	6	MCL	No
Arsenic	10	MCL	Yes
Barium	1,000	RL	No
Beryllium	4	MCL	No
Cadmium	5	MCL	Yes
Chromium	50	RL	No
Lead	50	RL	No
Nickel	100	MCL	No
Selenium	10	RL	No
Silver	50	RL	No
Thallium	2	MCL	No
Dissolved Metals (µg/L)			
Iron	300	SMCL	Yes
Manganese	50	SMCL	Yes
Inorganic Compounds (mg/L)			
Chloride	250	SMCL	Yes
Total Dissolved Solids (TDS)	500	SMCL	Yes

RACL: Remedial Action Concentration Limit

Basis: The lower of either Federal primary Maximum Contaminant Level (MCL) or State Reference Level (OAR 340-040-0020, Tables 1 through 3).

SMCL: Secondary MCL

COPC: Chemical of Potential Concern

In accordance with Section 17 of this permit, Permit-Specific Concentration Limits are established for the "east side" monitoring points specified in Section 18.2 of this permit as follows:

Site Specific Limits for MW 26 and 27
Assumes 2 Compliance Wells, 7 or 8 COCs, Semiannual Sampling

Indicator Parameters (Date set: 2011-2018)	Statistical Distribution	Prediction Limits (mg/L)		Retesting
		MW-26	MW-27	
Bicarbonate	Normal	175[a]	495	1 of 2
Chloride	Normal	6.2	15.0	1 of 2
TDS	Normal	246[a]	499	1 of 2
Calcium	Normal	32.0[a]	100	1 of 2
Iron	NP/Normal	4.5	17.6	1 of 2
Magnesium	Normal	10.1	46.0	1 of 2
Manganese	Normal	0.74	8.9	1 of 2
Sodium	Normal	30.0	44.4	1 of 2

Note: [a] surrogate value calculated from MW-22.
Retesting scenario achieves annual site wide false positive rate of 10% per EPA Unified guidance.

EXHIBIT 14
COFFIN BUTTE LANDFILL EXPANSION ODOR DISPERSION MODELING STUDY

Coffin Butte Landfill Expansion
Odor Dispersion Modeling Study

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

SCS ENGINEERS

Project No. 24224358.00 | October 22, 2024

5963 La Place Court, Suite 207
Carlsbad, CA 92008
760-744-9611

Table of Contents

Section Page

1.0 INTRODUCTION 1
2.0 FACILITY DESCRIPTION 2
2.1 Location 2
2.2 Local Land Use / Zoning 3
2.3 Terrain / Topography 4
2.4 Climate and Meteorology 5
2.5 Potential Odor Activities 10
2.6 Odor Monitoring and Control Measures 10
2.7 Odor Complaint History 10
2.8 Proposed Project 13
3.0 METHODOLOGY 14
3.1 Model Selection 14
3.2 Source Parameters 14
3.3 Building Downwash 17
3.4 Receptors 17
3.5 Meteorological Data 18
3.6 Terrain Data 18
3.7 Model Options 18
3.8 Nuisance Odor Threshold 18
4.0 RESULTS 19
5.0 CONCLUSIONS 24
6.0 REFEFENCES 25

Appendices

Appendix A CBLF and KCVO Windrose Comparison

Figures

Figure 1. Facility Location 2
Figure 2. Local Zoning Map 3
Figure 3. Elevation Contour Map 4
Figure 4. Nearby Weather Monitoring Stations 6
Figure 5. CBLF On-Site 3-Year Windrose 7
Figure 6. Corvallis Municipal Airport (KCVO) 3-Year Windrose 8
Figure 7. Salem-McNary Field (KSLE) 3-Year Windrose 9
Figure 8. Odor Complaints by Time of Day 11
Figure 9. Odor Complaint Locations (View 1 of 2) 12
Figure 10. Odor Complaint Locations (View 2 of 2) 12
Figure 11. Proposed Expansion Area (Taxlot 104180001107) 13
Figure 12. Modeled Area Source Locations 16
Figure 13. Nested Receptor Grid 17
Figure 14. Peak 1-Hour Off-site Odor Impact Locations 19
Figure 15. Source #1 Odor Concentration D/T Contours (Scenario #3, View 1 of 4) 20
Figure 16. Source #1 Odor Concentration D/T Contours (Scenario #3, View 2 of 4) 20
Figure 17. Source #1 Odor Concentration D/T Contours (Scenario #3, View 3 of 4) 21
Figure 18. Source #1 Odor Concentration D/T Contours (Scenario #3, View 4 of 4) 21
Figure 19. Source #2 Odor Concentration D/T Contours (Scenario #3, View 1 of 4) 22
Figure 20. Source #2 Odor Concentration D/T Contours (Scenario #3, View 2 of 4) 22
Figure 21. Source #2 Odor Concentration D/T Contours (Scenario #3, View 3 of 4) 23
Figure 22. Source #2 Odor Concentration D/T Contours (Scenario #3, View 4 of 4) 23

Tables

Table 1. Nearby Weather Monitoring Stations 5
Table 2. Odor Complaints by Season 10
Table 3. Source Parameters Modeled 15
Table 4. Modeling Scenarios 18
Table 5. Peak 1-Hour Off-site Odor Concentrations 19

1.0 INTRODUCTION

The Coffin Butte Landfill (CBLF) is proposing to expand the waste disposal area of the landfill by using an existing property just south of Coffin Butte Road. The goal of this study was to conduct an odor dispersion modeling analysis that compares the existing and proposed operating scenarios for potential nuisance odor impacts. Since odor is a subjective human response, odor dispersion modeling was used to provide an objective approach towards understanding how on-site emissions of odor potentially impact off-site locations.

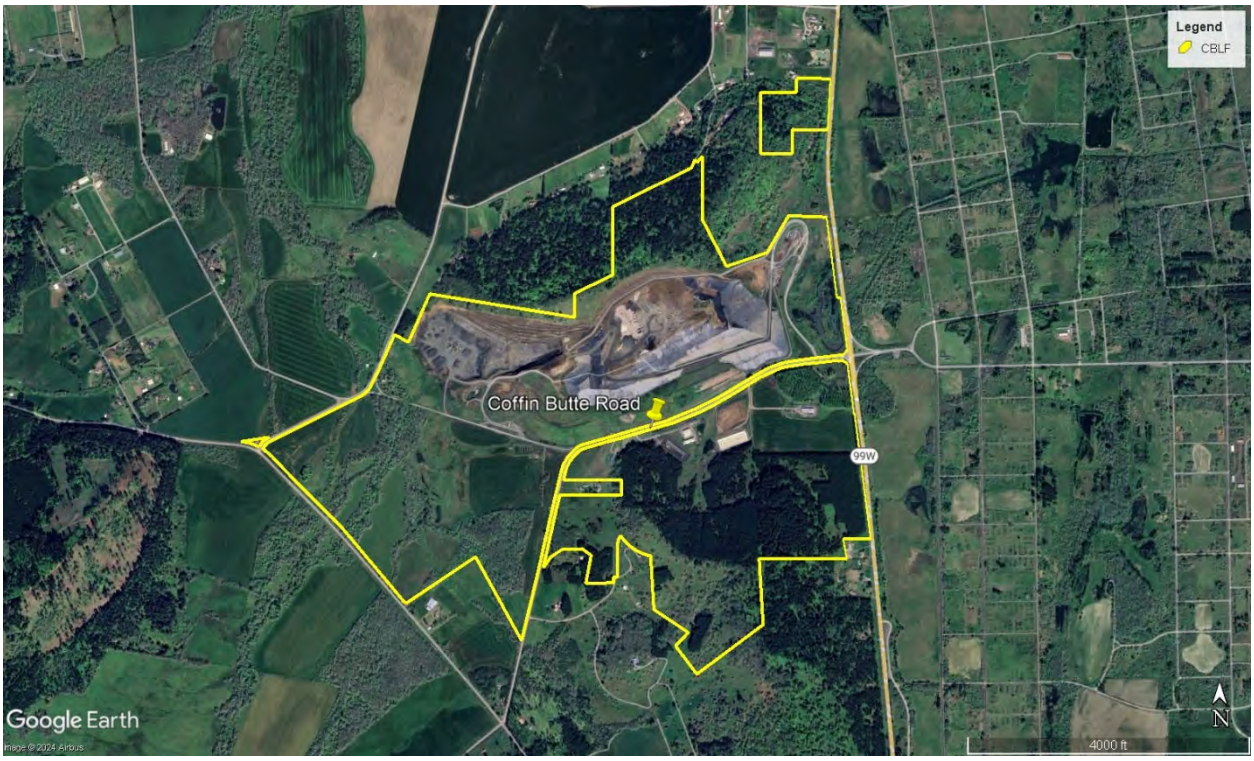
Following this Introduction, Section 2 provides a description of the facility. Section 3 describes the methodology used in this study while Section 4 summarizes the results. Section 5 then presents the conclusions. Finally, the appendices provide supporting documentation.

2.0 FACILITY DESCRIPTION

2.1 LOCATION

The CBLF is located at 28972 Coffin Butte Road in Corvallis, Oregon (Benton County). The facility is located just west of Highway 99W, approximately nine miles north of downtown Corvallis. Coffin Butte Road runs through the facility. See Figure 1 for the CBLF property boundary [1].

Figure 1. Facility Location

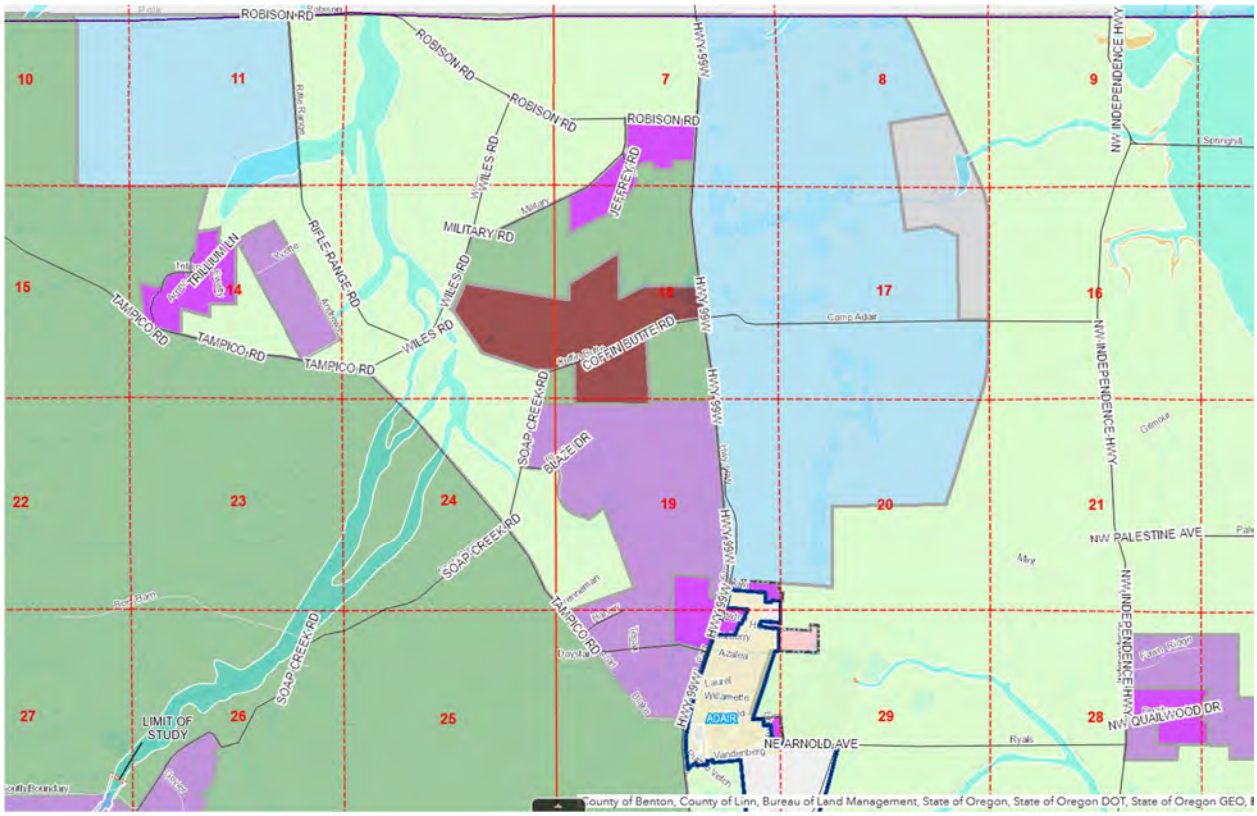


Note: Google Earth imagery from April 18, 2024.

2.2 LOCAL LAND USE / ZONING

Local land usage impacts air dispersion as surface characteristics differ for rural and urban conditions. Local land use near the CBLF is rural based upon the zoning map in Figure 2 [2].

Figure 2. Local Zoning Map



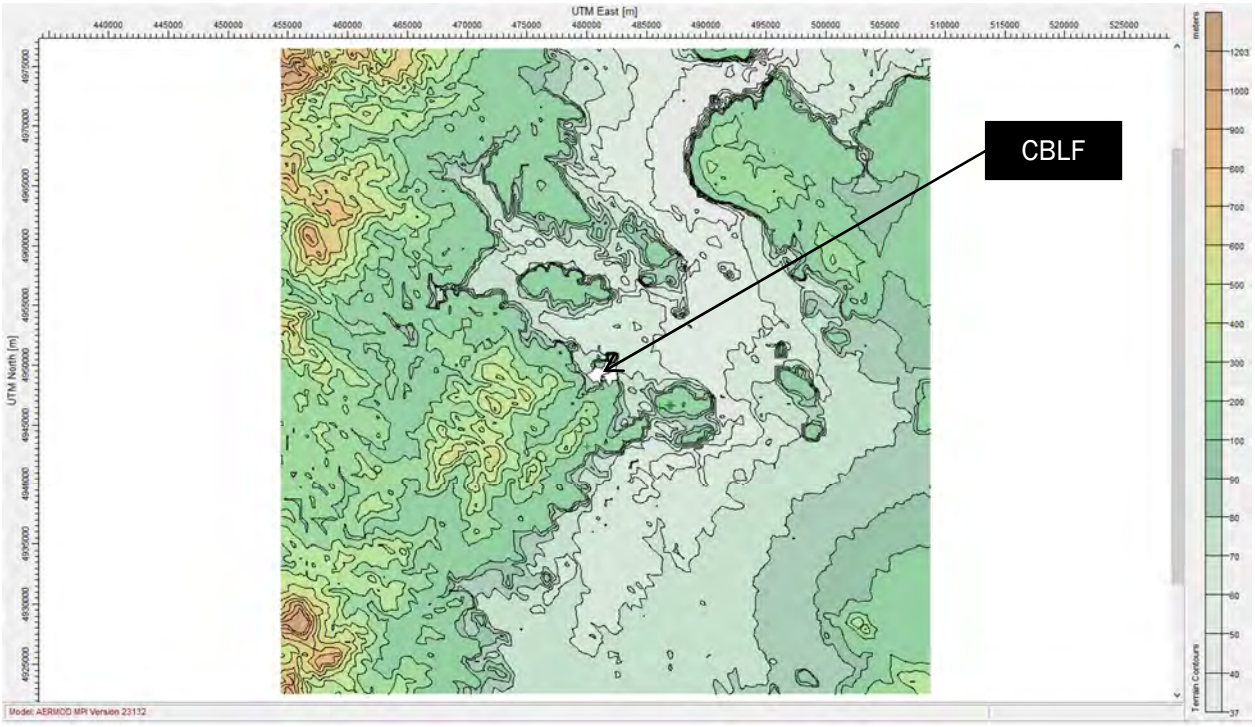
Zoning Color Code Legend:

- Exclusive farm use (light green);
- Forest conservation (green);
- Landfill (brown);
- Open space (light blue);
- Rural residential – 5 (magenta); and
- Rural residential – 10 (light magenta).

2.3 TERRAIN / TOPOGRAPHY

Local terrain also impacts air dispersion as winds can be channeled when flowing through canyons and valleys. In this case, the CBLF is located along the western edge of the Willamette Valley. See Figure 3 for the elevation contours surrounding the landfill [4].

Figure 3. Elevation Contour Map



2.4 CLIMATE AND METEOROLOGY

Local air quality is also impacted by the regional climate and meteorology as weather conditions control the transport and diffusion of emitted pollutants downwind from the release point into the surrounding area. Climate deals with long-term weather patterns while meteorology deals with short-term daily and hourly weather conditions. Nuisance odors are more likely to occur under poor meteorological conditions (e.g., low wind speed and stable wind conditions) that are common in the late night and early morning hours.

CBLF operates one weather station at the landfill. Nearby weather data is also collected by the National Oceanic and Atmospheric Administration (NOAA) / National Weather Service (NWS) at Corvallis Municipal Airport (KCVO) and Salem-McNary Field (KSLE). Table 1 provides information about these weather stations while Figure 4 displays their locations.

Table 1. Nearby Weather Monitoring Stations

Weather Data	On-site Weather Station	Corvallis Municipal Airport (KCVO)	Salem-McNary Field (KSLE)
Source	CBLF	NOAA	NOAA
USAF ID	---	726945	726940
WBAN ID	---	24202	24232
Frequency	30 minutes	1 hour	1 minute
Minimum wind speed (mph)	1	3.4	1
Wind direction resolution (deg)	1	10	1
Coordinates (Latitude, Longitude)	44.696, -123.234	44.5, -123.283	44.905, -123.001
Elevation (ft)	295	250	208
Distance from CBLF (miles)	0	13.9	18.5

A wind rose is used to display wind speed and wind direction (i.e., the direction from which the wind is blowing) data graphically for a designated historical time period (e.g., three years, seasonal, hour of the day). Figures 5 through 7 display wind roses for the CBLF, KCVO, and KSLE stations based upon the same three year time period (8/1/2021 to 8/1/2024). As shown in these figures, long term wind patterns vary depending upon the location measured. Therefore, wind conditions measured at the CBLF may not be representative of wind conditions at a reported odor complaint location due to valley terrain. See Appendix A for additional wind roses which compare the CBLF and KCVO wind roses based upon season and time of day.

Figure 4. Nearby Weather Monitoring Stations

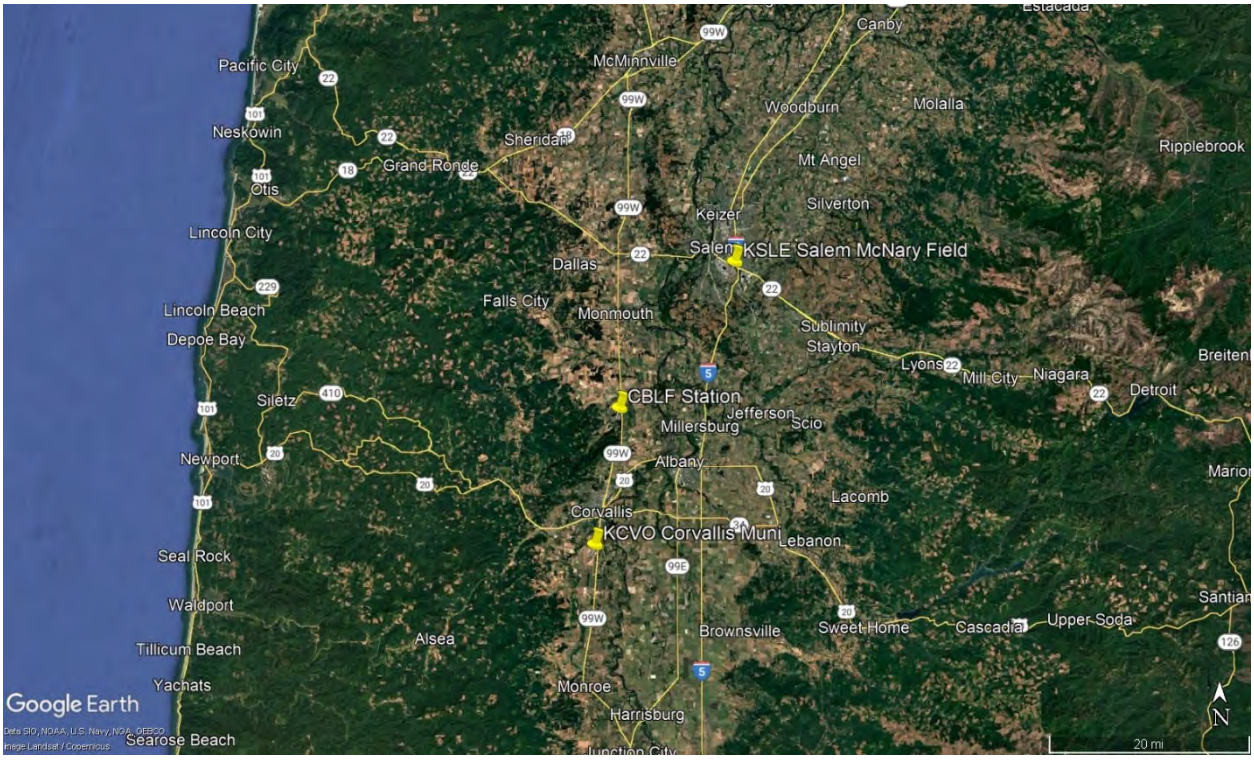


Figure 5. CBLF On-Site 3-Year Windrose

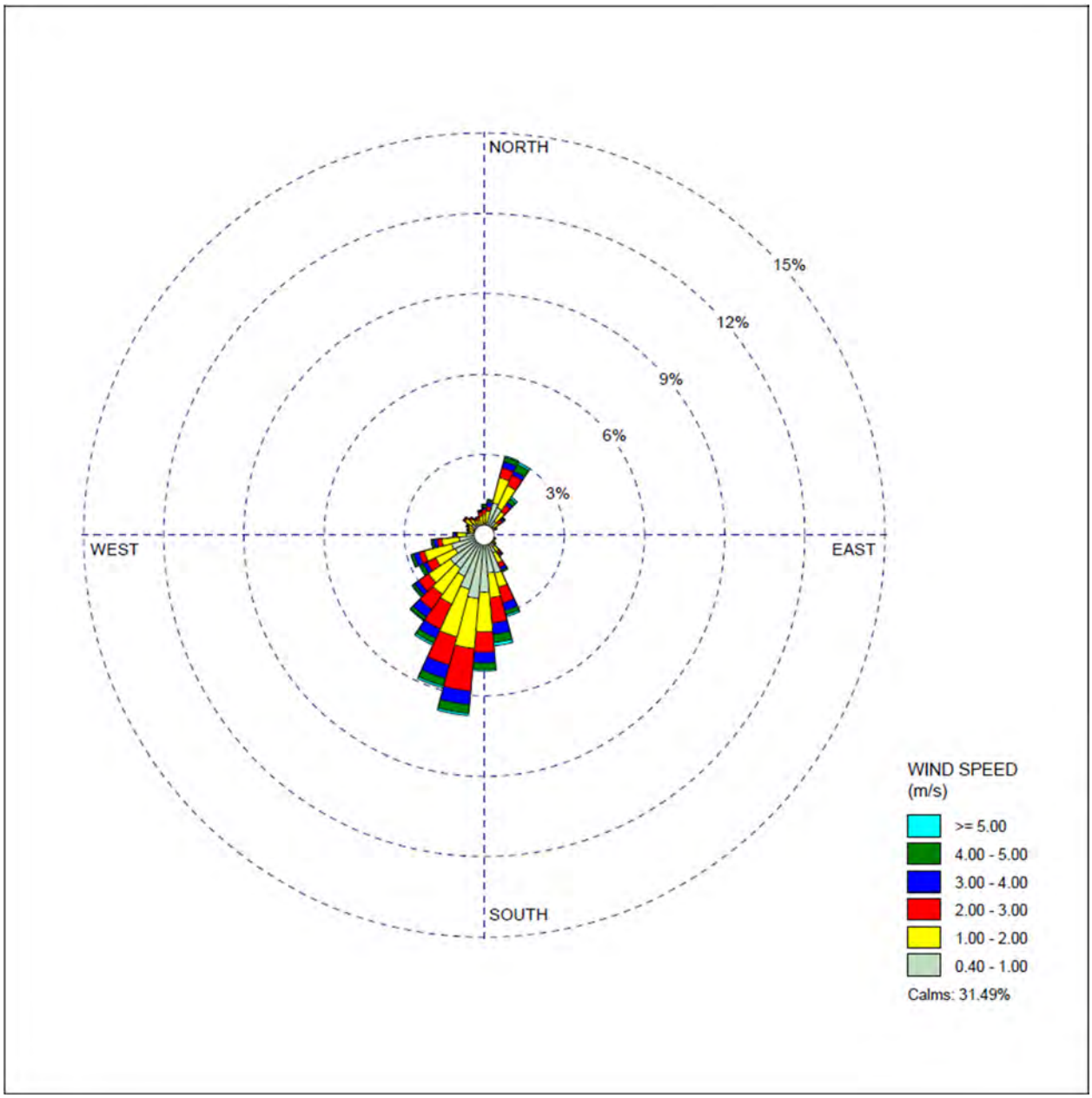


Figure 6. Corvallis Municipal Airport (KCVO) 3-Year Windrose

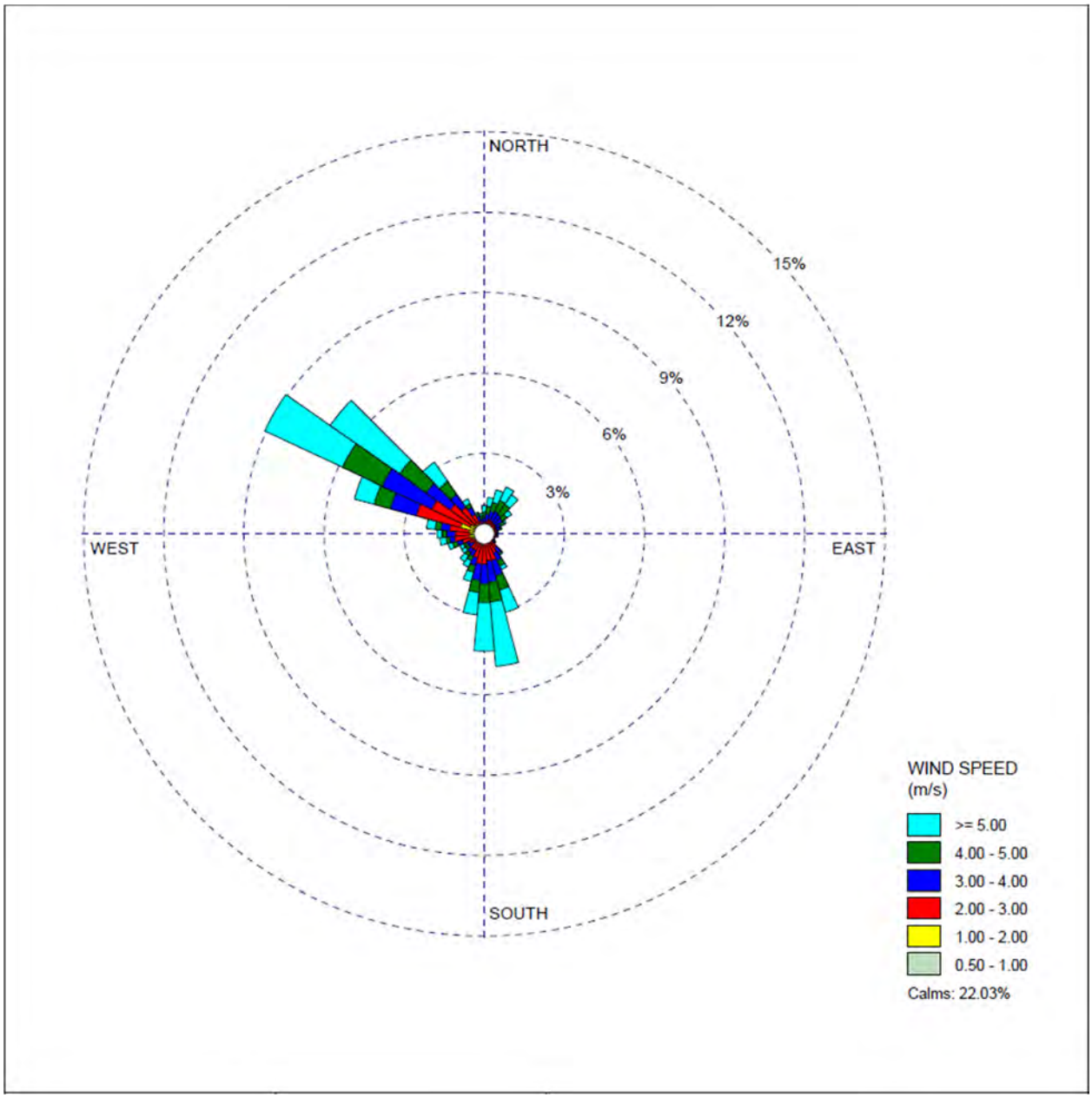
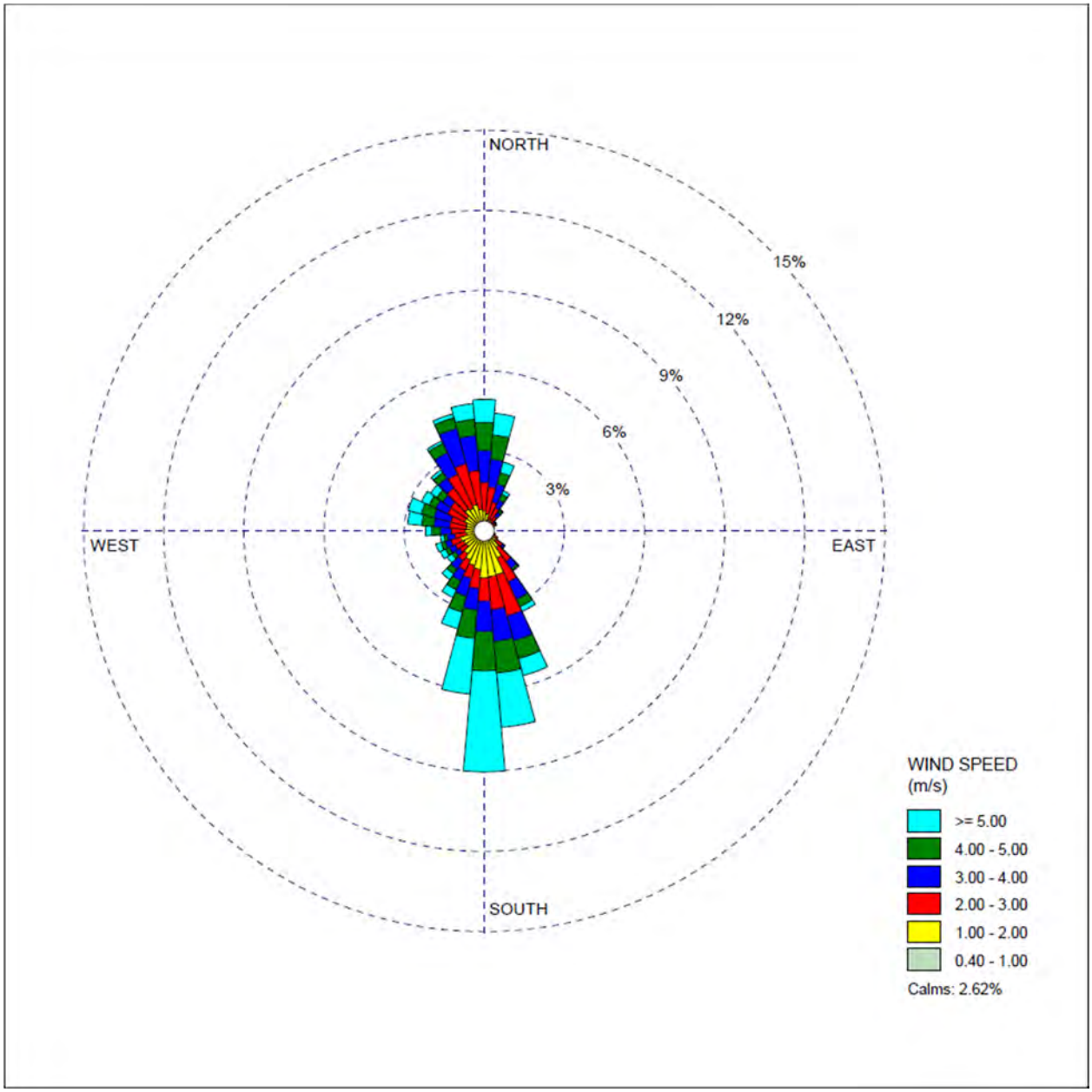


Figure 7. Salem-McNary Field (KSLE) 3-Year Windrose



2.5 POTENTIAL ODOR ACTIVITIES

CBLF accepts commercial and public solid waste. The waste is placed in layers at the working face, compacted by heavy equipment, and then covered daily. Once an area of the CBLF has reached capacity, it is eventually capped with final cover to minimize infiltration of precipitation and release of gases not captured by the landfill gas collection and control system (GCCS). Odor is potentially emitted from sources such as:

- working face;
- leachate (i.e., water that has passed through the landfill's layers);
- landfill gas (LFG) which is a natural byproduct of decomposing organic material; and
- flares which burn any excess LFG collected by the CBLF.

2.6 ODOR MONITORING AND CONTROL MEASURES

CBLF has developed and implemented a site-specific odor management plan that includes:

- application of daily cover;
- operating a LFG collection and control system;
- conducting surface emissions monitoring (SEM);
- monitoring local weather conditions (temperature, wind direction, etc.);
- conducting routine odor patrol inspections;
- responding to odor complaints received from the public and/or the Oregon Department of Environmental Quality (ODEQ);
- taking action when odors are detected/reported;
- observing the area of concern for smell and conditions;
- inspecting landfill operations for any unusual activities or conditions;
- identifying possible sources of odor; and
- confirming implementation of applicable odor minimization measures.

2.7 ODOR COMPLAINT HISTORY

SCS reviewed available data from recent odor complaints (January 2020 through August 8, 2024) to identify any specific patterns. Of the 70 odor complaints with exact dates reported, over half occurred during the winter season (see Table 2). Of the 50 complaints with the time of day reported, the peak complaint time was 8:00 am (see Figure 8). See Figure 9 and Figure 10 for odor complaint locations that provided an address or an intersection.

Table 2. Odor Complaints by Season

Season	Time Period	Complaints (%)
Winter	December 1 to February 29	55.7%
Spring	March 1 to May 31	21.4%
Summer	June 1 to August 31	14.3%
Fall	September 1 to November 30	8.6%

Figure 8. Odor Complaints by Time of Day

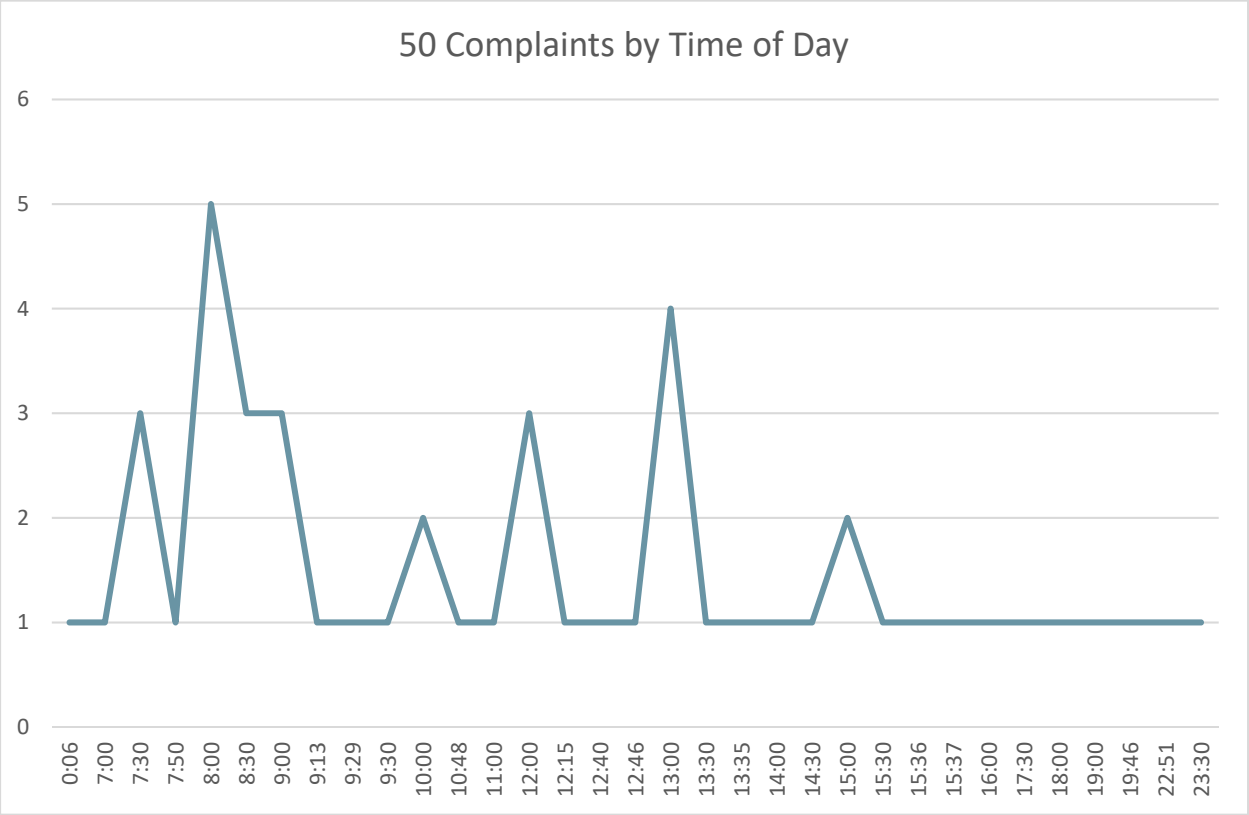


Figure 9. Odor Complaint Locations (View 1 of 2)

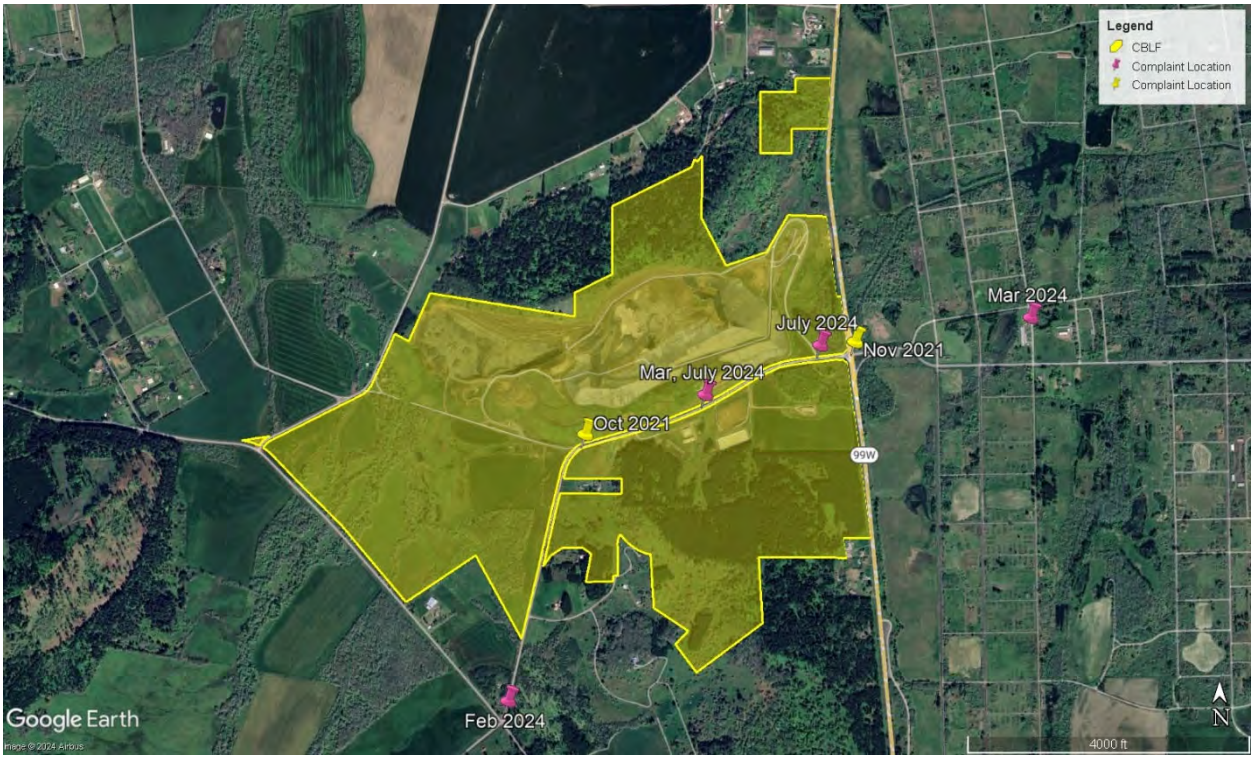
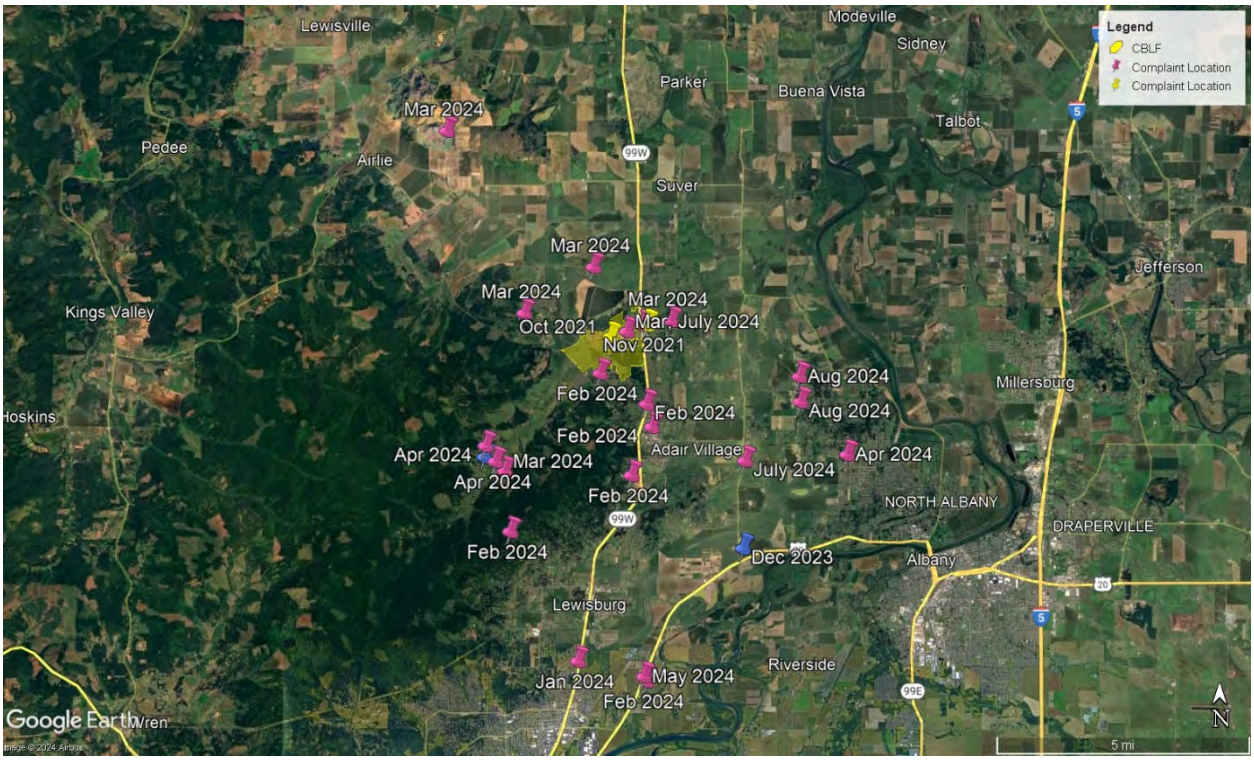


Figure 10. Odor Complaint Locations (View 2 of 2)



2.8 PROPOSED PROJECT

CBLF is requesting approval of a conditional use permit (CUP) application to expand the area on which landfill activities will be conducted to the south side of Coffin Butte Road (the "Development Site"). In addition to using the Development Site for the landfill, the proposed changes include an 1,800-square-foot employee building and parking on land to the west of the landfill, access road modifications on lands to the north, and the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, the shop/maintenance area, cut activities for landfill, and leachate ponds to support the landfill onto the property to the east (collectively, the "Project") [3]. Figure 11 displays the location of the expansion area in relation to existing operations.

Figure 11. Proposed Expansion Area (Taxlot 104180001107)

3.0 METHODOLOGY

Since odor is a subjective human response, odor dispersion modeling provides an objective approach towards understanding how on-site emissions of odor potentially impact off-site locations. The following summarizes the methodology used in this study.

3.1 MODEL SELECTION

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (EPA Version 23132 (May 12, 2023) incorporated into the Lakes Environmental AERMOD View 12.0 software suite) [5] was used to model representative emissions of odor from the landfill. AERMOD was selected for this study since:

- AERMOD is preferred/recommended by the EPA for near-field dispersion of emissions for distances less than 50 kilometers in both simple and complex terrain.
- AERMOD is acceptable to the ODEQ for dispersion modeling studies [6].
- AERMOD has undergone numerous validation studies.
- AERMOD is in the public domain and is readily available.
- AERMOD can model multiple sources and multiple receptors.
- AERMOD can use representative meteorological data to simulate atmospheric conditions that affect the transport and dispersion of air pollution from sources.
- AERMOD can use local terrain data to model receptors in complex terrain.
- AERMOD can be used to model impacts of odor causing pollutants.

Input data for AERMOD included the following which are described below:

- source parameters (locations, dimensions, emission rates, etc.);
- receptor locations;
- meteorological data;
- terrain data; and
- model options.

See below for details regarding the AERMOD model input.

3.2 SOURCE PARAMETERS

Source parameters were used to model the release of odor from two virtual sources (one representing existing operations and one representing proposed operations). Each source was modeled as a 100-meter by 100-meter area source with the same odor emission rate so that individual odor impacts could be compared. The odor emission rate for each source was estimated as odor concentration times odor volumetric flow rate using representative data since field measurements were not collected for this study.

Odor concentration is defined as the dilution of an odor sample with odor-free air, at which point only 50% of an odor panel (or population) will detect or recognize the odor (e.g., per ASTM 679-04 – Standard Practice for Determination of Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series Method of Limits). This point is expressed in units of “dilutions-to-threshold” or “D/T”. By definition, odor threshold is equal to 1 D/T (i.e., volume of odorous air after dilution divided by volume before dilution equals one). Typically, odors become a nuisance at or above 7 D/T [8,9]. For

this study, 500 D/T was used to represent odor concentrations from the working face, covered areas, and leachate based upon prior field studies conducted by SCS Engineers at other landfills.

Odor volumetric flow rate (m^3/s) was estimated as vertical velocity (m/s) times the source's surface area (m^2). For this study, 1.0×10^{-4} m/s was used to represent the vertical velocity of odor emitted from the working face, covered areas, and leachate based upon prior field studies and odor studies conducted by SCS Engineers at other landfills.

Table 3 summarizes the source parameters modeled while Figure 12 displays the modeled source locations.

Table 3. Source Parameters Modeled

Parameter	Virtual Source #1 (Existing Operations)	Virtual Source #2 (Proposed Operations)
UTM X, Y Coordinates (m)	481500, 4949700	481745, 4949095
Elevation (m)	133.98	101.6 and 133.98
Release Height (m)	0	0
Length of X Side (m)	100	100
Length of Y Side (m)	100	100
Odor Concentration (D/T)	500	500
Vertical Velocity (m/s)	0.0001	0.0001
Odor Emission Rate per Area (D/T)*(m/s)	0.05	0.05
Odor Emission Rate (D/T)*(m^3/s)	500	500
Rotation Angle (deg)	0	0
Initial Vertical Dimension (m)	(none)	(none)

Figure 12. Modeled Area Source Locations

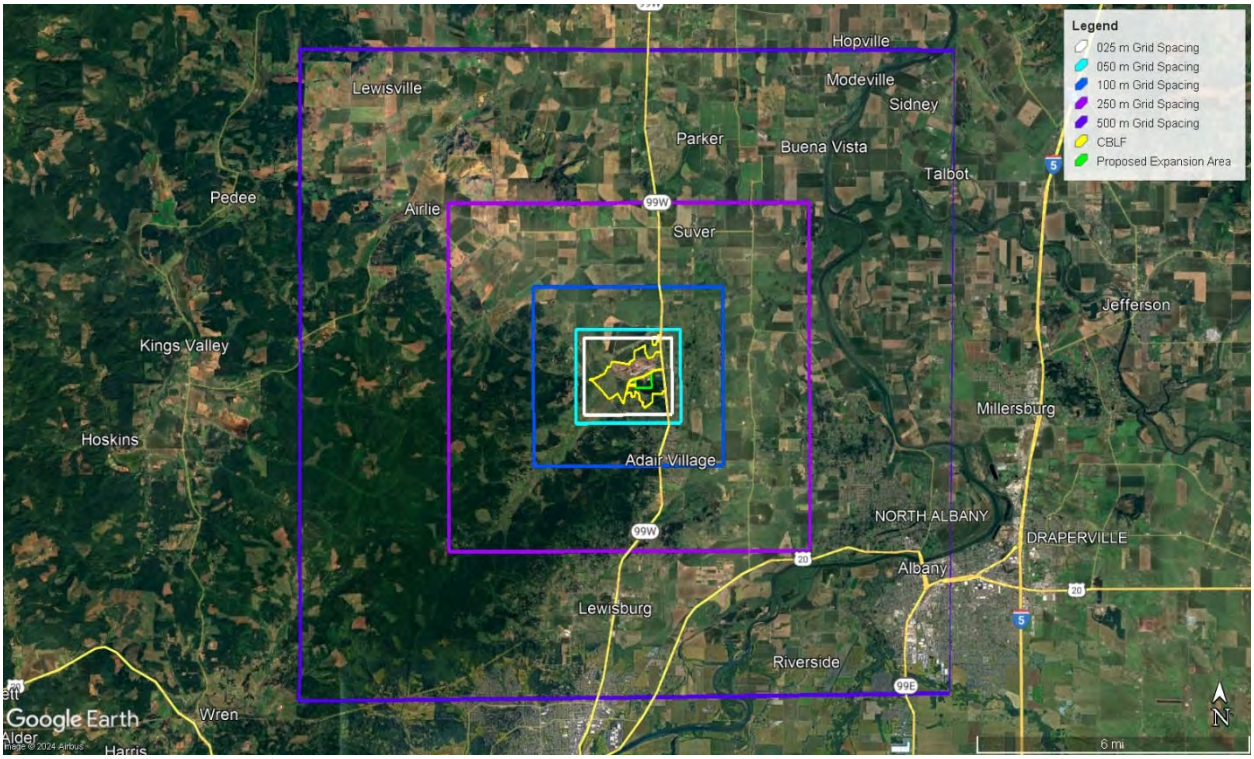
3.3 BUILDING DOWNWASH

Building downwash occurs when wind flowing over/around buildings impacts the dispersion of pollution from nearby stacks (point sources). Building downwash was not included since point sources were not modeled in the analysis.

3.4 RECEPTORS

AERMOD was used to generate nested 25-meter, 50-meter, 100-meter, 250-meter, and 500-meter spaced receptor grids over the landfill and surrounding area. Additional receptors were placed along the landfill's property boundary at 10-meter intervals. Receptor flag pole heights were set to zero meters (ground level). On-site receptors within the landfill's property boundary were removed from the analysis. See Figure 13 for the layout of the nested grids.

Figure 13. Nested Receptor Grid



3.5 METEOROLOGICAL DATA

Selection of an appropriate meteorological station for dispersion modeling purposes is based upon many factors such as the source's meteorological conditions (e.g., prevailing winds, mixing heights, etc.), terrain, surrounding land use and surface characteristics, and proximity. As seen in Section 2.4, wind conditions vary depending upon location within the valley. Therefore, three meteorological datasets were used in the analysis:

- KCVO surface data and Salem upper air data (2018 through 2023) processed by AERMET.
- KSLE surface data and Salem upper air data (2018 through 2023) processed by AERMET.
- Screening surface and upper air data generated for a range of weather conditions spanning all wind directions using AERMOD's Makemet utility.

3.6 TERRAIN DATA

Local terrain data was first downloaded from the United States Geological Survey (USGS) 1/3 arc-second National Elevation Dataset (NED). Elevations were then processed and imported into AERMOD for the sources and receptors modeled.

3.7 MODEL OPTIONS

AERMOD was used to predict maximum, off-site, 1-hour odor concentrations for each virtual source using the rural dispersion mode and elevated terrain. Table 4 summarizes the modeling scenarios analyzed. As indicated in Table 4, Source #2 (proposed operations) was modeled at two different elevations to represent future options (one at the current undeveloped elevation and one at the same elevation as the current working face).

Table 4. Modeling Scenarios

Scenario No.	Meteorological Data	Virtual Source #1 (Existing Operations) Modeled Elevation (m)	Virtual Source #2 (Proposed Operations) Modeled Elevation (m)
1	KCVO	133.98	101.6
2	KSLE	133.98	101.6
3	Makemet	133.98	101.6
4	KCVO	133.98	133.98
5	KSLE	133.98	133.98
6	Makemet	133.98	133.98

3.8 NUISANCE ODOR THRESHOLD

Oregon state laws prohibit businesses from emitting odors which cause a nuisance. These nuisance laws are implemented by the ODEQ which has developed a strategy for responding to odor complaints reported through an online tool. The strategy emphasizes early odor detection, voluntary cooperation and the rapid resolution of nuisance conditions related to odors [7]. Since the ODEQ's nuisance odor strategy does not include a D/T value for nuisance odor, this study used 7 D/T as the threshold for nuisance odor [8, 9].

4.0 RESULTS

Table 5 summarizes the peak, off-site, 1-hour odor concentrations for each modeling scenario. See Figure 14 for the peak, off-site impact locations. See Figure 15 through Figure 22 for the odor concentration contours from modeling scenario #3 which had the highest off-site impacts (note, reported odor complaint locations from Figure 10 are displayed in these figures for reference).

Table 5. Peak 1-Hour Off-site Odor Concentrations

Scenario No.	Meteorological Data	Virtual Source #1 (Existing Operations) Peak Off-Site Odor Concentration (D/T)	Virtual Source #2 (Proposed Operations) Peak Off-Site Odor Concentration (D/T)	Nuisance Odor Threshold (D/T)	Nuisance Odor Threshold Exceeded?
1	KCVO	0.42	0.64	7	No
2	KSLE	0.92	1.52	7	No
3	Makemet	1.21	2.04	7	No
4	KCVO	0.42	0.64	7	No
5	KSLE	0.92	1.52	7	No
6	Makemet	1.21	1.34	7	No

Figure 14. Peak 1-Hour Off-site Odor Impact Locations

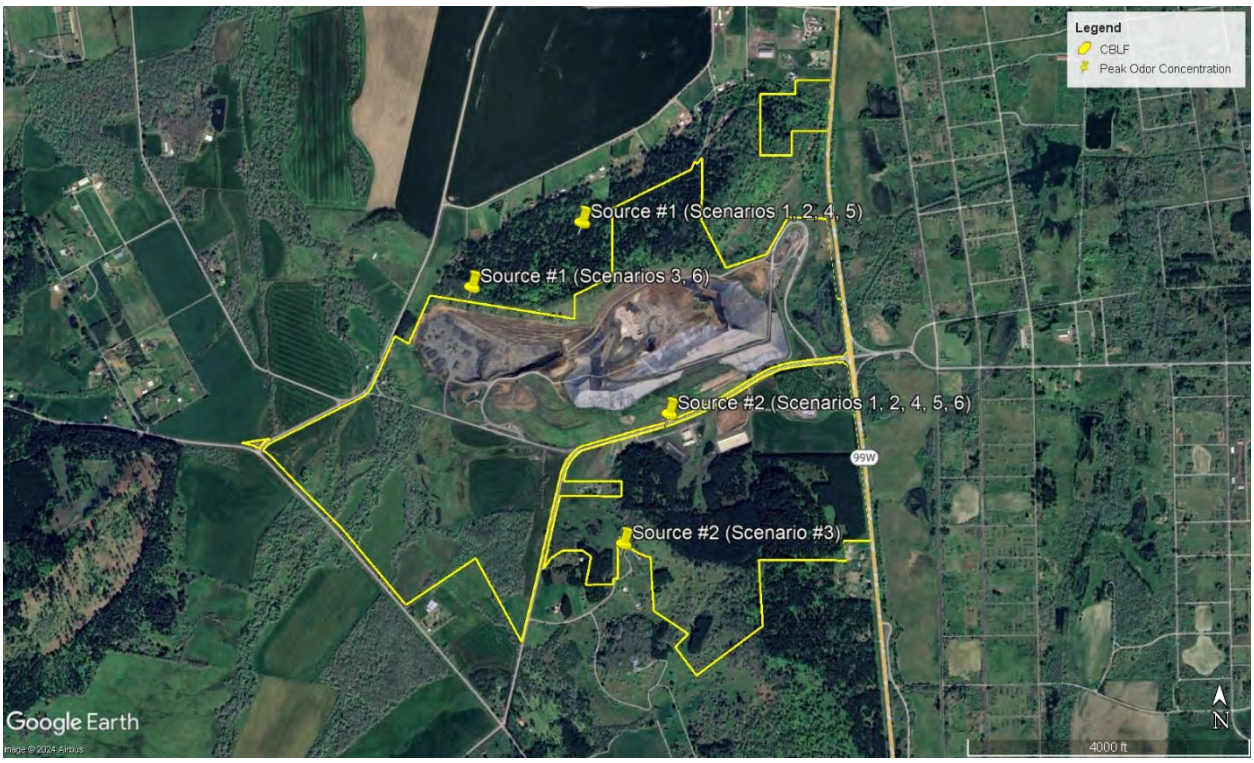


Figure 15. Source #1 Odor Concentration D/T Contours (Scenario #3, View 1 of 4)

Figure 16. Source #1 Odor Concentration D/T Contours (Scenario #3, View 2 of 4)

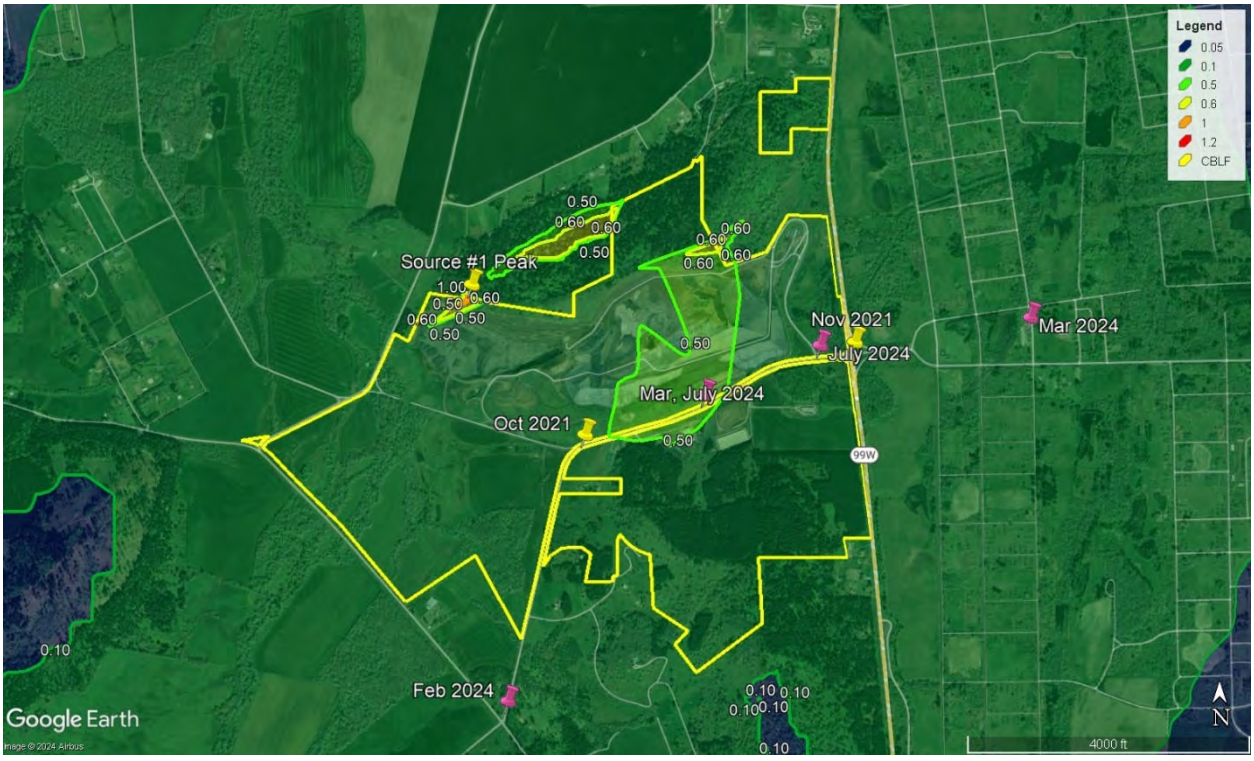


Figure 17. Source #1 Odor Concentration D/T Contours (Scenario #3, View 3 of 4)

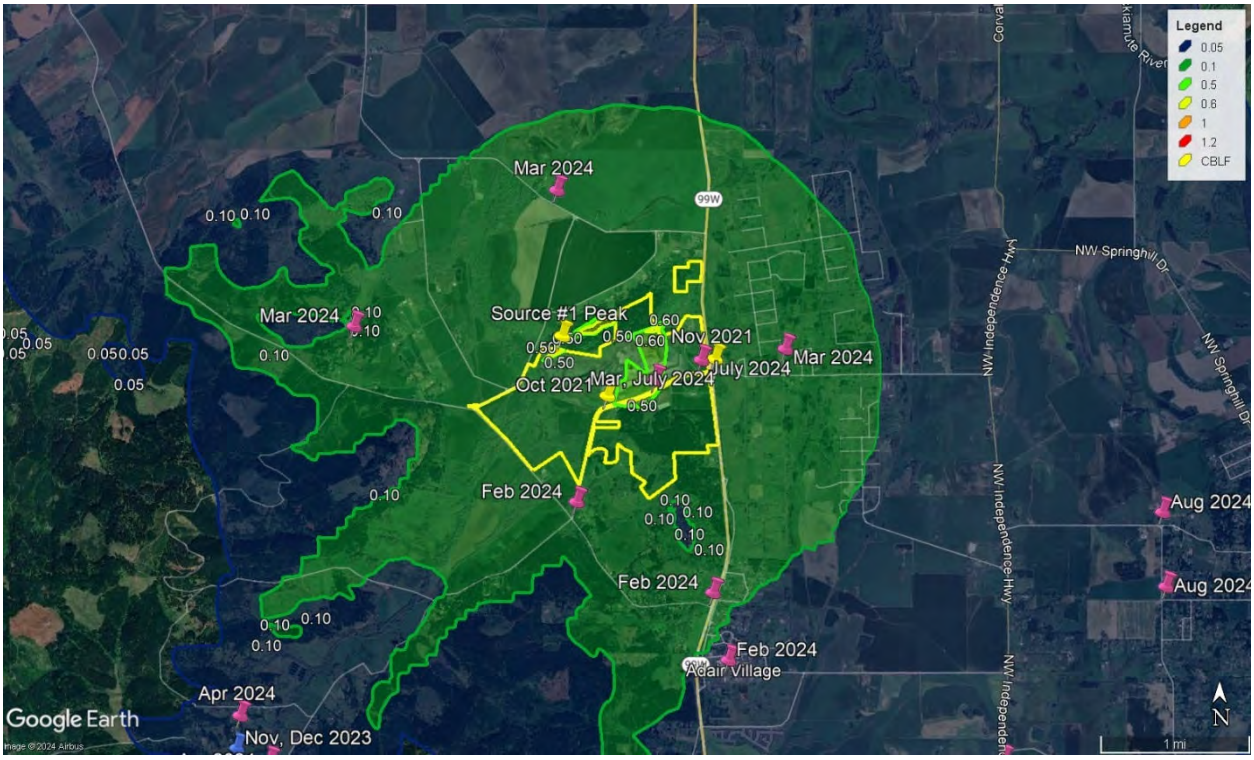


Figure 18. Source #1 Odor Concentration D/T Contours (Scenario #3, View 4 of 4)

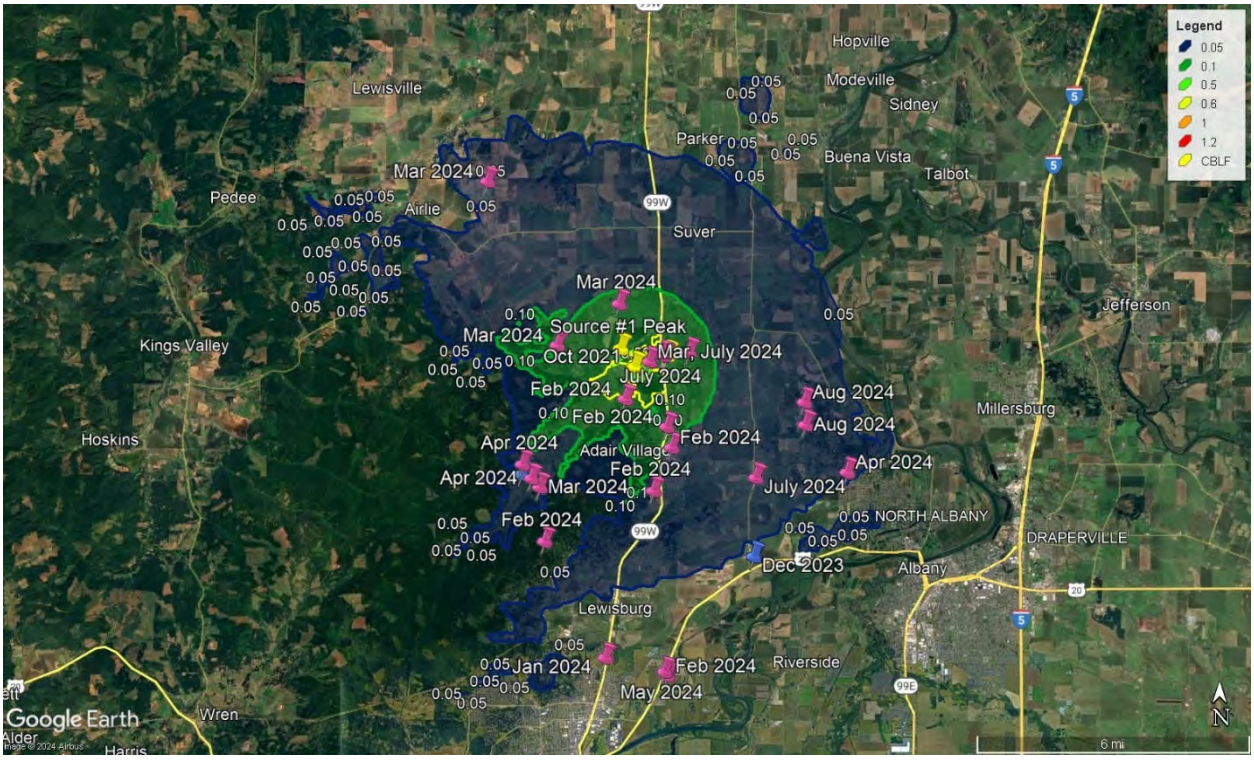


Figure 19. Source #2 Odor Concentration D/T Contours (Scenario #3, View 1 of 4)

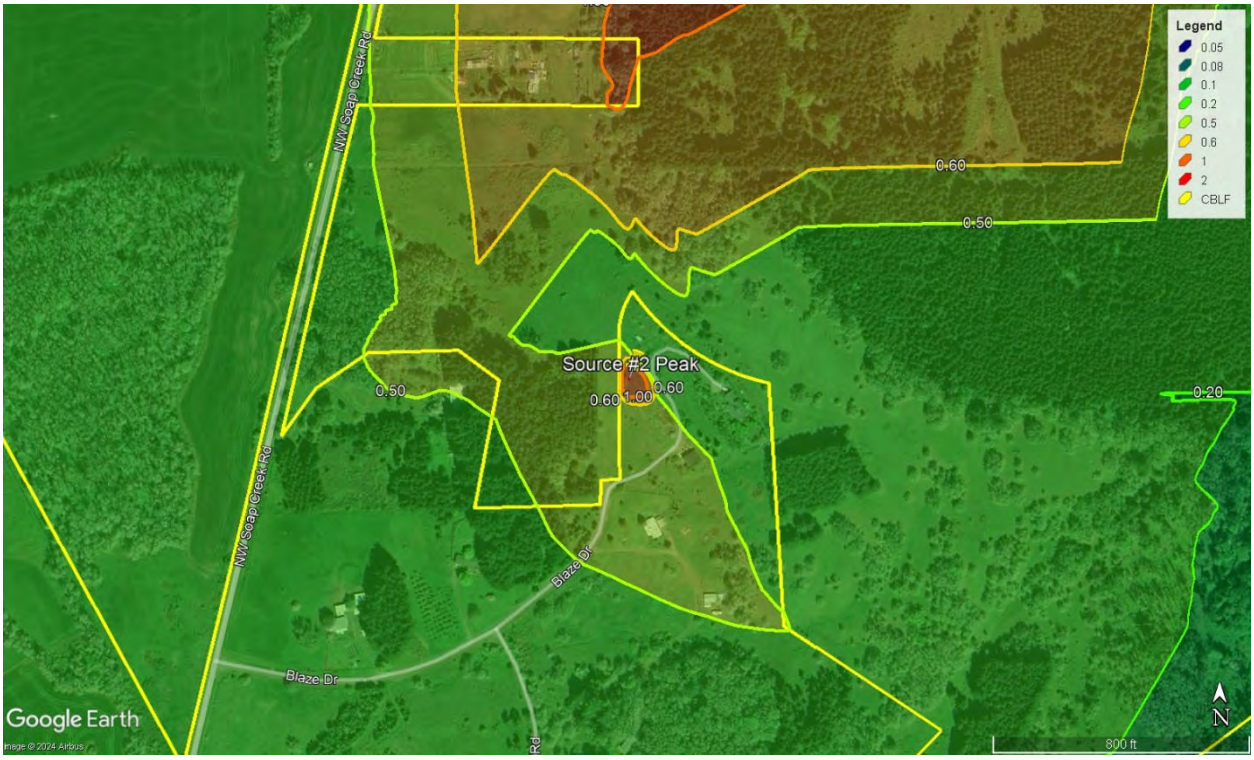


Figure 20. Source #2 Odor Concentration D/T Contours (Scenario #3, View 2 of 4)

Figure 21. Source #2 Odor Concentration D/T Contours (Scenario #3, View 3 of 4)

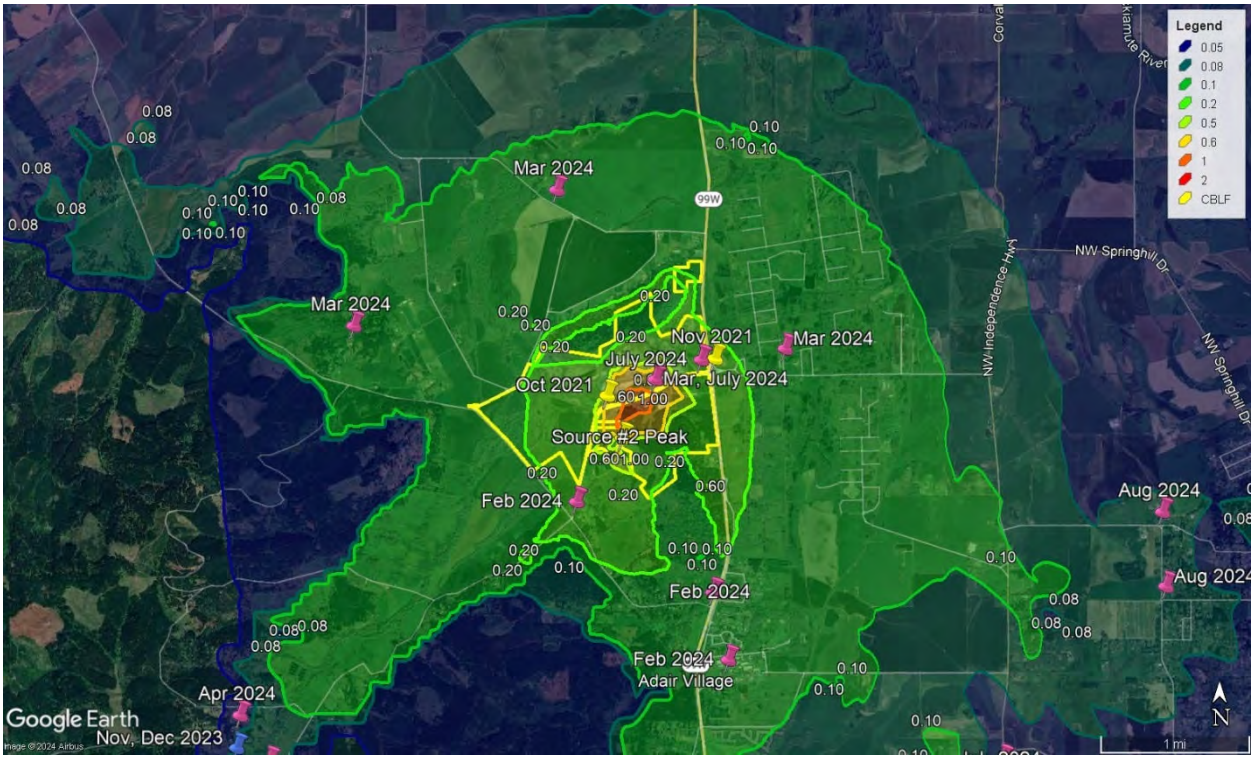
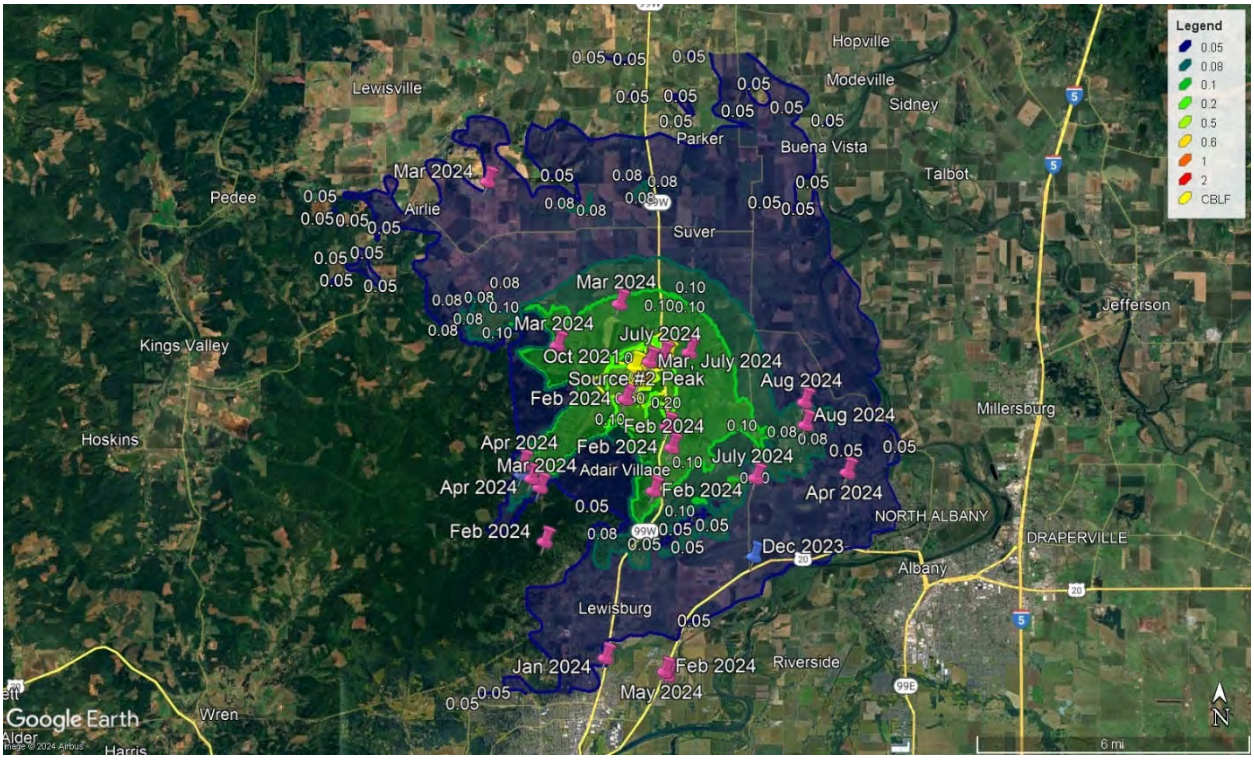


Figure 22. Source #2 Odor Concentration D/T Contours (Scenario #3, View 4 of 4)



5.0 CONCLUSIONS

The analysis modeled six different scenarios in order to predict the peak, off-site, 1-hour odor concentrations from existing and proposed operations for comparison to a numeric threshold of significance for nuisance odors (7 D/T). The following conclusions are presented based upon the results of this study:

- Peak, off-site, 1-hour odor concentrations were below 7 D/T (the numeric threshold of significance for nuisance odors) for all scenarios modeled.
- For existing operations (Source #1), the modeled peak, off-site, 1-hour odor concentration was north of the landfill (in two different locations depending upon the meteorological data used) and ranged from 0.42 to 1.21 D/T. Impacts above 1 D/T (the point at which only 50% of the population is expected to smell any odor) extended only a small distance off-site. None of the complaint locations from Figure 10 were within the 1 D/T contour.
- For proposed operations (Source #2), the modeled peak, off-site, 1-hour odor concentration was either along Coffin Butte Road or south of the landfill (in two different locations depending upon the meteorological data used) and ranged from 0.64 to 2.04 D/T. Impacts above 1 D/T (the point at which only 50% of the population is expected to smell any odor) were either along Coffin Butte Road or extended only a small distance off-site. Only one complaint location from Figure 10 was within the 1 D/T contour.
- Moving operations to the proposed expansion area will move the predicted peak, off-site 1-hour impact location, but impacts would remain well below the 7 D/T threshold.
- While off-site odors can occur as a result of the current and future landfill operations, these potential impacts are less than significant and expected to be short lived (i.e., only occur under weather conditions with poor atmospheric dispersion).

6.0 REFEFENCES

1. Benton County, “Taxlots”, https://gis.co.benton.or.us/gisdata/Assessment/.

2. Benton County, “Benton County Zoning Map Online”, https://cd.bentoncountyor.gov/maps/.

3. Valley Landfills, Inc., “Burden of Proof 2024 Conditional Use Application”, https://coffinbuttelandfill.com/2024-cup/.

4. United States Geological Survey, “National Elevation Dataset (NED)”, https://www.usgs.gov/publications/national-elevation-dataset.

5. Lakes Environmental, “AERMOD View 12.0”, AERMOD Version 23132, https://www.weblakes.com/, November 2023.

6. Oregon Department of Environmental Quality, “Recommended Procedures for Air Quality Dispersion Modeling”, https://www.oregon.gov/deq/aq/Pages/default.aspx, March 2022.

7. Oregon Department of Environmental Quality, “Nuisance Odor Strategy”, https://www.oregon.gov/deq/aq/pages/nuisance-odor.aspx.

8. San Diego State University and California Integrated Waste Management Board, “Contractor’s Report to the Board – Comprehensive Compost Odor Response Project”, March 2007, https://www2.calrecycle.ca.gov/Publications/Download/841.

9. McGinley, P.E., Charles M., “Enforceable Permit Odor Limits”, St. Croix Sensory, Inc., https://www.fivesenses.com/, 2000.

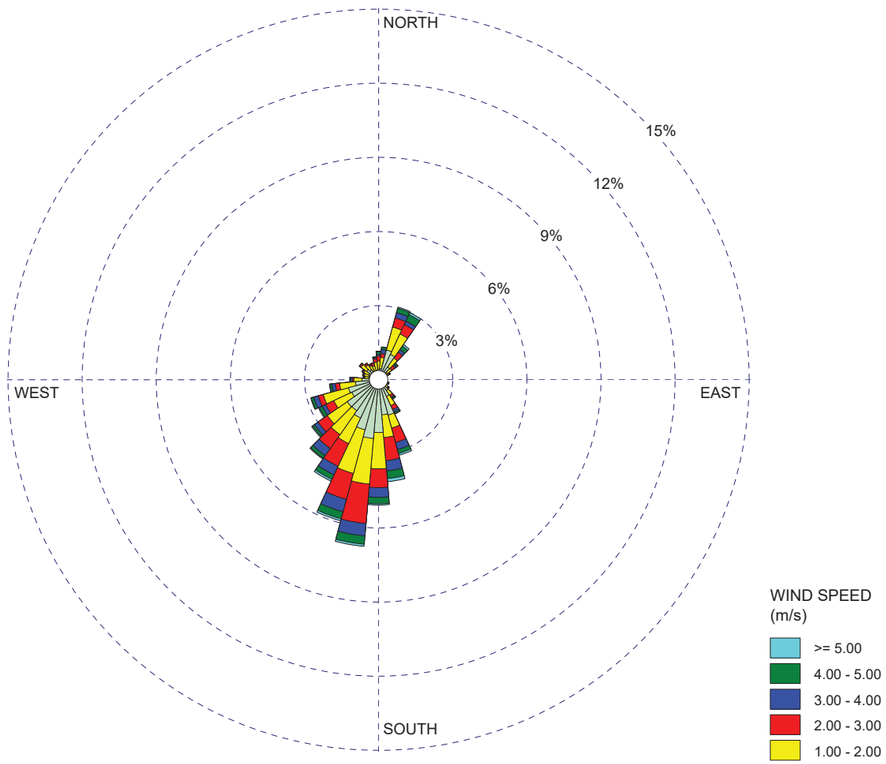
10. Hanson, J., Yesiller, N., et al, “Compaction Characteristics of Municipal Waste”, http://gwri.calpoly.edu/media/Research_Papers/Compaction_Characteristics_of_Municipal_Solid_Waste.pdf, 2010.

Appendix A

CBLF and KCVO Windrose Comparison

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR WINDROSE (8/1/2021 TO 8/1/2024)

DISPLAY:
Wind Speed
Direction (blowing from)

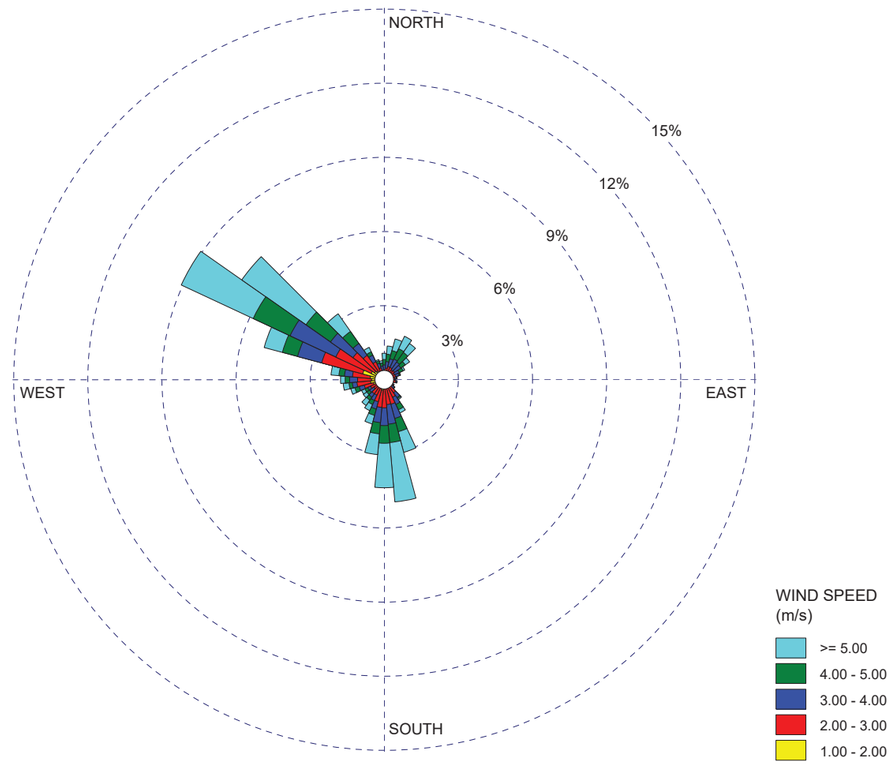


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **31.49%**	TOTAL COUNT: **52532**	
	AVG. WIND SPEED: **1.11 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR WINDROSE (8/1/2021 TO 8/1/2024)

DISPLAY:
Wind Speed
Direction (blowing from)

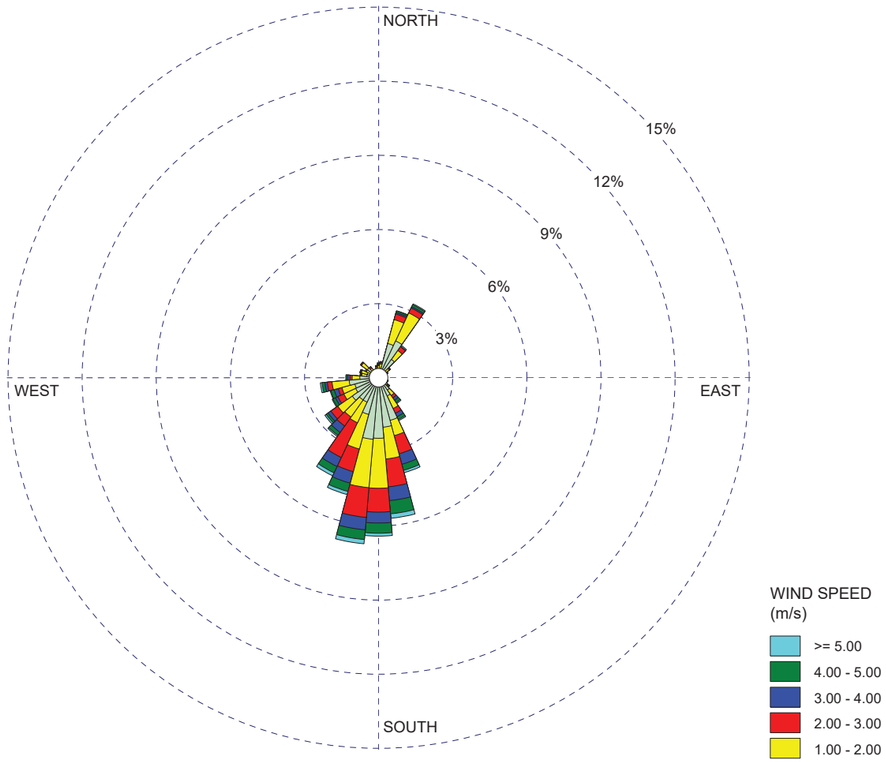


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 00:00** **End Date: 7/31/2024 - 23:59**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **22.03%**	TOTAL COUNT: **24841 hrs.**	
	AVG. WIND SPEED: **3.07 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR WINTER WINDROSE (8/1/2021 TO 8/1/2024, DEC-FEB)

DISPLAY:
Wind Speed
Direction (blowing from)

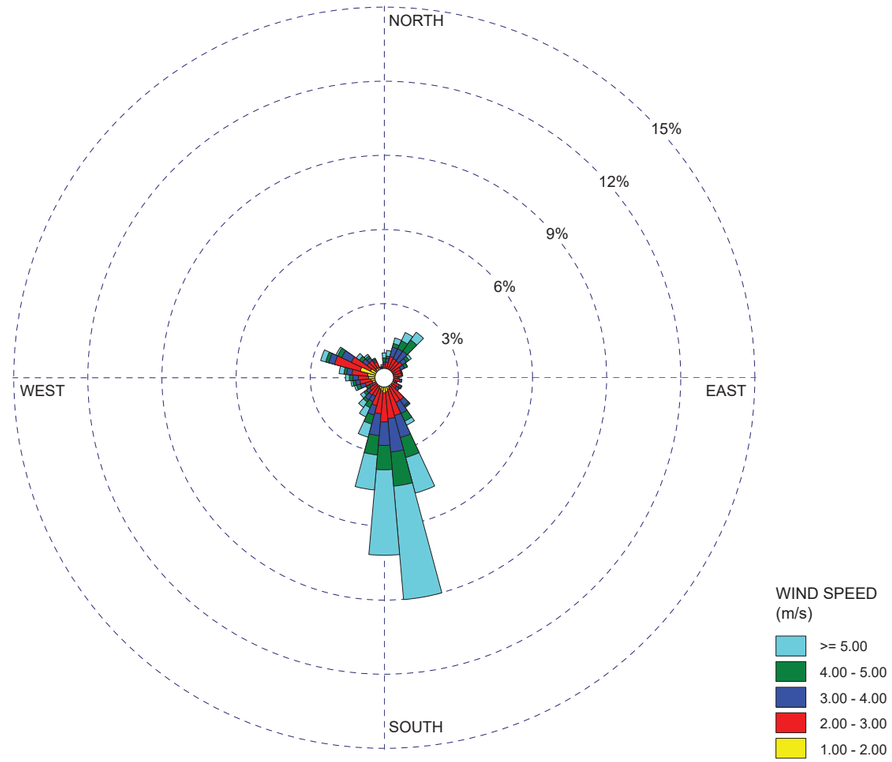


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **34.24%**	TOTAL COUNT: **13002**	
	AVG. WIND SPEED: **1.07 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR WINTER WINDROSE (8/1/2021 TO 8/1/2024, DEC-FEB)

DISPLAY:
Wind Speed
Direction (blowing from)



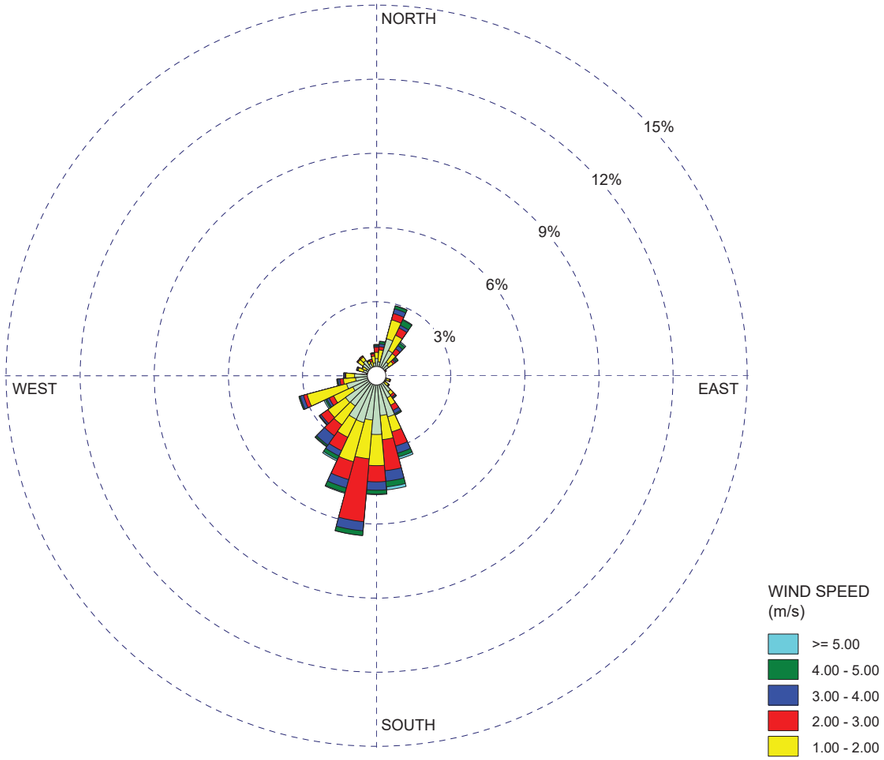
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 12/1/2021 - 00:00** **End Date: 2/29/2024 - 23:59**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **28.47%**	TOTAL COUNT: **6235 hrs.**	
	AVG. WIND SPEED: **2.66 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR FALL WINDROSE (8/1/2021 TO 8/1/2024, SEP-NOV)

DISPLAY:
Wind Speed
Direction (blowing from)



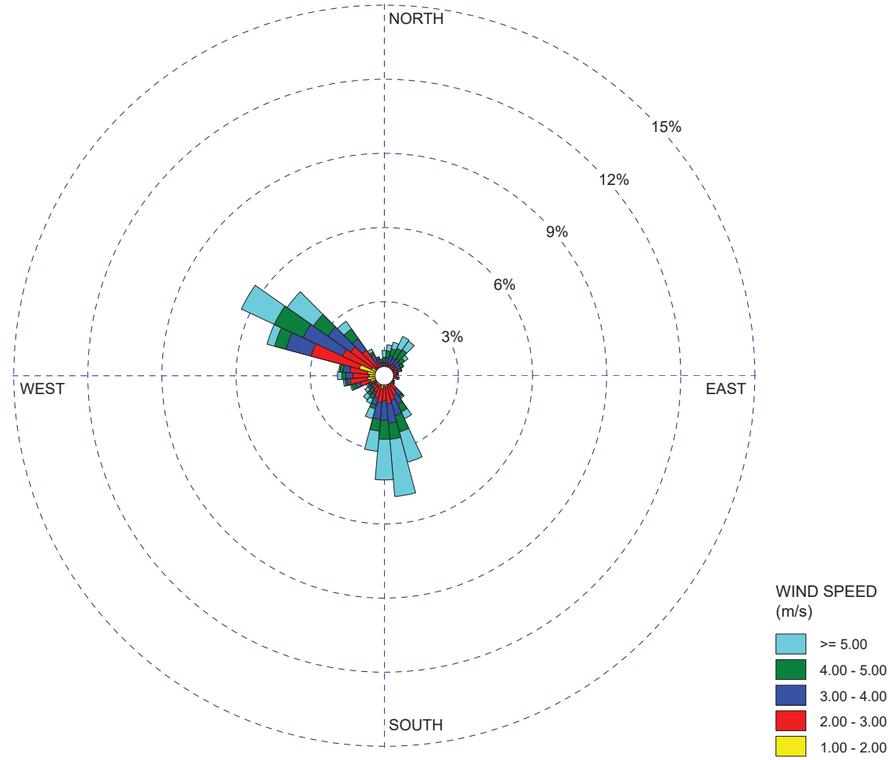
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **33.70%**	TOTAL COUNT: **13108**	
	AVG. WIND SPEED: **0.98 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR FALL WINDROSE (8/1/2021 TO 8/1/2024, SEP-NOV)

DISPLAY:
Wind Speed
Direction (blowing from)



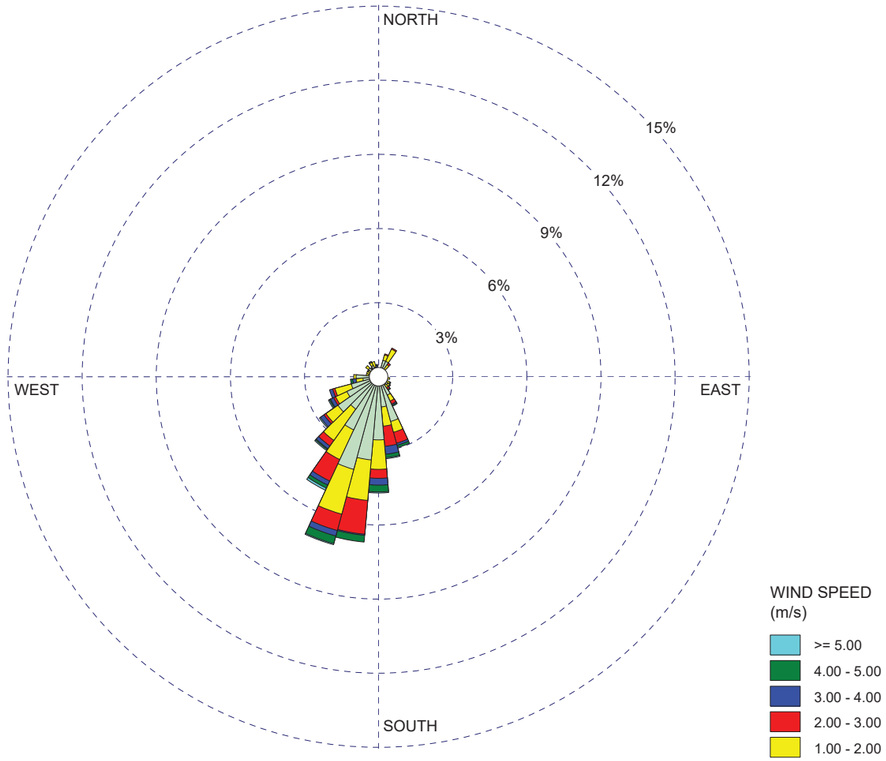
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 9/1/2021 - 00:00** **End Date: 11/30/2023 - 23:59**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **28.25%**	TOTAL COUNT: **6184 hrs.**	
	AVG. WIND SPEED: **2.59 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 01 WINDROSE (8/1/2021 TO 8/1/2024, 0000-0100)

DISPLAY:
Wind Speed
Direction (blowing from)



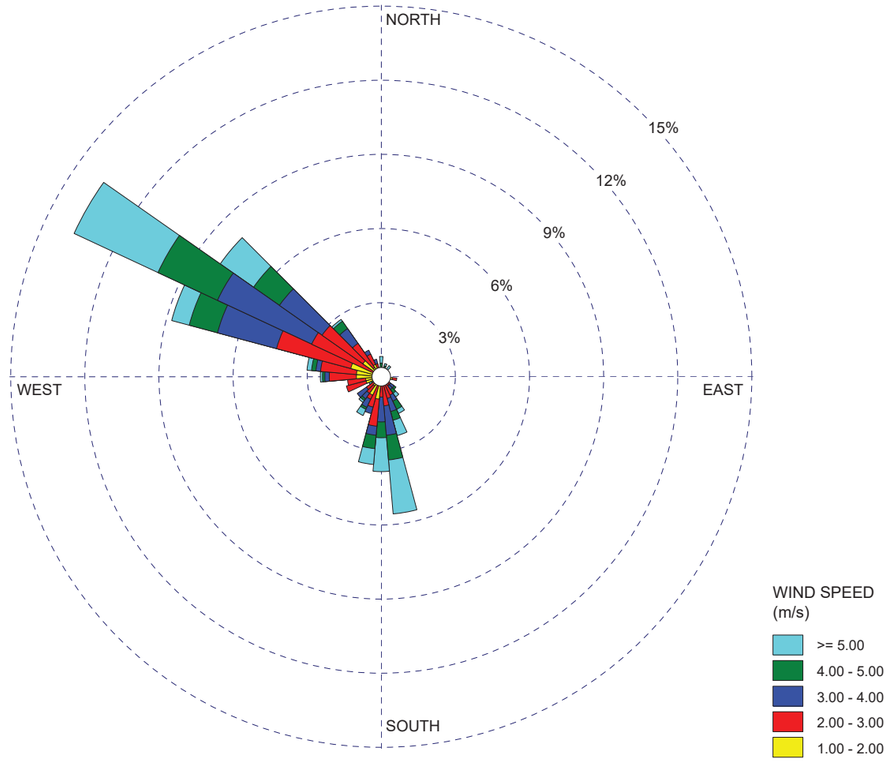
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **44.57%**	TOTAL COUNT: **2192**	
	AVG. WIND SPEED: **0.71 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 01 WINDROSE (8/1/2021 TO 8/1/2024, 0000-0100)

DISPLAY:
Wind Speed
Direction (blowing from)

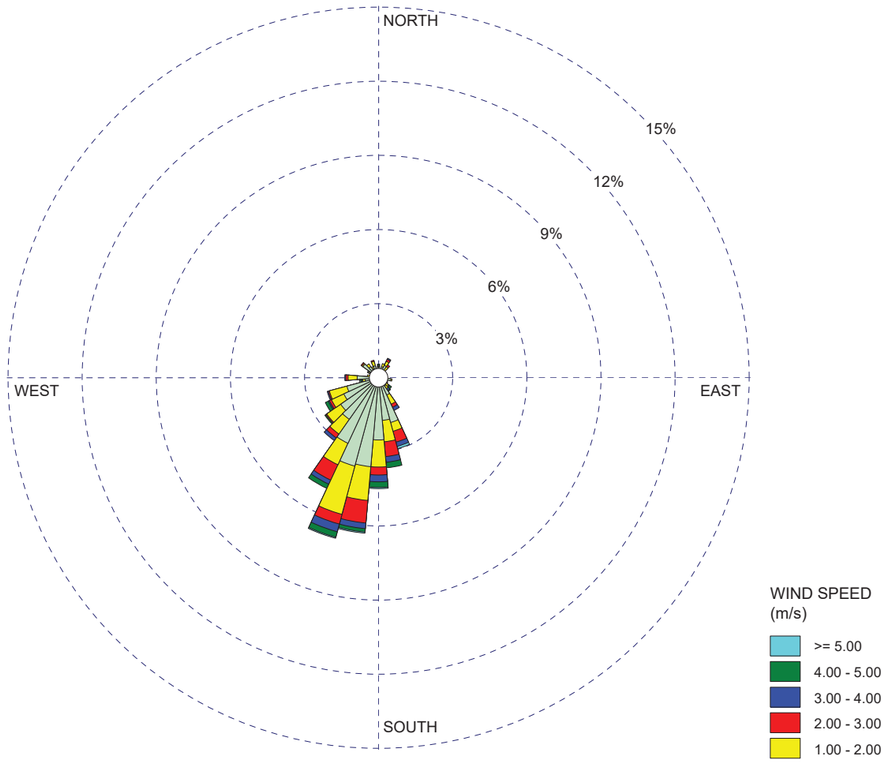


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 01:00** **End Date: 7/31/2024 - 01:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **24.27%**	TOTAL COUNT: **1069 hrs.**	
	AVG. WIND SPEED: **2.70 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 02 WINDROSE (8/1/2021 TO 8/1/2024, 0100-0200)

DISPLAY:
Wind Speed
Direction (blowing from)

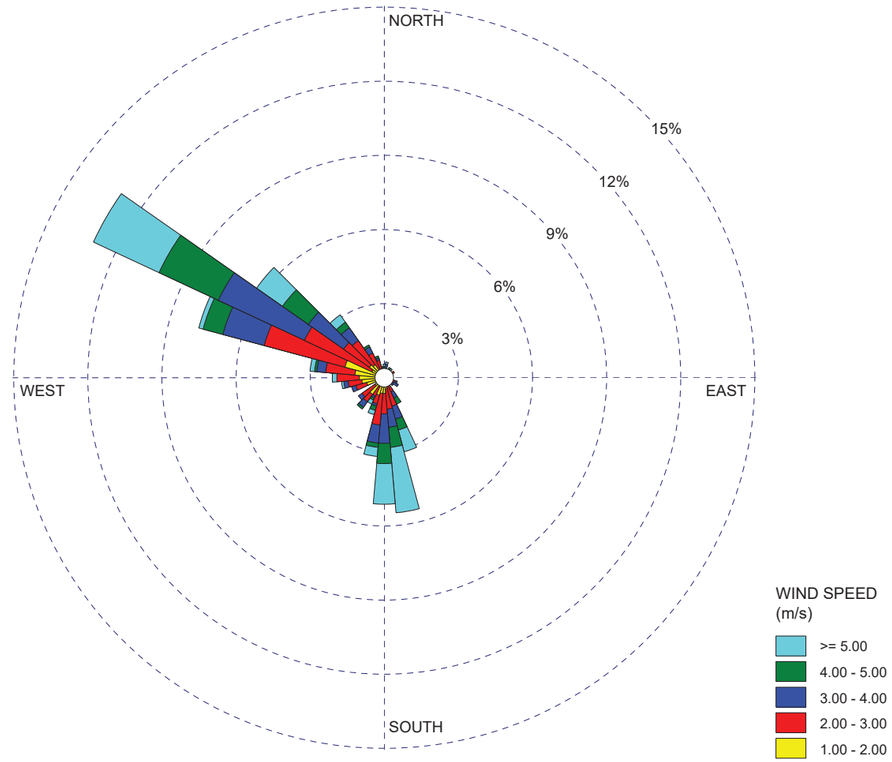


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **45.87%**	TOTAL COUNT: **2189**	
	AVG. WIND SPEED: **0.65 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 02 WINDROSE (8/1/2021 TO 8/1/2024, 0100-0200)

DISPLAY:
Wind Speed
Direction (blowing from)



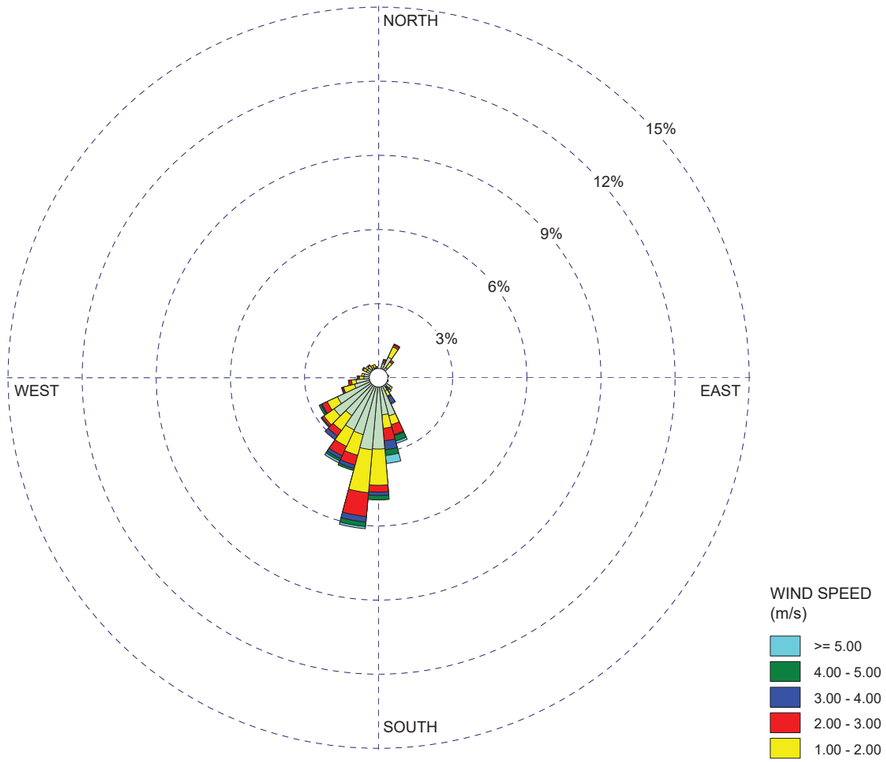
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 02:00** **End Date: 7/31/2024 - 02:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **27.10%**	TOTAL COUNT: **1074 hrs.**	
	AVG. WIND SPEED: **2.52 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 03 WINDROSE (8/1/2021 TO 8/1/2024, 0200-0300)

DISPLAY:
Wind Speed
Direction (blowing from)



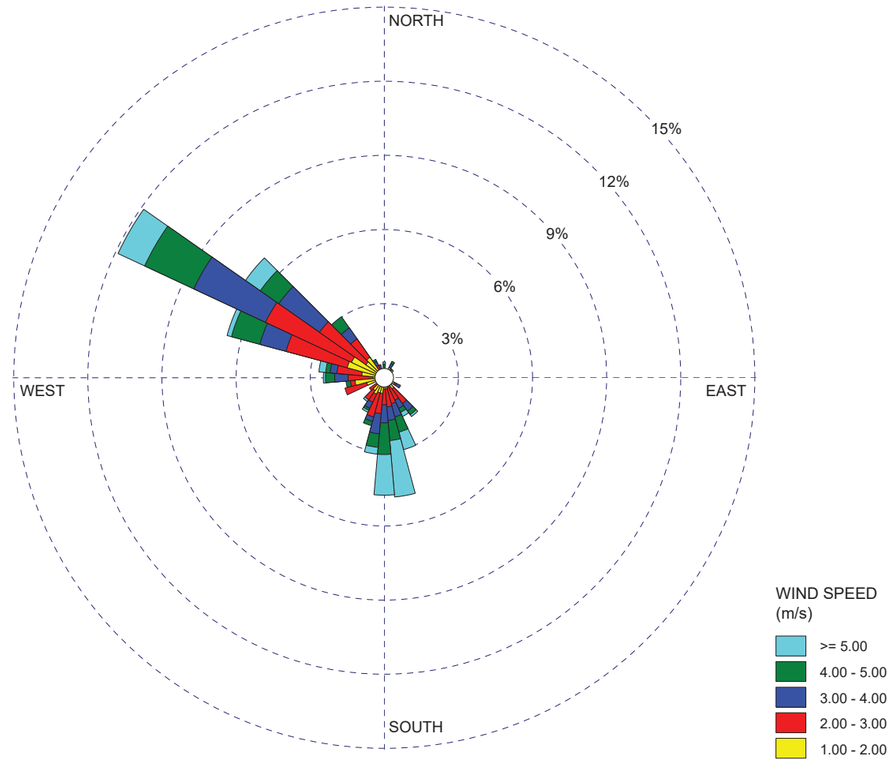
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **50.39%**	TOTAL COUNT: **2187**	
	AVG. WIND SPEED: **0.63 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 03 WINDROSE (8/1/2021 TO 8/1/2024, 0200-0300)

DISPLAY:
Wind Speed
Direction (blowing from)



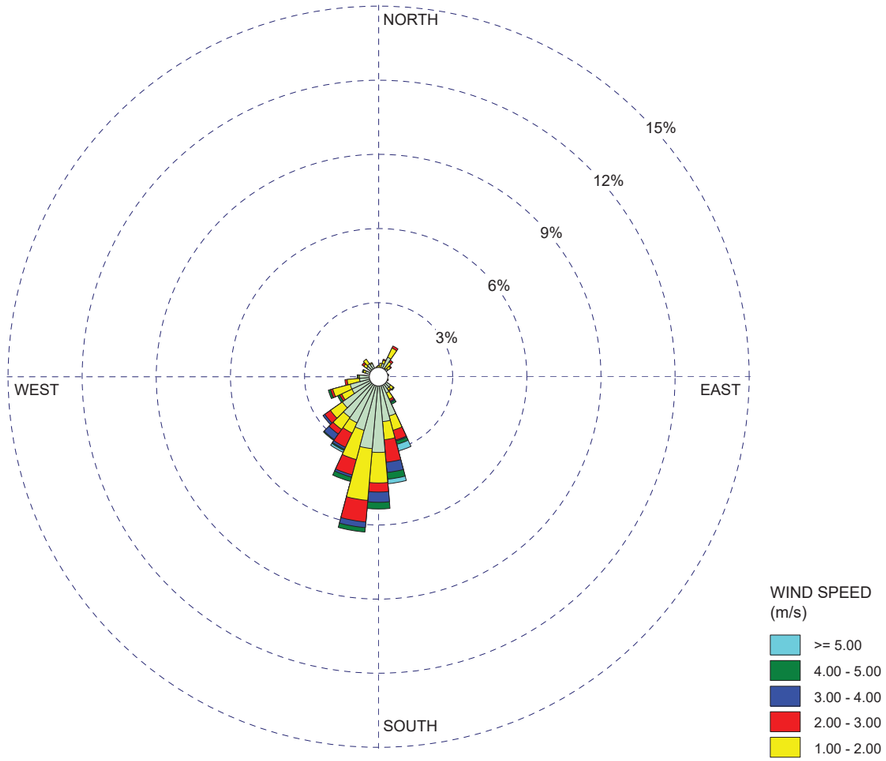
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 03:00** **End Date: 7/31/2024 - 03:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **29.29%**	TOTAL COUNT: **1075 hrs.**	
	AVG. WIND SPEED: **2.36 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 04 WINDROSE (8/1/2021 TO 8/1/2024, 0300-0400)

DISPLAY:
Wind Speed
Direction (blowing from)



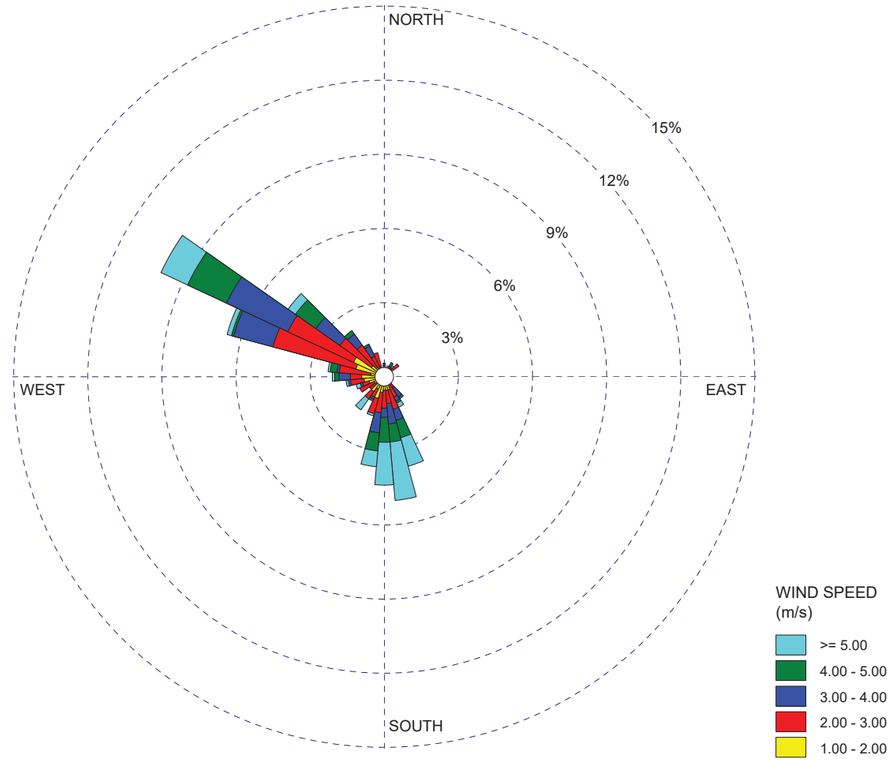
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **47.53%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **0.66 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 04 WINDROSE (8/1/2021 TO 8/1/2024, 0300-0400)

DISPLAY:
Wind Speed
Direction (blowing from)



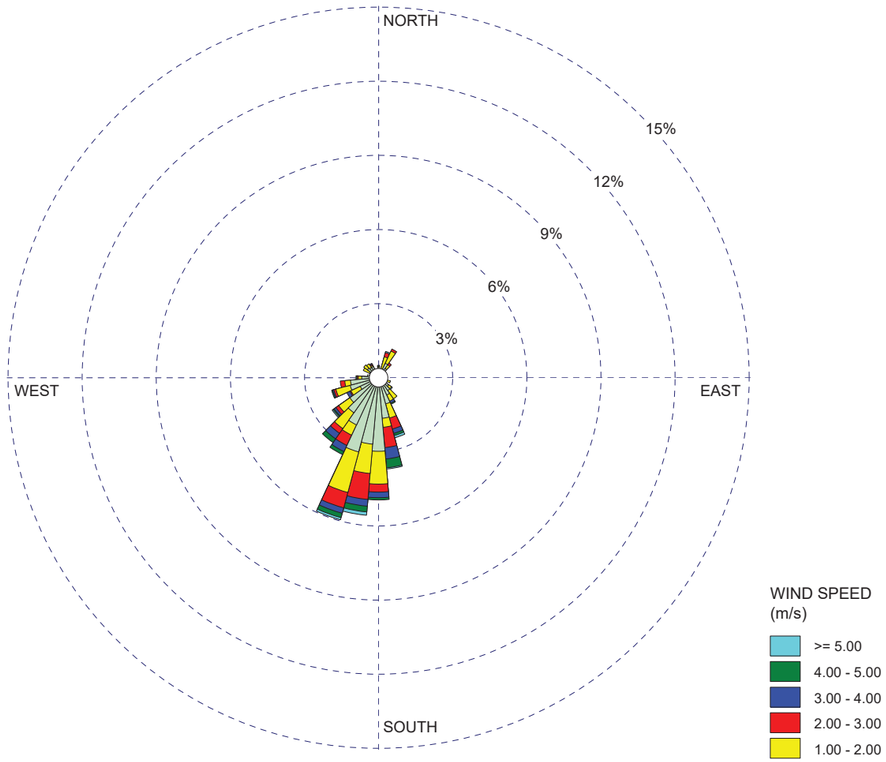
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 04:00** **End Date: 7/31/2024 - 04:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **33.94%**	TOTAL COUNT: **1069 hrs.**	
	AVG. WIND SPEED: **2.18 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 05 WINDROSE (8/1/2021 TO 8/1/2024, 0400-0500)

DISPLAY:
Wind Speed
Direction (blowing from)



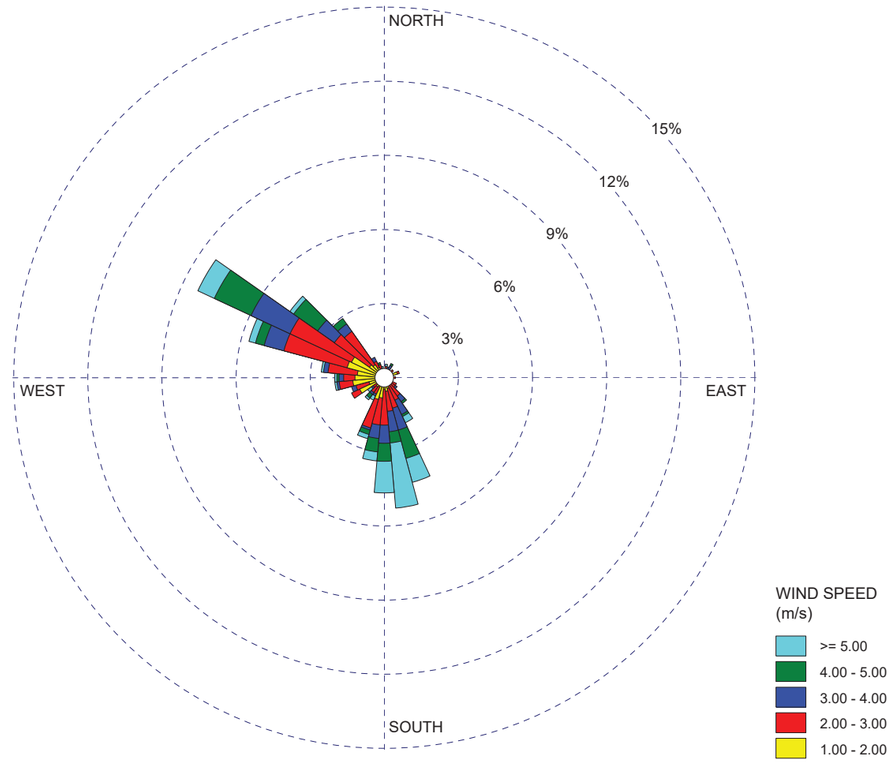
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **49.66%**	TOTAL COUNT: **2187**	
	AVG. WIND SPEED: **0.66 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 05 WINDROSE (8/1/2021 TO 8/1/2024, 0400-0500)

DISPLAY:
Wind Speed
Direction (blowing from)



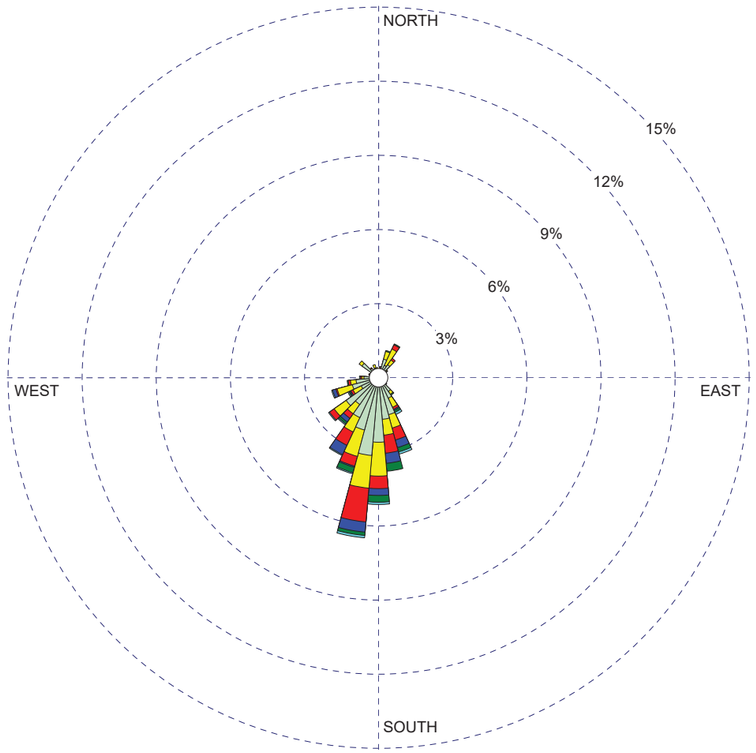
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 05:00** **End Date: 7/31/2024 - 05:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **32.85%**	TOTAL COUNT: **1074 hrs.**	
	AVG. WIND SPEED: **2.15 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 06 WINDROSE (8/1/2021 TO 8/1/2024, 0500-0600)

DISPLAY:
Wind Speed
Direction (blowing from)



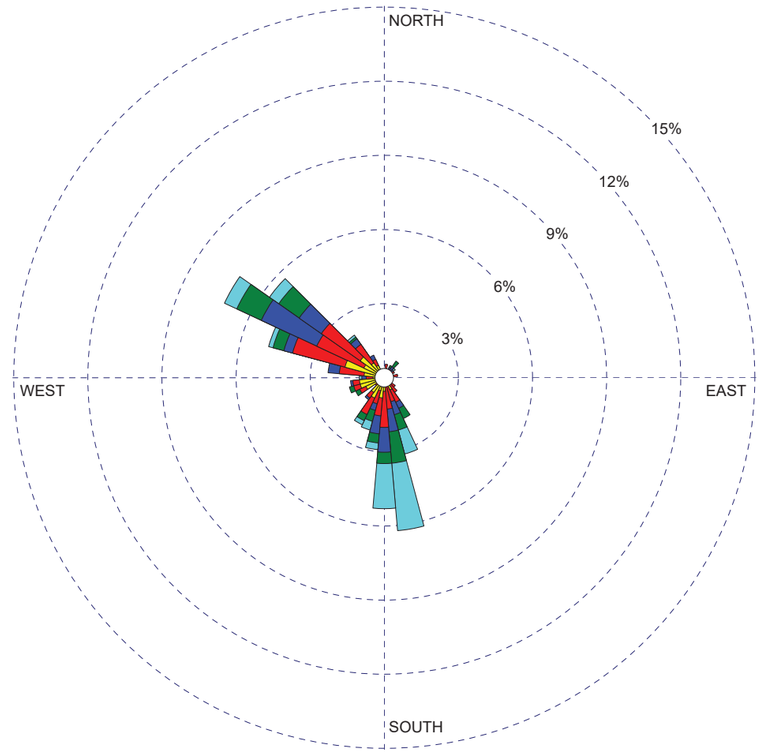
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **50.55%**	TOTAL COUNT: **2188**	
	AVG. WIND SPEED: **0.66 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 06 WINDROSE (8/1/2021 TO 8/1/2024, 0500-0600)

DISPLAY:
Wind Speed
Direction (blowing from)



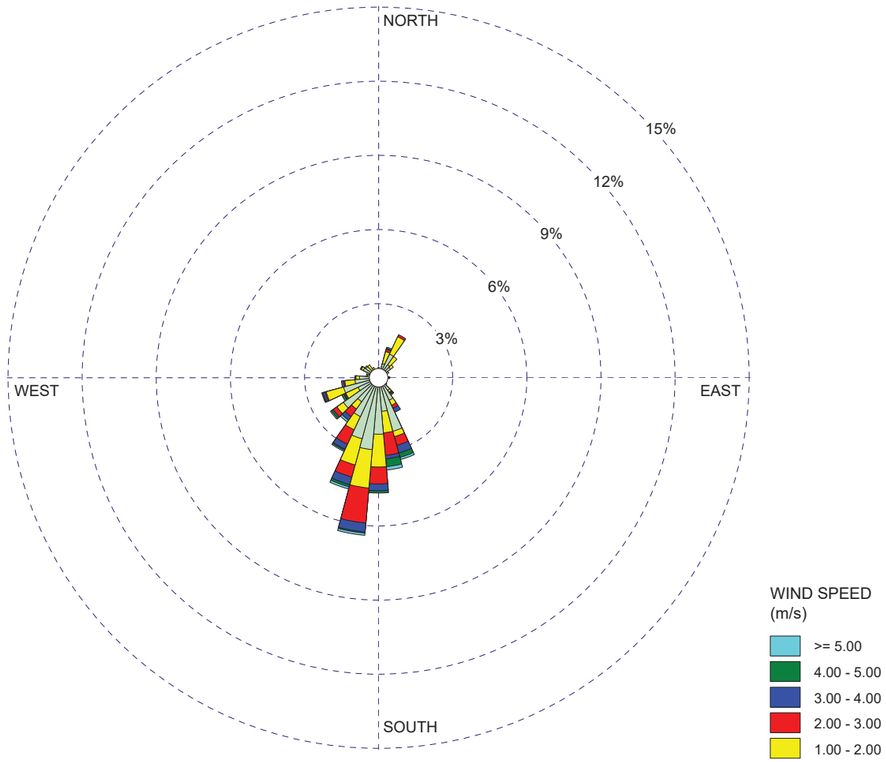
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 06:00** **End Date: 7/31/2024 - 06:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **37.41%**	TOTAL COUNT: **1073 hrs.**	
	AVG. WIND SPEED: **2.03 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 07 WINDROSE (8/1/2021 TO 8/1/2024, 0600-0700)

DISPLAY:
Wind Speed
Direction (blowing from)



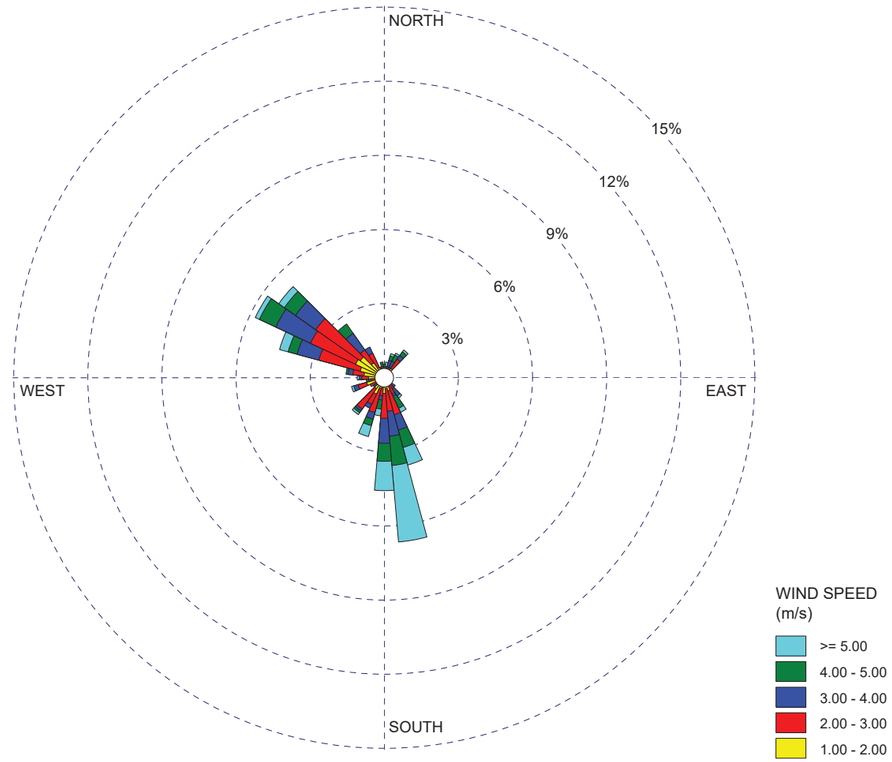
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **48.13%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **0.68 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 07 WINDROSE (8/1/2021 TO 8/1/2024, 0600-0700)

DISPLAY:
Wind Speed
Direction (blowing from)

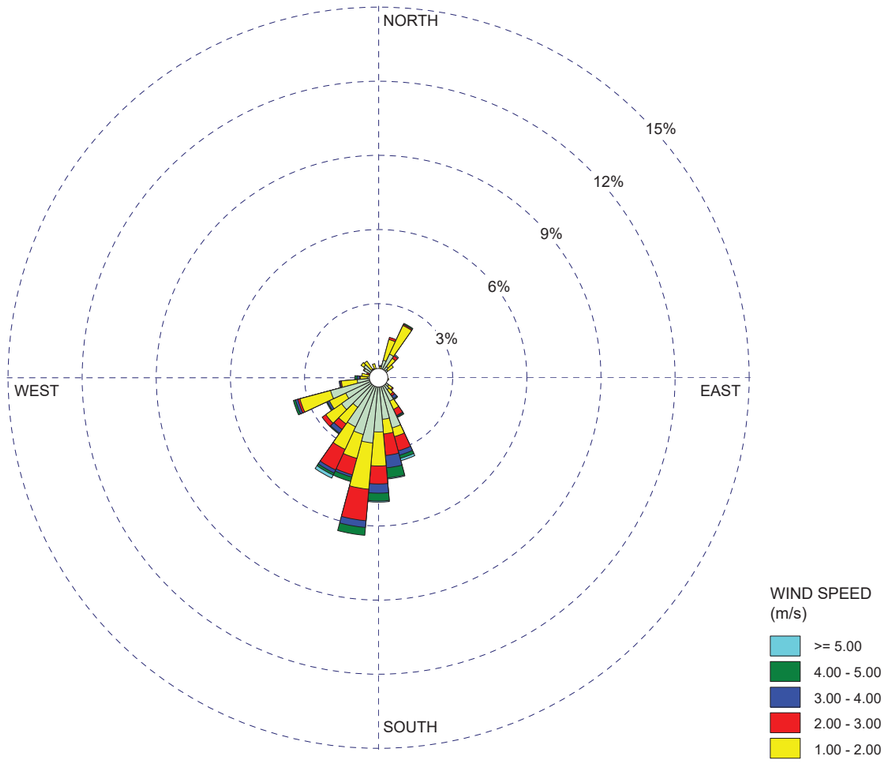


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 07:00** **End Date: 7/31/2024 - 07:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **39.69%**	TOTAL COUNT: **1069 hrs.**	
	AVG. WIND SPEED: **1.99 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 08 WINDROSE (8/1/2021 TO 8/1/2024, 0700-0800)

DISPLAY:
Wind Speed
Direction (blowing from)

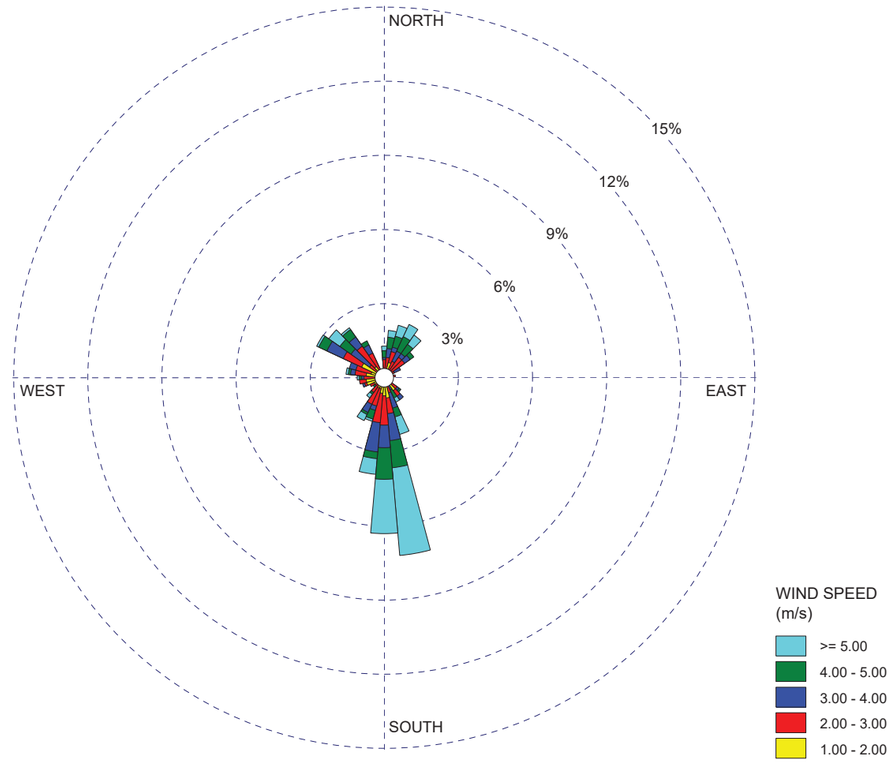


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **41.11%**	TOTAL COUNT: **2189**	
	AVG. WIND SPEED: **0.79 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 08 WINDROSE (8/1/2021 TO 8/1/2024, 0700-0800)

DISPLAY:
Wind Speed
Direction (blowing from)



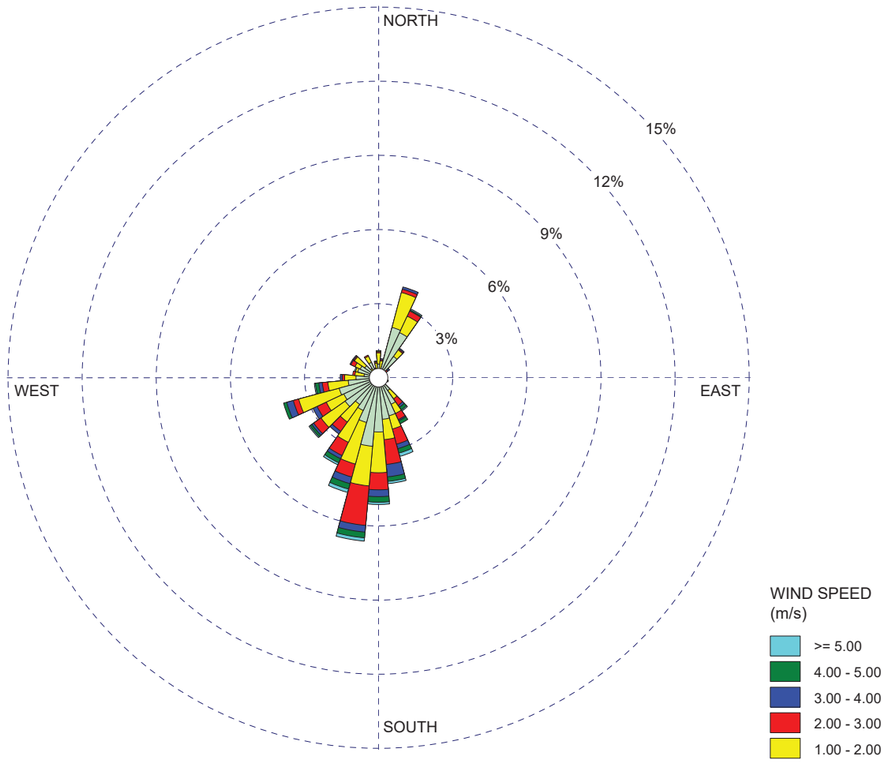
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 08:00** **End Date: 7/31/2024 - 08:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **35.58%**	TOTAL COUNT: **1034 hrs.**	
	AVG. WIND SPEED: **2.24 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 09 WINDROSE (8/1/2021 TO 8/1/2024, 0800-0900)

DISPLAY:
Wind Speed
Direction (blowing from)



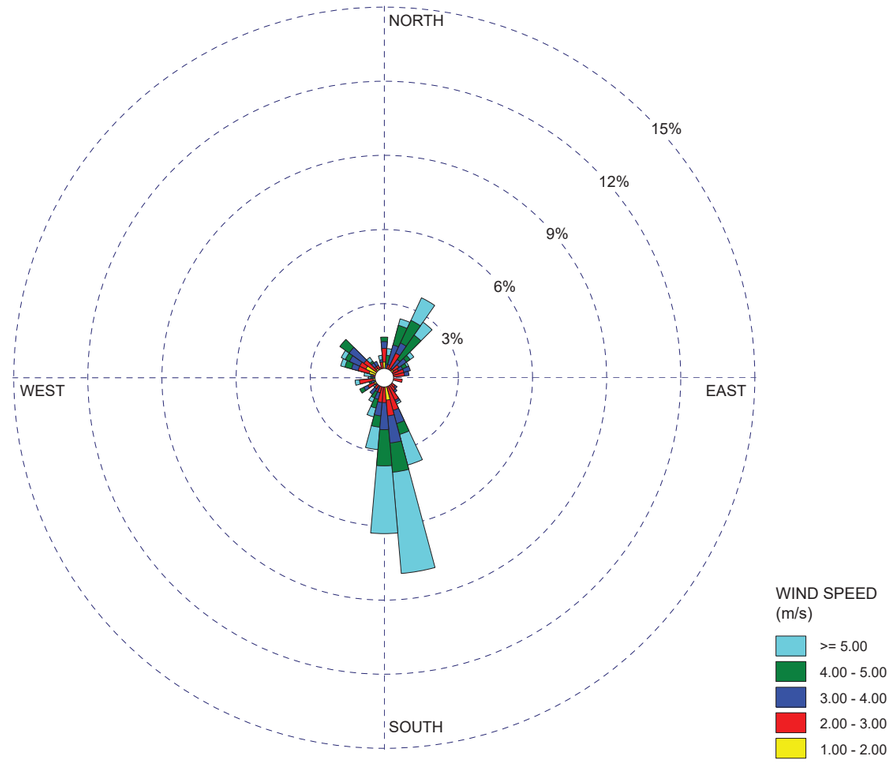
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **30.85%**	TOTAL COUNT: **2187**	
	AVG. WIND SPEED: **0.99 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 09 WINDROSE (8/1/2021 TO 8/1/2024, 0800-0900)

DISPLAY:
Wind Speed
Direction (blowing from)



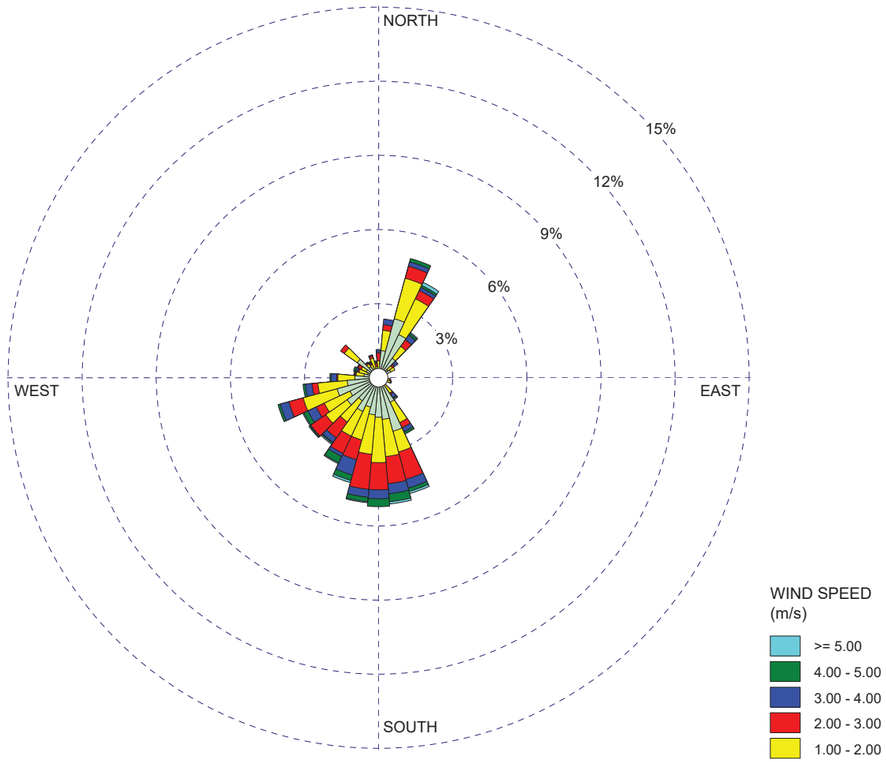
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 09:00** **End Date: 7/31/2024 - 09:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **30.84%**	TOTAL COUNT: **983 hrs.**	
	AVG. WIND SPEED: **2.55 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 10 WINDROSE (8/1/2021 TO 8/1/2024, 0900-1000)

DISPLAY:
Wind Speed
Direction (blowing from)



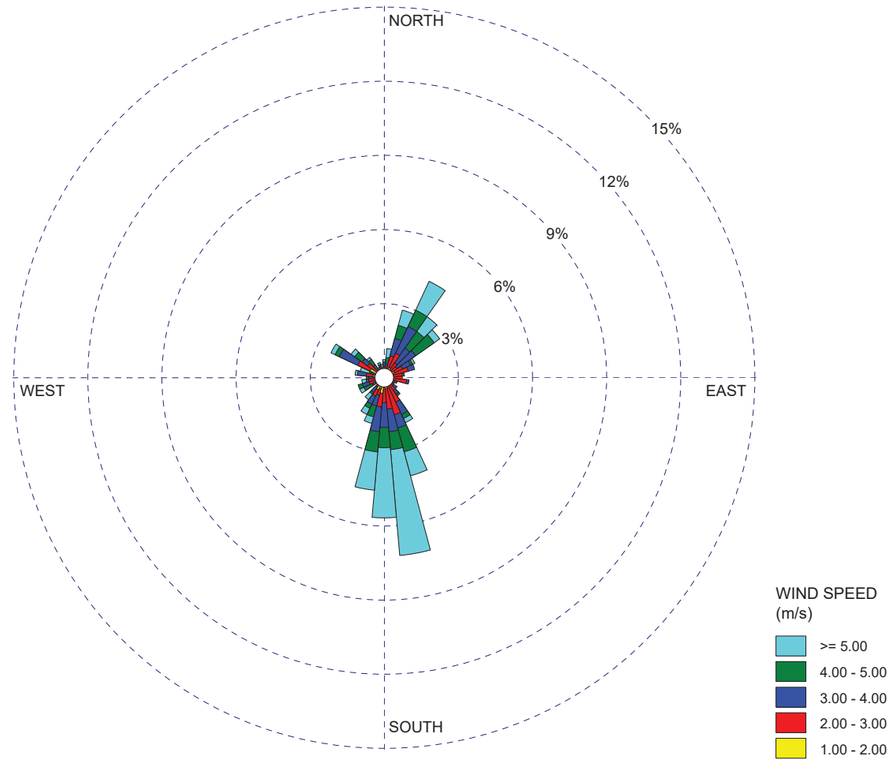
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **21.34%**	TOTAL COUNT: **2186**	
	AVG. WIND SPEED: **1.23 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 10 WINDROSE (8/1/2021 TO 8/1/2024, 0900-1000)

DISPLAY:
Wind Speed
Direction (blowing from)

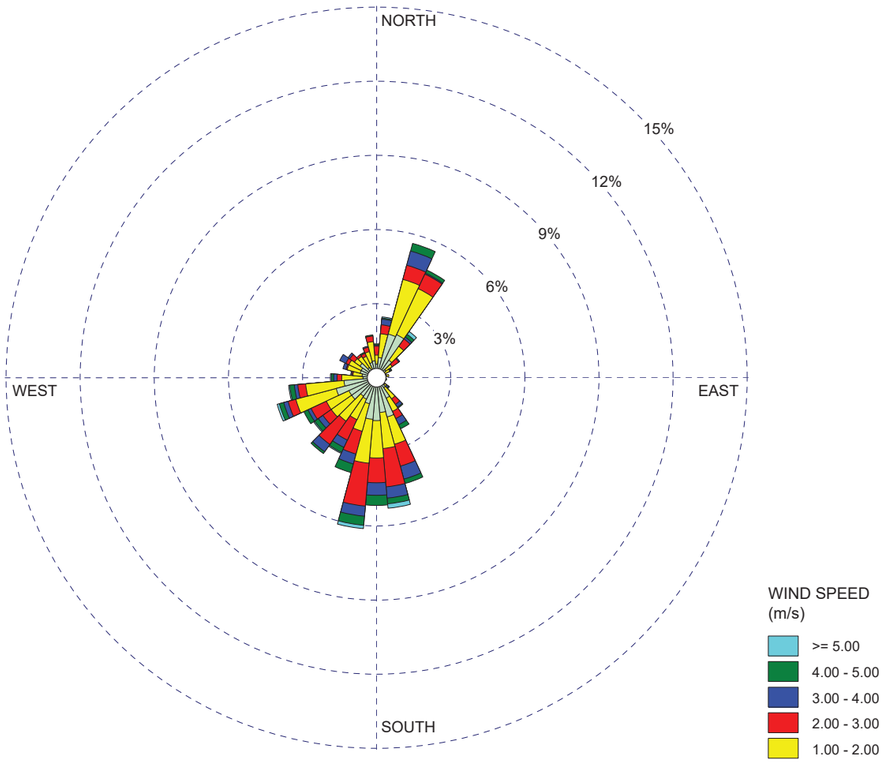


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 10:00** **End Date: 7/31/2024 - 10:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **23.91%**	TOTAL COUNT: **960 hrs.**	
	AVG. WIND SPEED: **2.88 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 11 WINDROSE (8/1/2021 TO 8/1/2024, 1000-1100)

DISPLAY:
Wind Speed
Direction (blowing from)

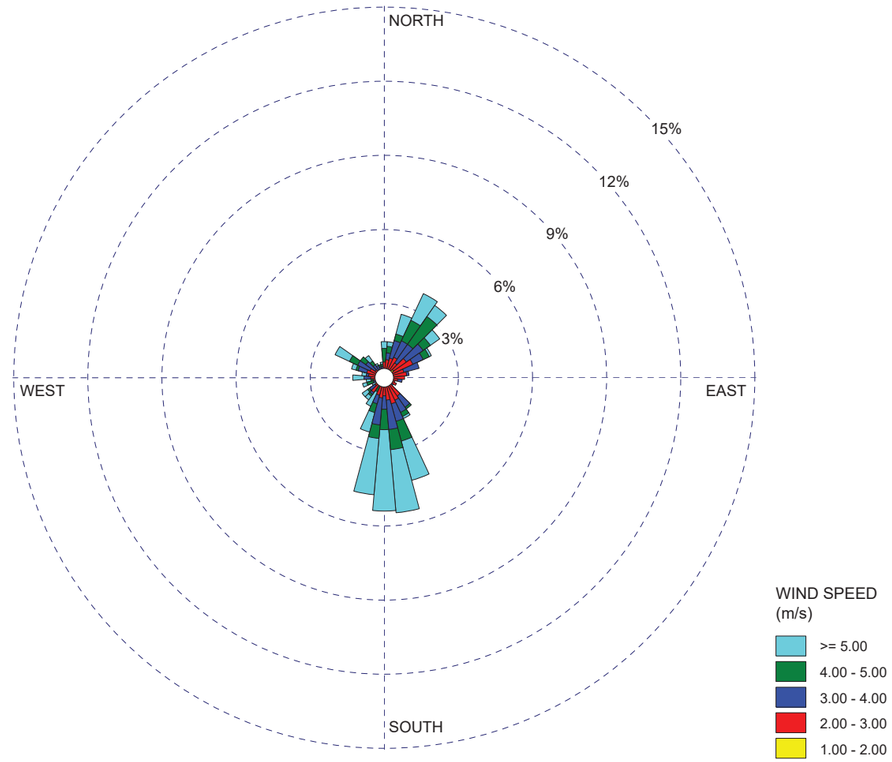


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **16.12%**	TOTAL COUNT: **2185**	
	AVG. WIND SPEED: **1.39 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 11 WINDROSE (8/1/2021 TO 8/1/2024, 1000-1100)

DISPLAY:
Wind Speed
Direction (blowing from)

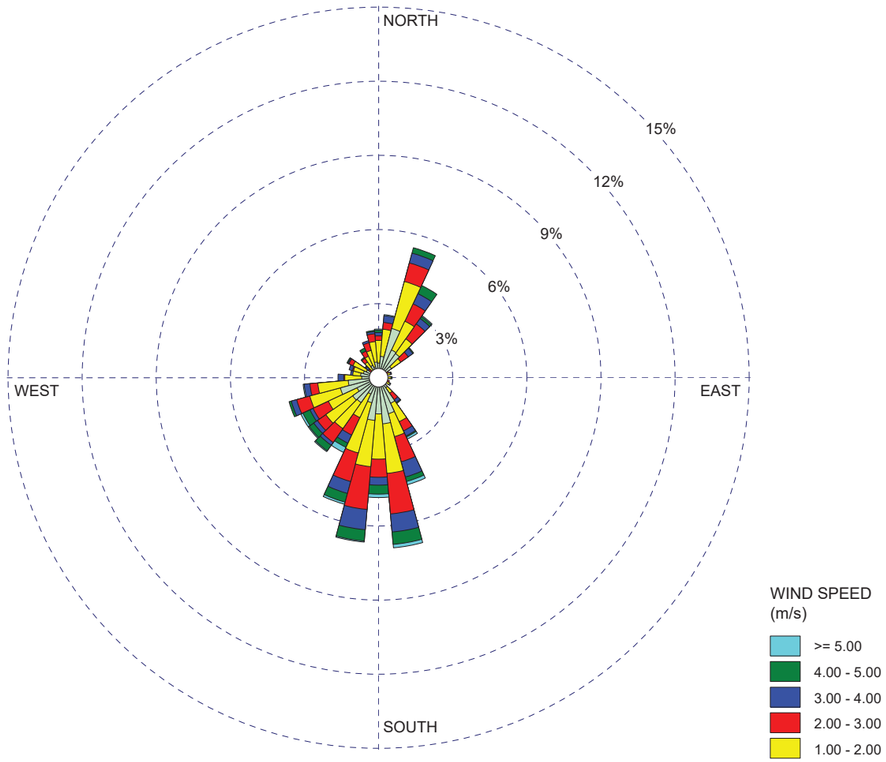


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 11:00** **End Date: 7/31/2024 - 11:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **21.62%**	TOTAL COUNT: **941 hrs.**	
	AVG. WIND SPEED: **3.08 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 12 WINDROSE (8/1/2021 TO 8/1/2024, 1100-1200)

DISPLAY:
Wind Speed
Direction (blowing from)

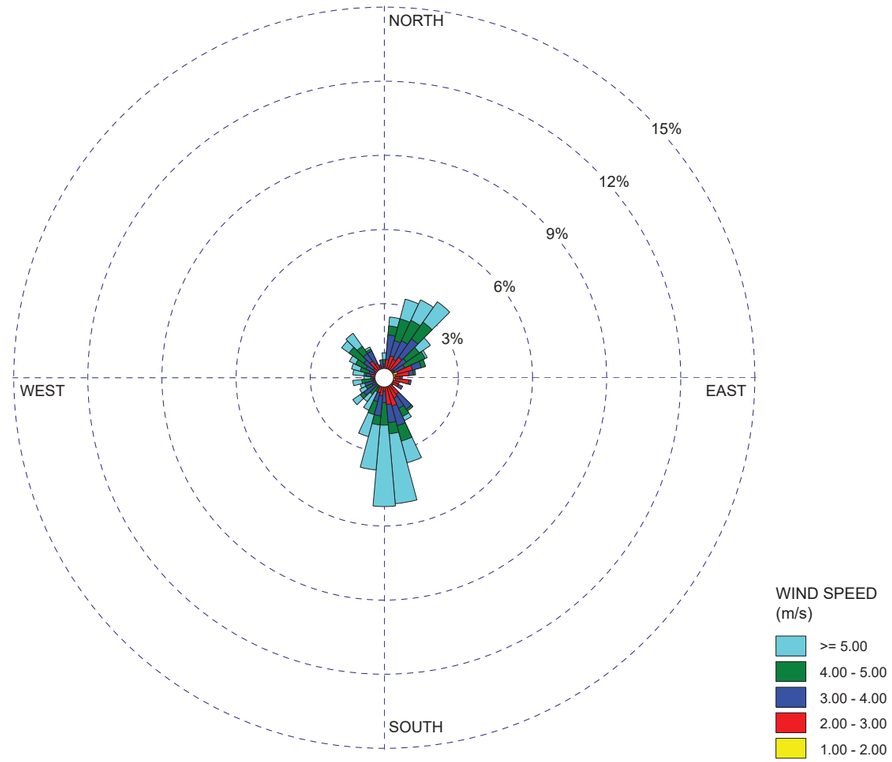


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **12.83%**	TOTAL COUNT: **2188**	
	AVG. WIND SPEED: **1.54 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 12 WINDROSE (8/1/2021 TO 8/1/2024, 1100-1200)

DISPLAY:
Wind Speed
Direction (blowing from)

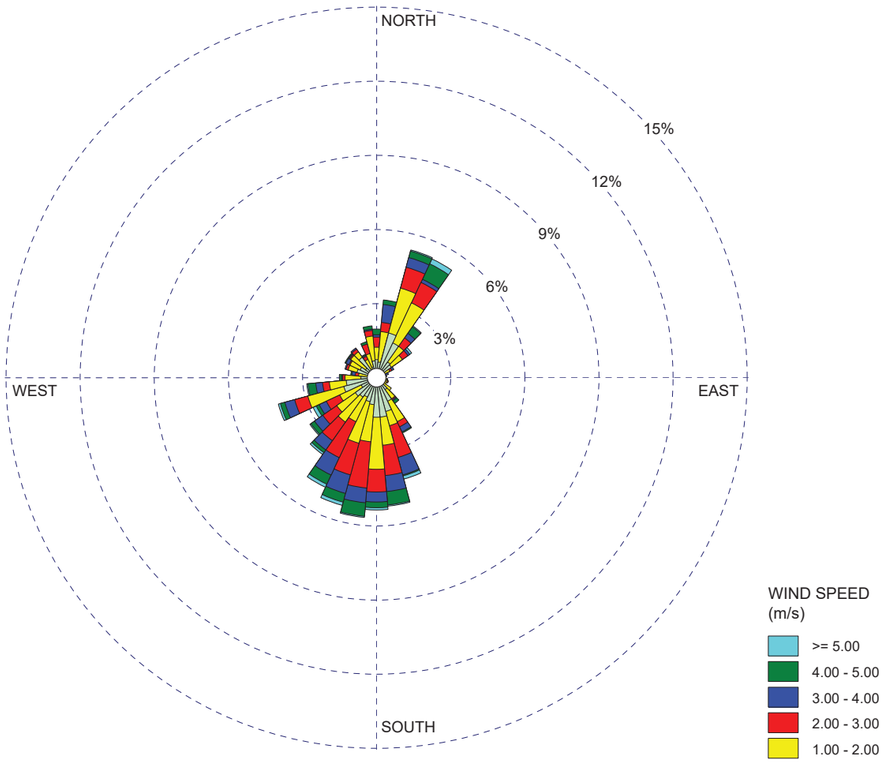


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 12:00** **End Date: 7/31/2024 - 12:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **16.97%**	TOTAL COUNT: **932 hrs.**	
	AVG. WIND SPEED: **3.37 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 13 WINDROSE (8/1/2021 TO 8/1/2024, 1200-1300)

DISPLAY:
Wind Speed
Direction (blowing from)

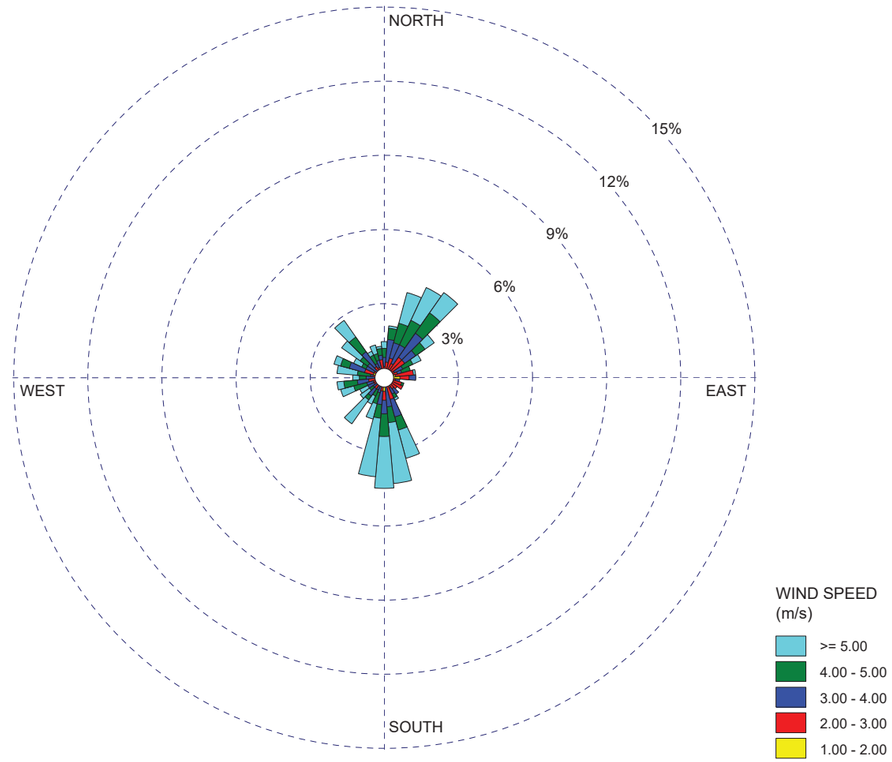


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **11.60%**	TOTAL COUNT: **2188**	
	AVG. WIND SPEED: **1.63 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 13 WINDROSE (8/1/2021 TO 8/1/2024, 1200-1300)

DISPLAY:
Wind Speed
Direction (blowing from)



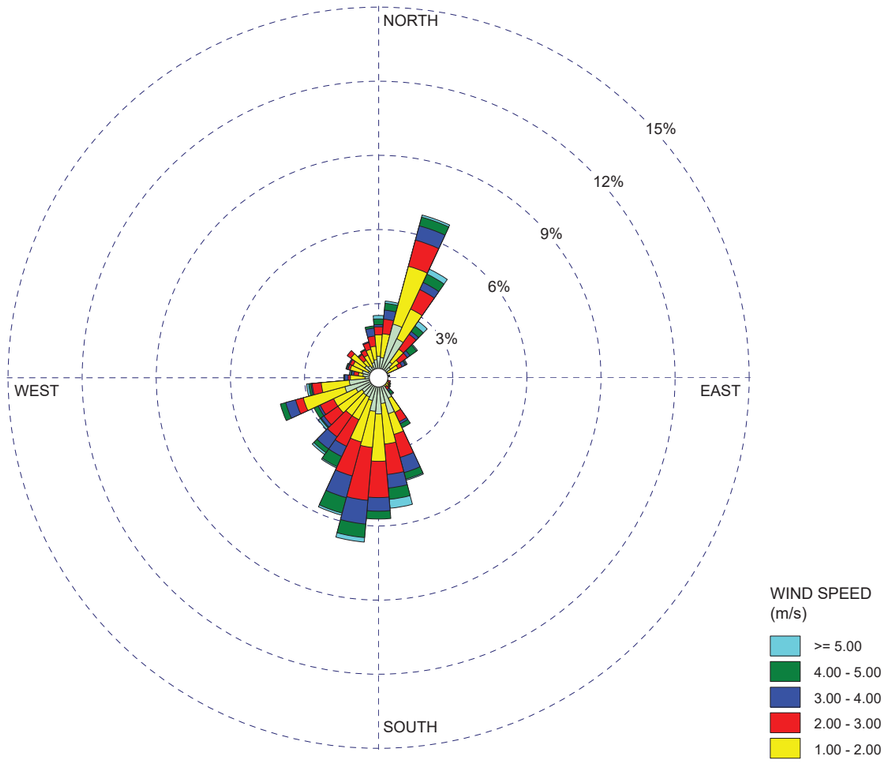
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 13:00** **End Date: 7/31/2024 - 13:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **15.05%**	TOTAL COUNT: **939 hrs.**	
	AVG. WIND SPEED: **3.54 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 14 WINDROSE (8/1/2021 TO 8/1/2024, 1300-1400)

DISPLAY:
Wind Speed
Direction (blowing from)



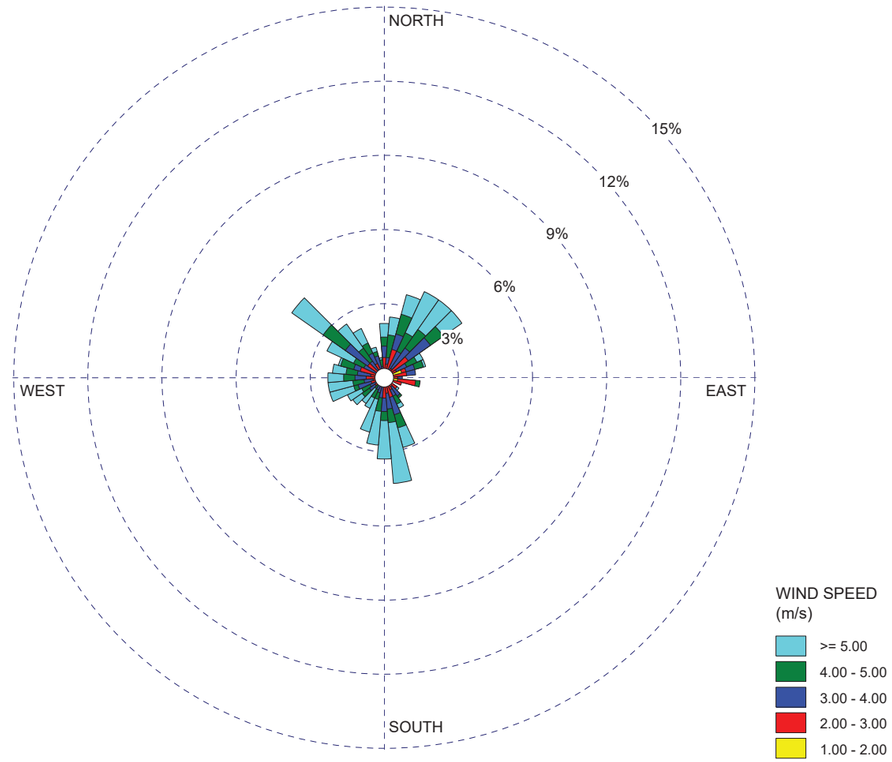
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **9.27%**	TOTAL COUNT: **2189**	
	AVG. WIND SPEED: **1.72 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 14 WINDROSE (8/1/2021 TO 8/1/2024, 1300-1400)

DISPLAY:
Wind Speed
Direction (blowing from)



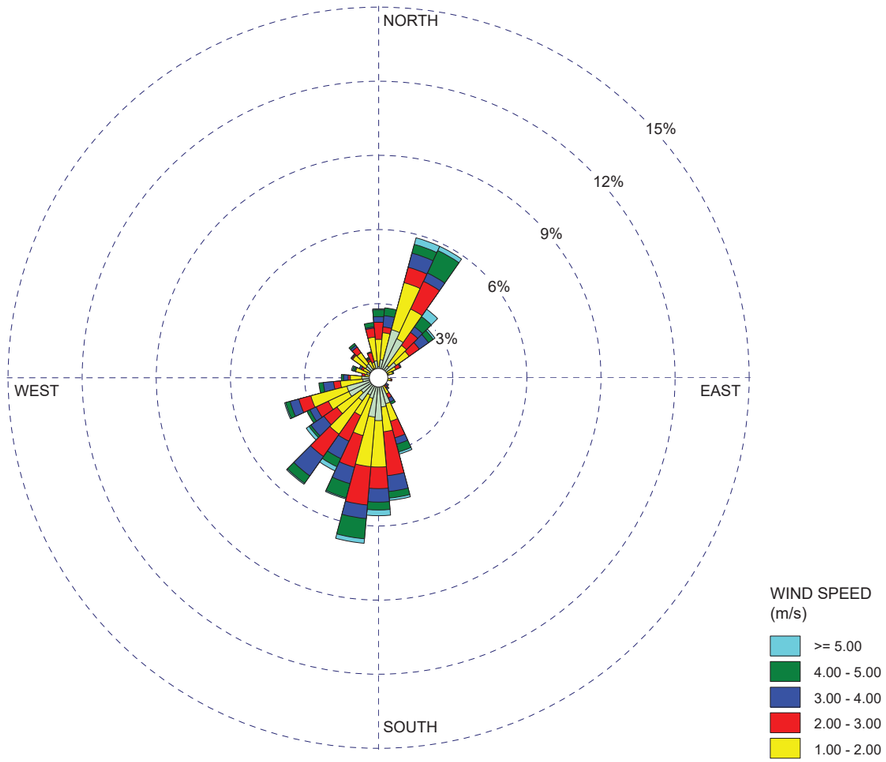
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 14:00** **End Date: 7/31/2024 - 14:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **11.95%**	TOTAL COUNT: **975 hrs.**	
	AVG. WIND SPEED: **3.80 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 15 WINDROSE (8/1/2021 TO 8/1/2024, 1400-1500)

DISPLAY:
Wind Speed
Direction (blowing from)



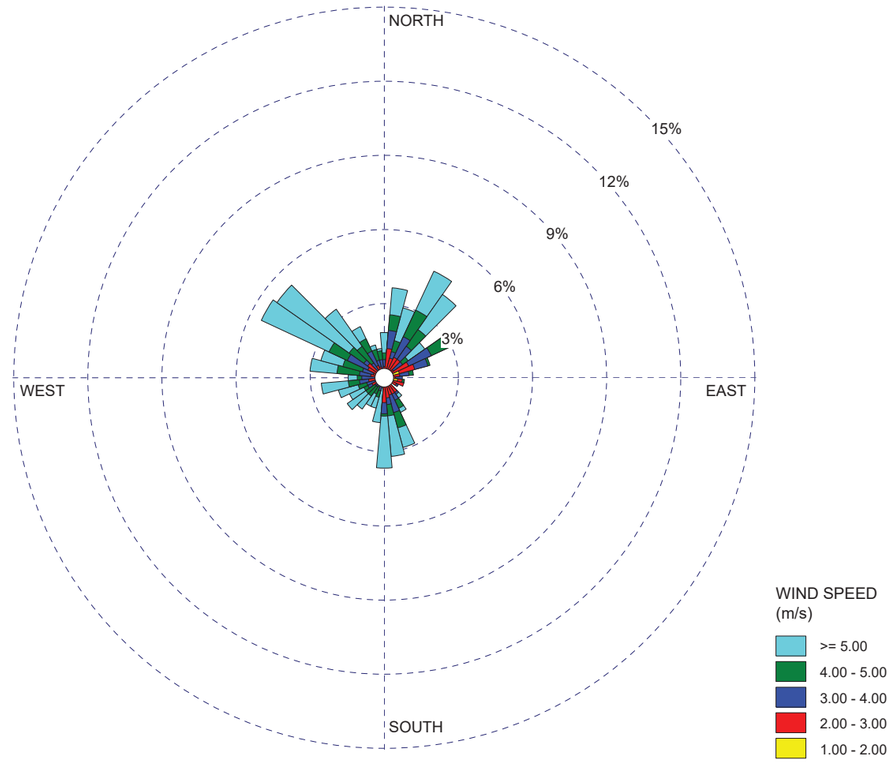
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **11.38%**	TOTAL COUNT: **2189**	
	AVG. WIND SPEED: **1.75 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 15 WINDROSE (8/1/2021 TO 8/1/2024, 1400-1500)

DISPLAY:
Wind Speed
Direction (blowing from)



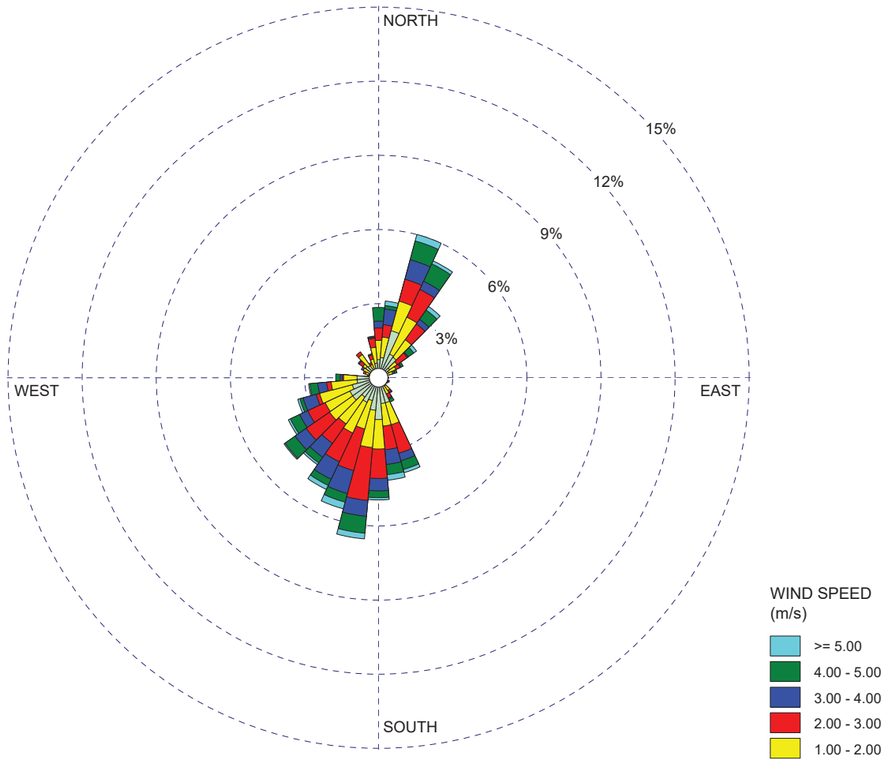
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 15:00** **End Date: 7/31/2024 - 15:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **10.49%**	TOTAL COUNT: **1001 hrs.**	
	AVG. WIND SPEED: **4.02 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 16 WINDROSE (8/1/2021 TO 8/1/2024, 1500-1600)

DISPLAY:
Wind Speed
Direction (blowing from)



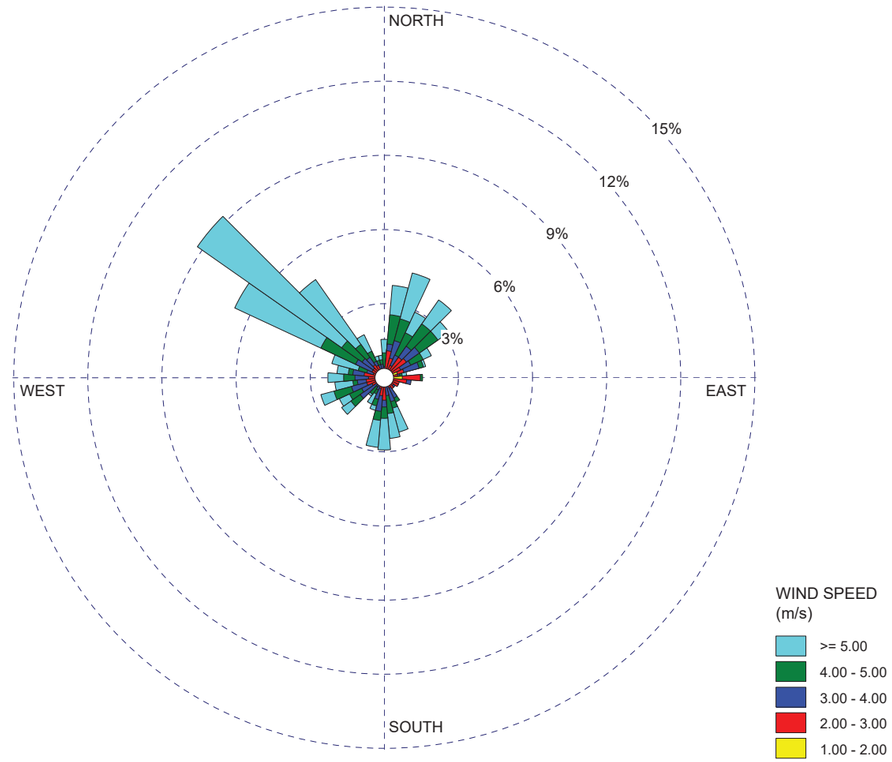
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **13.21%**	TOTAL COUNT: **2188**	
	AVG. WIND SPEED: **1.77 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 16 WINDROSE (8/1/2021 TO 8/1/2024, 1500-1600)

DISPLAY:
Wind Speed
Direction (blowing from)



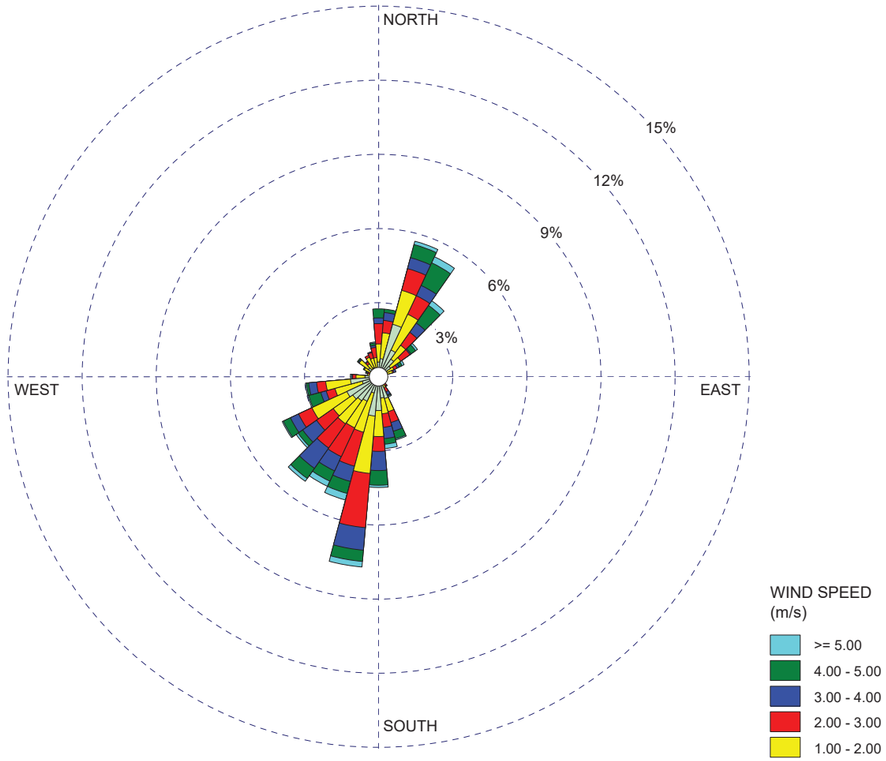
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 16:00** **End Date: 7/31/2024 - 16:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **10.31%**	TOTAL COUNT: **1034 hrs.**	
	AVG. WIND SPEED: **4.11 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 17 WINDROSE (8/1/2021 TO 8/1/2024, 1600-1700)

DISPLAY:
Wind Speed
Direction (blowing from)



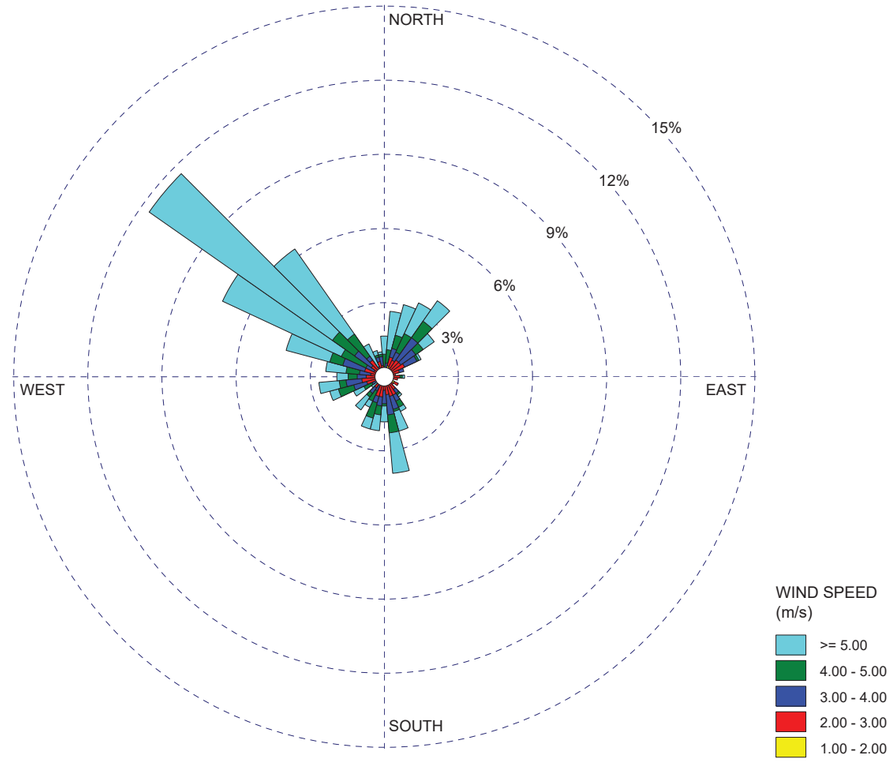
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **17.49%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **1.68 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 17 WINDROSE (8/1/2021 TO 8/1/2024, 1600-1700)

DISPLAY:
Wind Speed
Direction (blowing from)



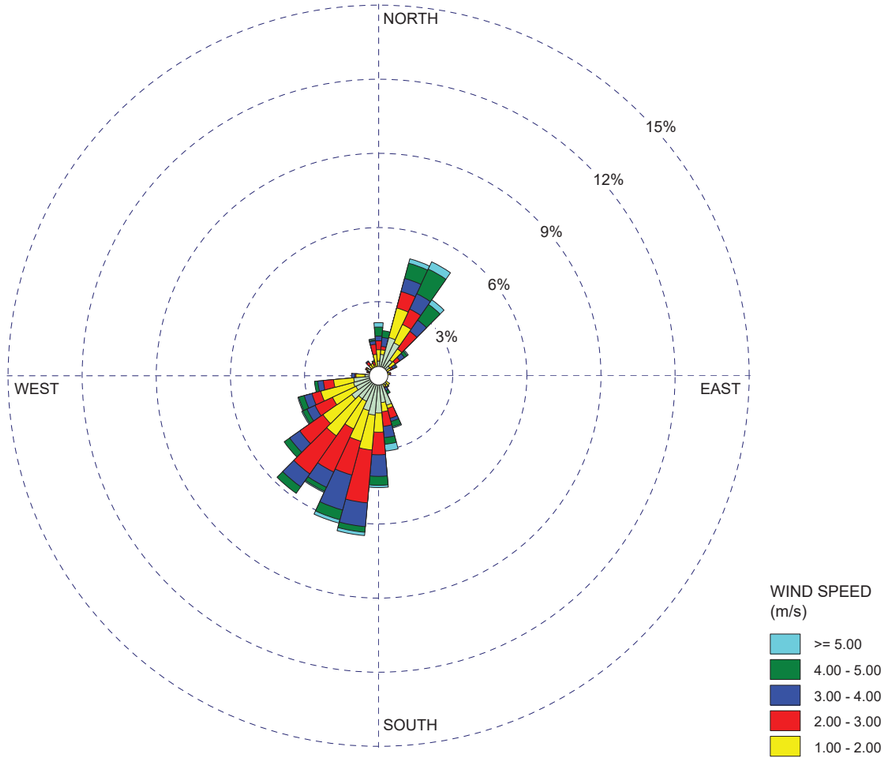
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 17:00** **End Date: 7/31/2024 - 17:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **11.95%**	TOTAL COUNT: **1056 hrs.**	
	AVG. WIND SPEED: **4.20 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 18 WINDROSE (8/1/2021 TO 8/1/2024, 1700-1800)

DISPLAY:
Wind Speed
Direction (blowing from)



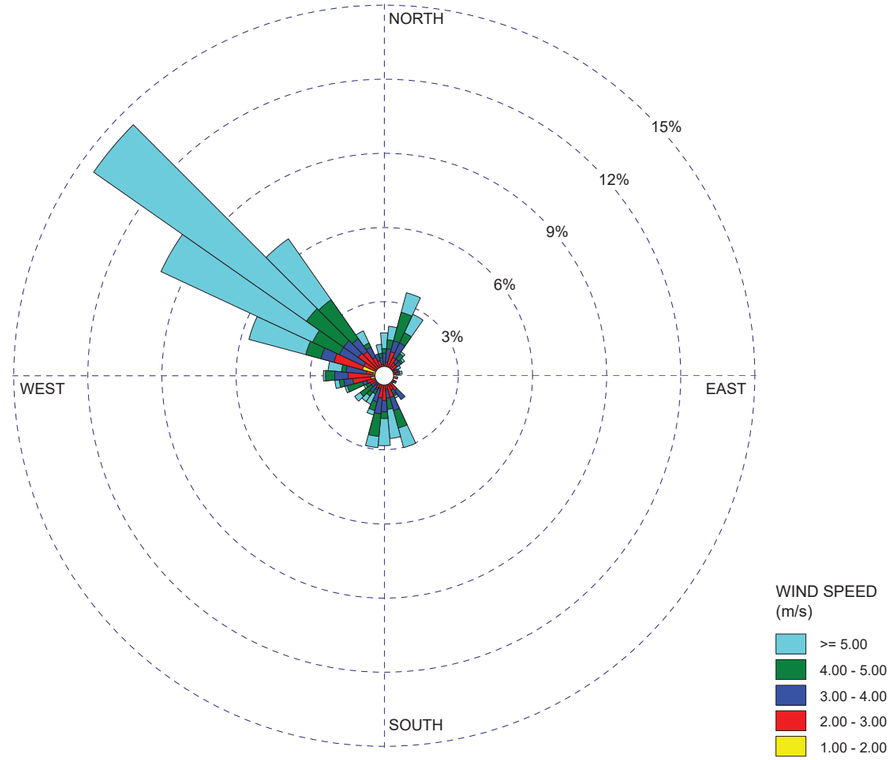
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **22.15%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **1.55 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 18 WINDROSE (8/1/2021 TO 8/1/2024, 1700-1800)

DISPLAY:
Wind Speed
Direction (blowing from)



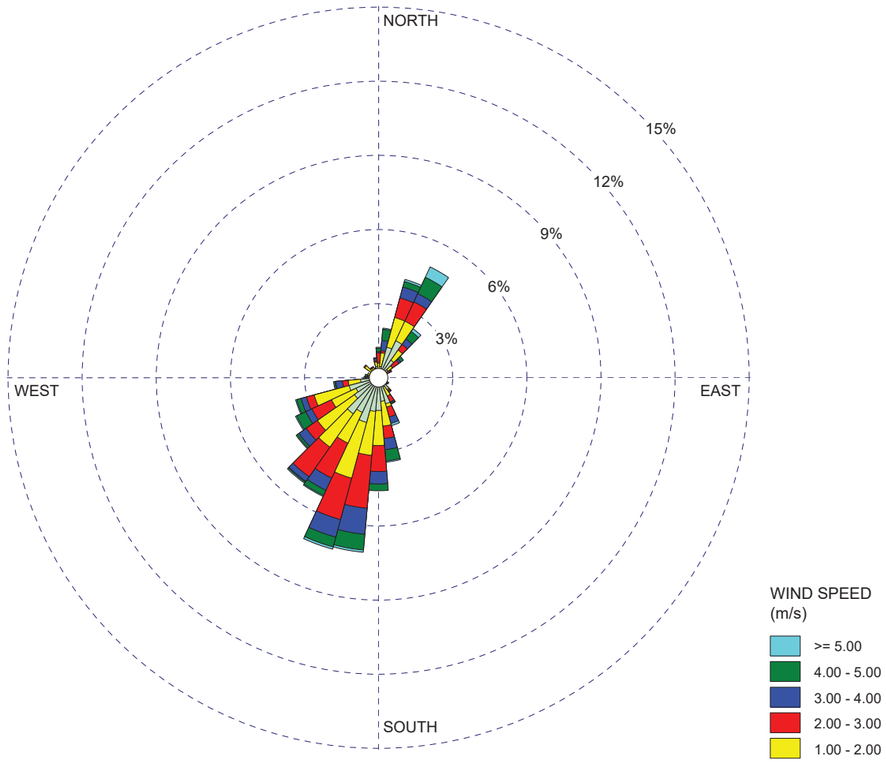
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 18:00** **End Date: 7/31/2024 - 18:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **12.23%**	TOTAL COUNT: **1075 hrs.**	
	AVG. WIND SPEED: **4.02 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 19 WINDROSE (8/1/2021 TO 8/1/2024, 1800-1900)

DISPLAY:
Wind Speed
Direction (blowing from)



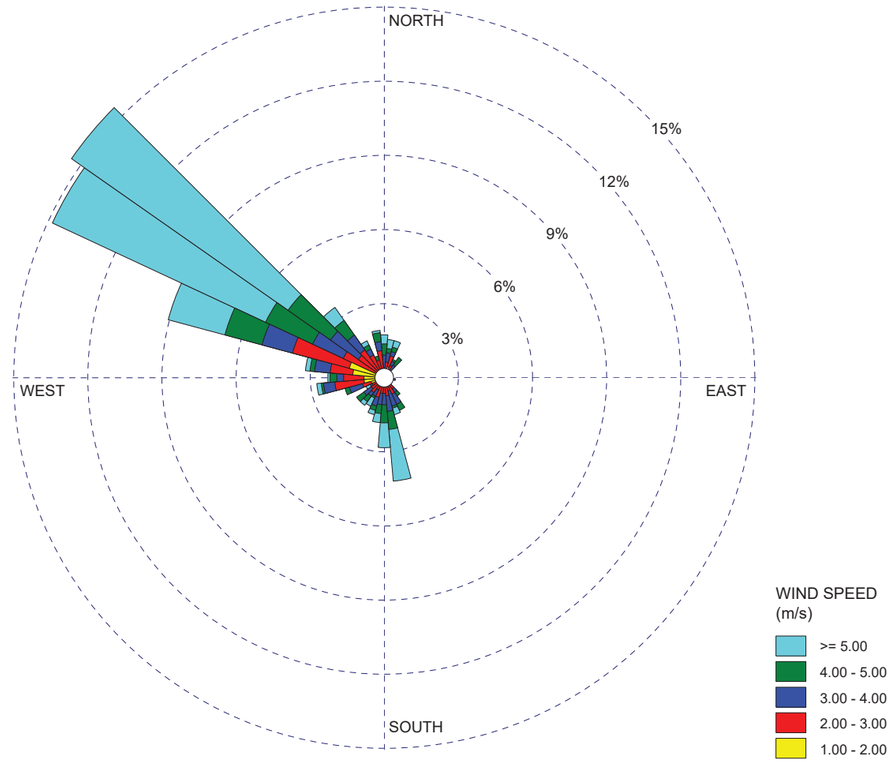
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **26.67%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **1.37 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 19 WINDROSE (8/1/2021 TO 8/1/2024, 1800-1900)

DISPLAY:
Wind Speed
Direction (blowing from)

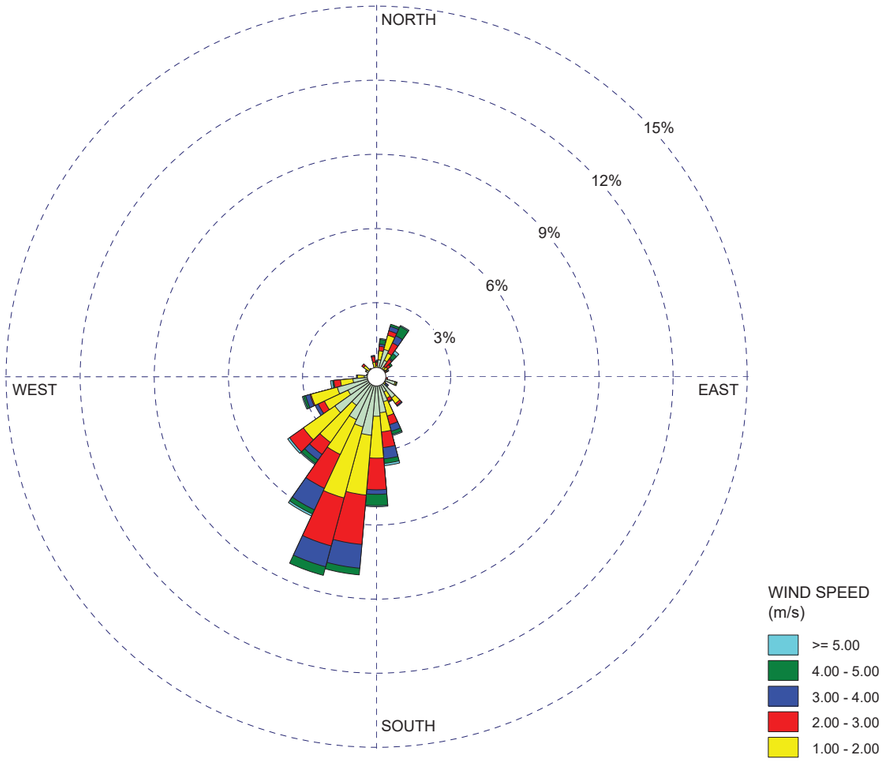


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 19:00** **End Date: 7/31/2024 - 19:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **12.50%**	TOTAL COUNT: **1070 hrs.**	
	AVG. WIND SPEED: **3.83 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 20 WINDROSE (8/1/2021 TO 8/1/2024, 1900-2000)

DISPLAY:
Wind Speed
Direction (blowing from)

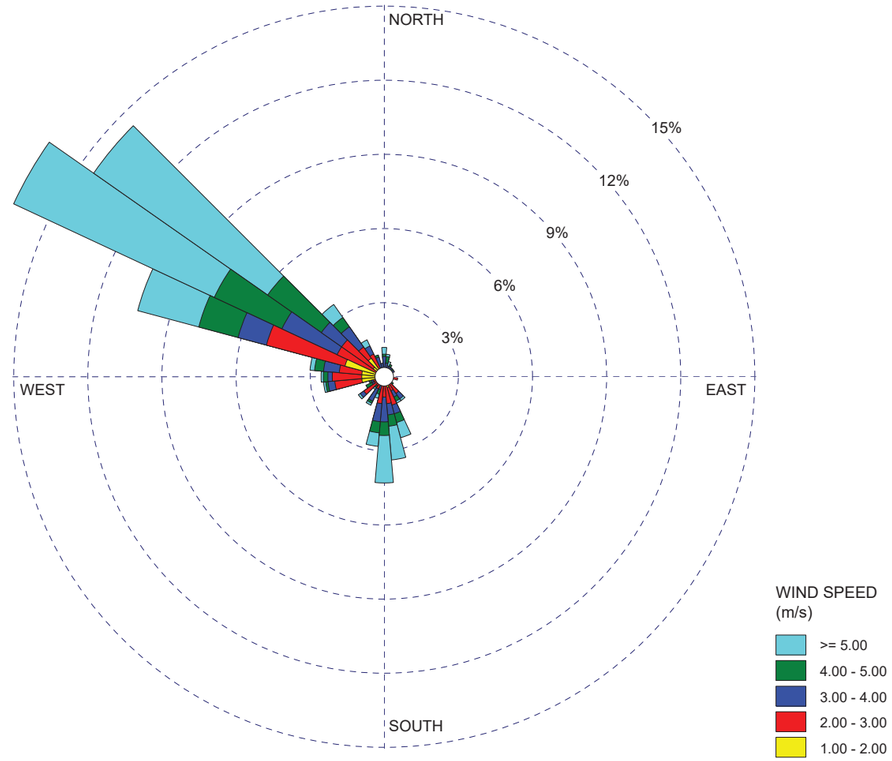


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **30.32%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **1.15 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 20 WINDROSE (8/1/2021 TO 8/1/2024, 1900-2000)

DISPLAY:
Wind Speed
Direction (blowing from)



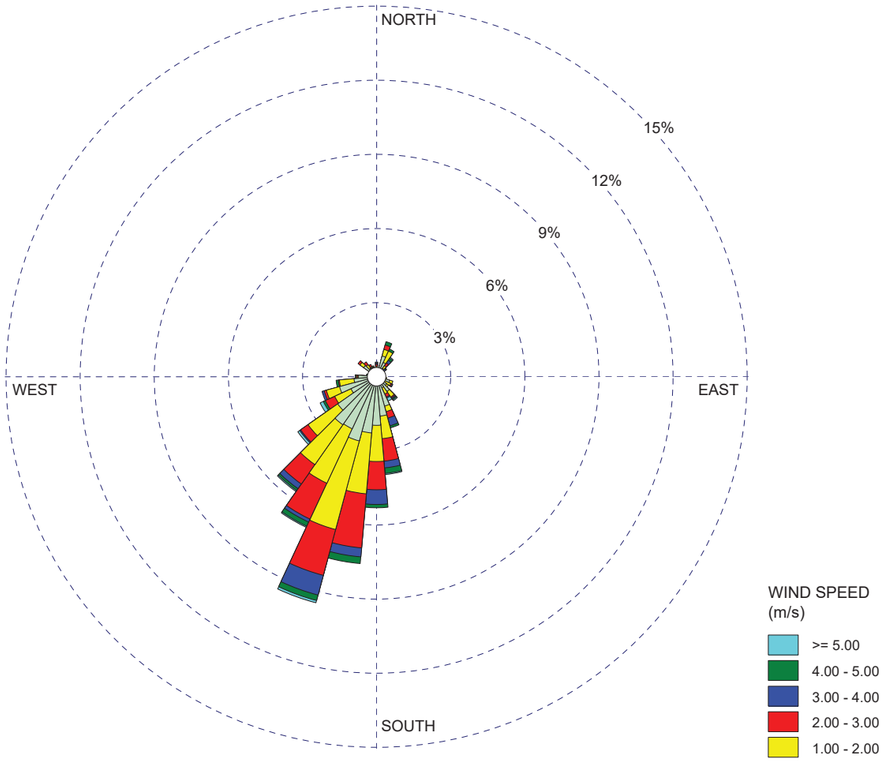
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 20:00** **End Date: 7/31/2024 - 20:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **14.23%**	TOTAL COUNT: **1067 hrs.**	
	AVG. WIND SPEED: **3.63 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 21 WINDROSE (8/1/2021 TO 8/1/2024, 2000-2100)

DISPLAY:
Wind Speed
Direction (blowing from)



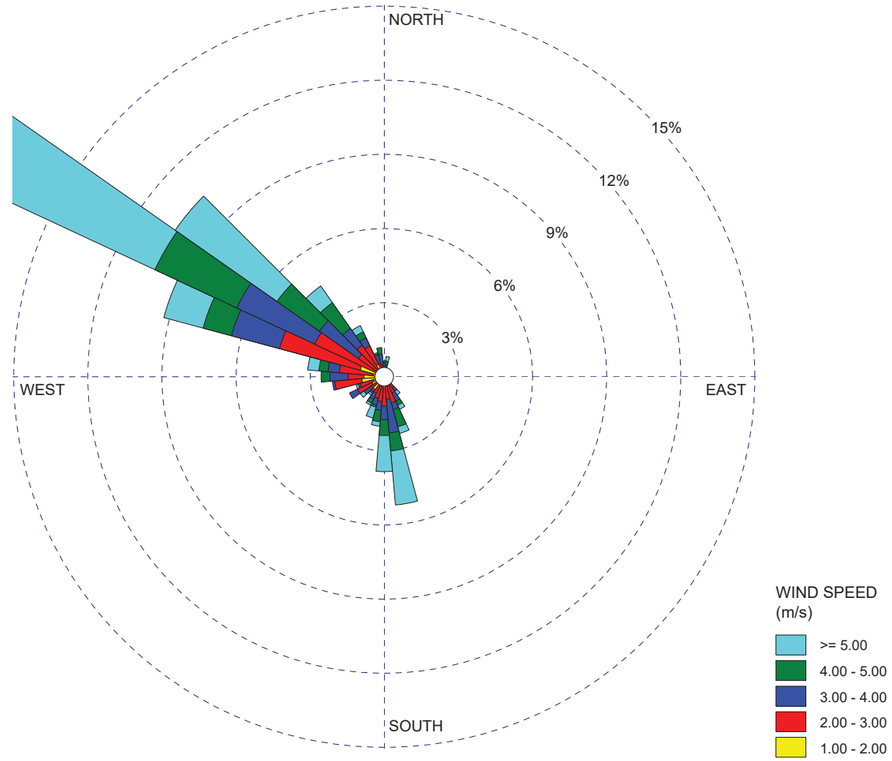
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **33.24%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **0.99 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 21 WINDROSE (8/1/2021 TO 8/1/2024, 2000-2100)

DISPLAY:
Wind Speed
Direction (blowing from)



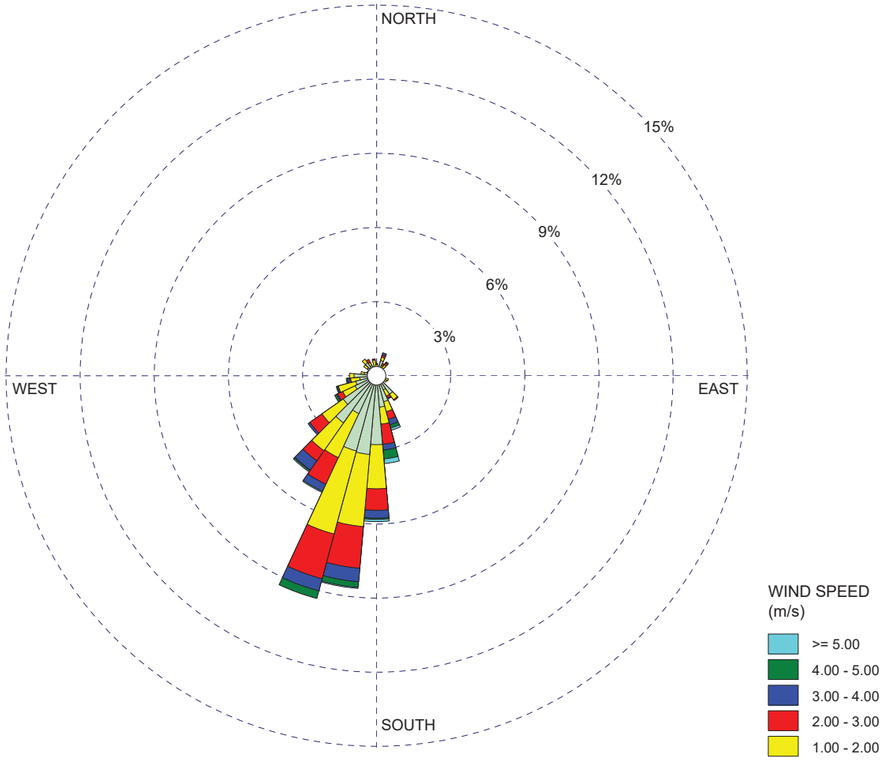
COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 21:00** **End Date: 7/31/2024 - 21:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **14.60%**	TOTAL COUNT: **1074 hrs.**	
	AVG. WIND SPEED: **3.49 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

COFFIN BUTTE LANDFILL
3-YEAR HOUR 22 WINDROSE (8/1/2021 TO 8/1/2024, 2100-2200)

DISPLAY:
Wind Speed
Direction (blowing from)



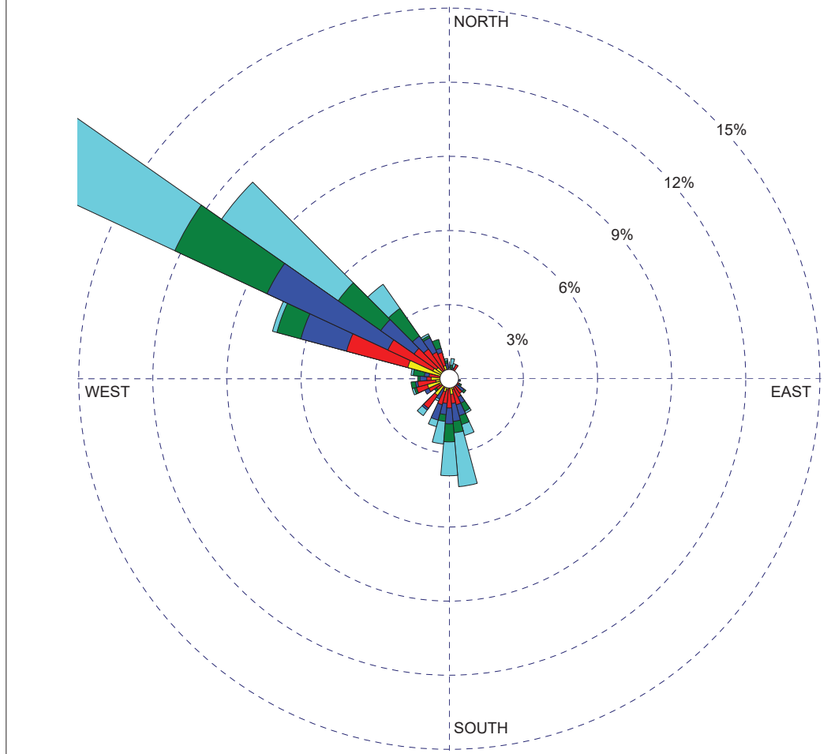
COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **38.54%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **0.88 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:

CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 22 WINDROSE (8/1/2021 TO 8/1/2024, 2100-2200)

DISPLAY:
Wind Speed
Direction (blowing from)

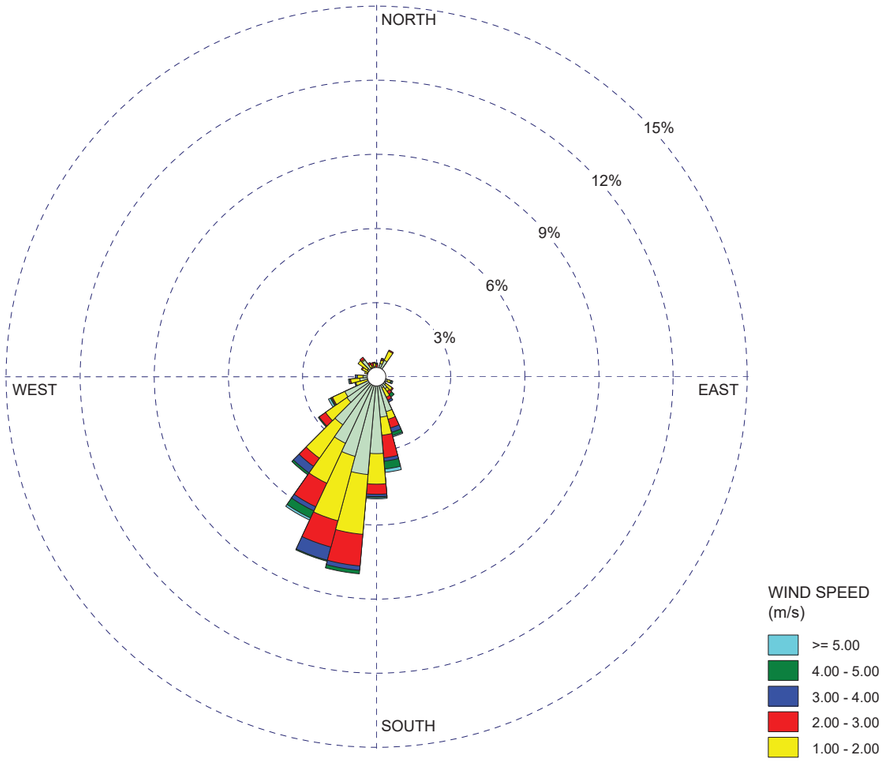


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 22:00** **End Date: 7/31/2024 - 22:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **17.15%**	TOTAL COUNT: **1071 hrs.**	
	AVG. WIND SPEED: **3.32 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 23 WINDROSE (8/1/2021 TO 8/1/2024, 2200-2300)

DISPLAY:
Wind Speed
Direction (blowing from)

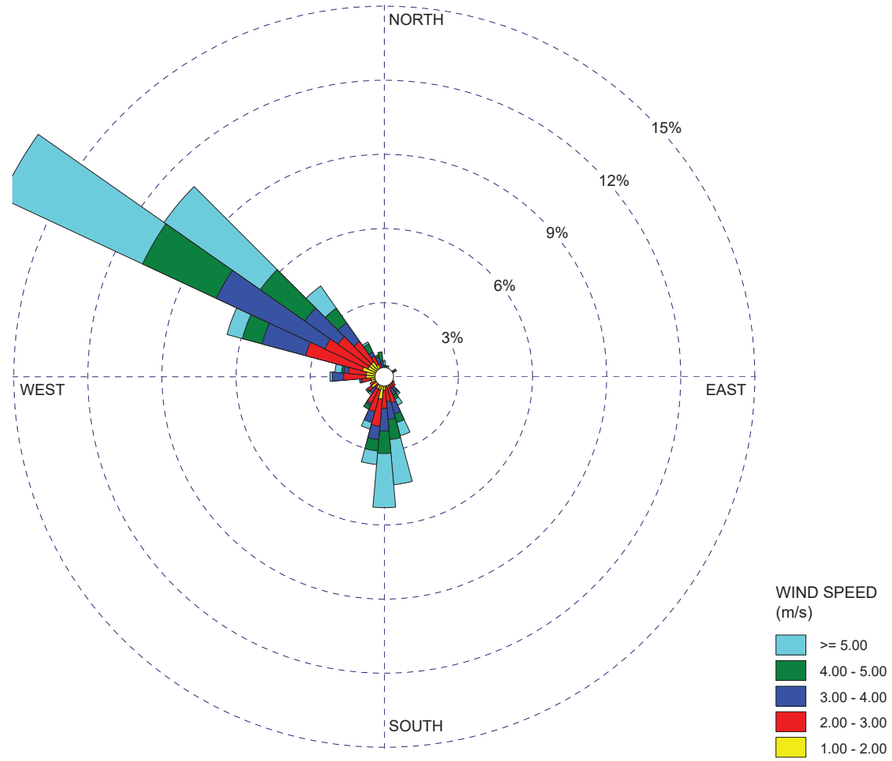


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **40.09%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **0.79 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 23 WINDROSE (8/1/2021 TO 8/1/2024, 2200-2300)

DISPLAY:
Wind Speed
Direction (blowing from)

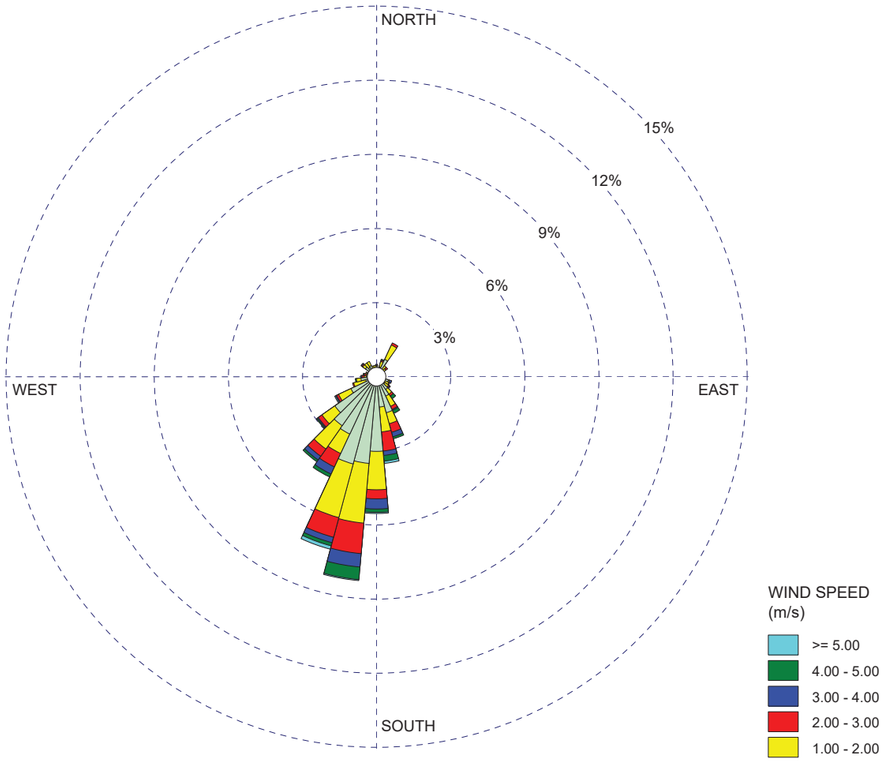


COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 23:00** **End Date: 7/31/2024 - 23:00**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **21.08%**	TOTAL COUNT: **1068 hrs.**	
	AVG. WIND SPEED: **3.06 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
COFFIN BUTTE LANDFILL
3-YEAR HOUR 24 WINDROSE (8/1/2021 TO 8/1/2024, 2300-2400)

DISPLAY:
Wind Speed
Direction (blowing from)

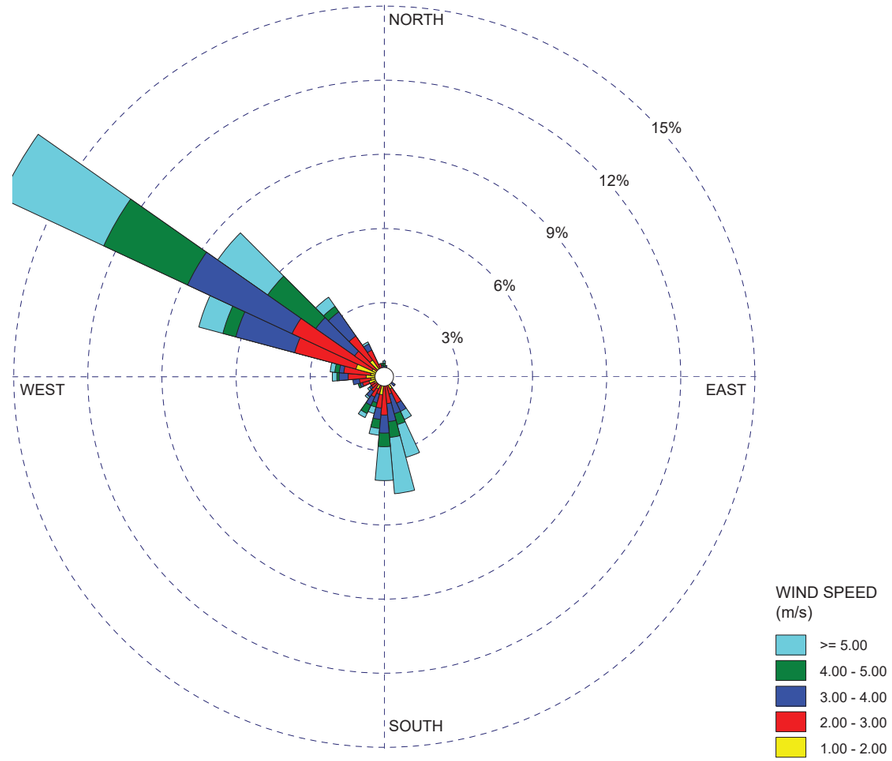


COMMENTS: Onsite (30 minute data)		COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **42.83%**	TOTAL COUNT: **2190**	
	AVG. WIND SPEED: **0.76 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

WIND ROSE PLOT:
CORVALLIS MUNICIPAL AIRPORT (KCVO)
3-YEAR HOUR 24 WINDROSE (8/1/2021 TO 8/1/2024, 2300-2400)

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS: NOAA hourly data (10-degree wind directions)	DATA PERIOD: **Start Date: 8/1/2021 - 00:00** **End Date: 7/31/2024 - 23:59**	COMPANY NAME: **SCS ENGINEERS**	
		MODELER:	
	CALM WINDS: **23.72%**	TOTAL COUNT: **1058 hrs.**	
	AVG. WIND SPEED: **2.86 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

EXHIBIT 15
TRAFFIC REPORT

TRANSIGHT CONSULTING, LLC
Transportation Engineering and Planning Services

Date:	February 26, 2024
To:	Inga Williams, Benton County
From:	Joe Bessman, PE
Project Reference No.:	1539
Project Name:	Coffin Butte Landfill Expansion

PURPOSE AND SUMMARY

The purpose of this memorandum is to provide a Transportation Impact Analysis for the Coffin Butte Landfill expansion in Benton County. The current landfill cell is projected to reach its capacity within the next four years, requiring that the planning and design of new landfill cells begin to continue to support landfill services for Linn, Benton, Lincoln, Polk, and Marion County areas.

In summary, the current Republic Services plan is to expand the landfill into lands designated by Benton County as "Landfill Site" (LS) that are located south of Coffin Butte Road. The landfill expansion area will include a new outbound scale, and widening of Coffin Butte Road is proposed to a three-lane Major Collector section between the existing landfill entrance and the expansion site to better support left-turns outside of the travel way.

The application proposes improvements to Coffin Butte Road. This plan will maintain area ingress and egress and continue to support the functional role of area transportation facilities. Key transportation findings of the current plan are as follows:

- There are no changes in area travel patterns with this revised configuration. Access to the landfill will continue to be provided from Coffin Butte Road, and Coffin Butte Road will remain open as a Benton County *Major Collector* and *Freight Route*.
- The widening of Coffin Butte Road to a three-lane section with improved shoulder/bicycle lanes will separate impacts to through travelers on Coffin Butte Road during the construction period and during the ensuing operation of the landfill.
- This plan creates no changes to emergency ingress and egress routes to the area.
- This plan creates no impacts to Tampico Road, thereby avoiding any need to improve this streetscape or otherwise modify the roadway character.
- This plan does not impact area cyclists. The widening of shoulders along the impacted portion of Coffin Butte Road to provide standard bicycle lanes is an improvement from the current condition and will bring the section into compliance with Benton County standards.
- This plan does not impact the adopted Transportation System Plan or require any changes to the functional classification or performance standards of surrounding streets.

The use of this new landfill area will provide time for Knife River to complete their ongoing processing of the rock resource within their current location, ultimately allowing the current quarry area to be used as a future landfill site.

PROJECT DESCRIPTION

The Coffin Butte Landfill is located west of Highway 99W near Adair Village, located between the cities of Corvallis and Independence. The current site is co-located with Knife River's quarrying operation. The overall site includes 740 acres, with over 500 acres dedicated to preservation and non-landfill uses. This landfill has been in operation for over 40 years at its current location, with this new phase necessary to continue to support the area population. The location of the site is provided in Figure 1 for context.

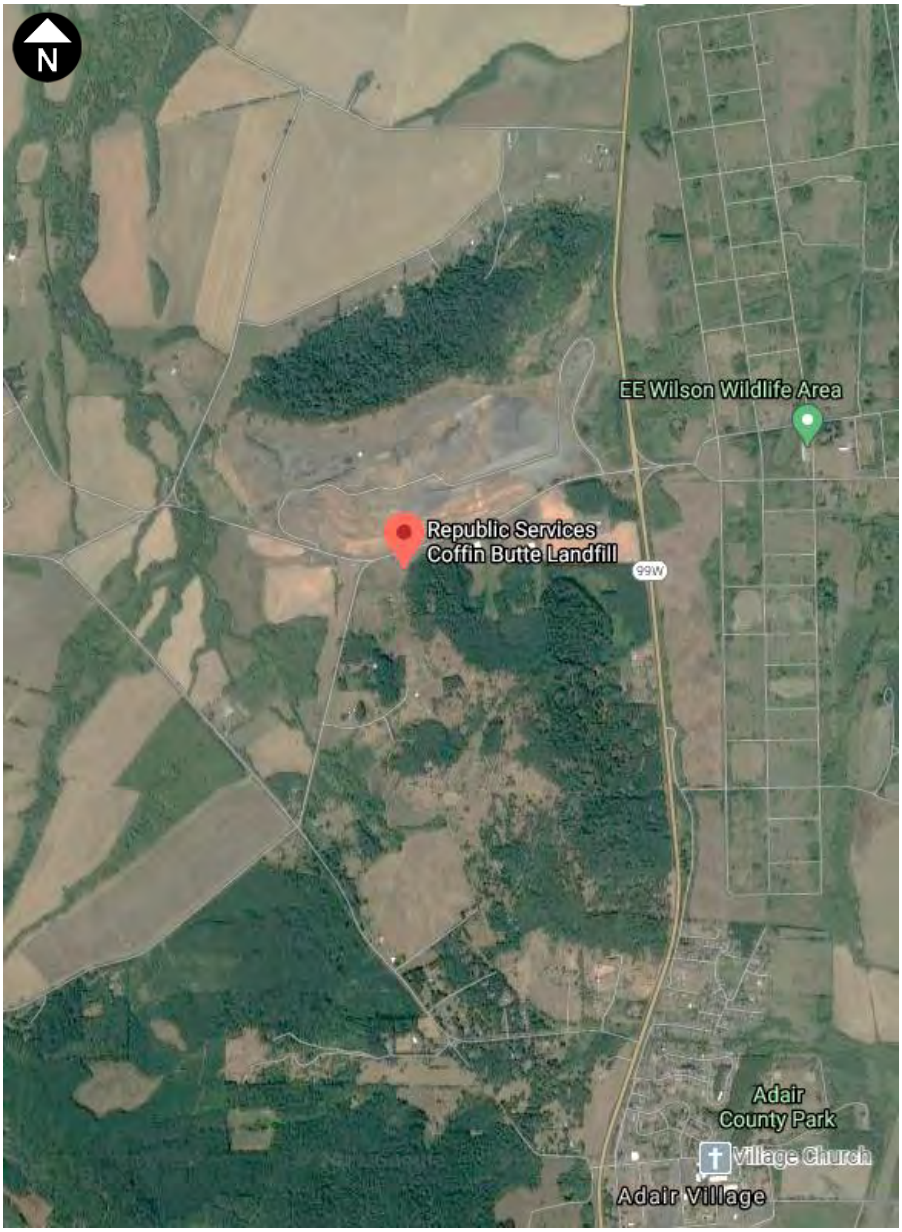


Figure 1. Site vicinity map. *Image source: maps.google.com.*

The expansion will encompass lands that are south of the current landfill location on the south side of Coffin Butte Road. Private passenger vehicles using the landfill will continue to use the scales and services on the north side of Coffin Butte Road, with these consolidated materials then hauled by commercial truck to the expansion site for disposal. Commercial account users will also be required to use the current scales

to weigh in, then will be directed to the expansion area to dispose of materials. These private and commercial vehicles will use a new outbound scale near the expansion site exit, will pay the appropriate fees, and will then exit onto Coffin Butte Road. Figure 2 illustrates the layout of the revised landfill for context.

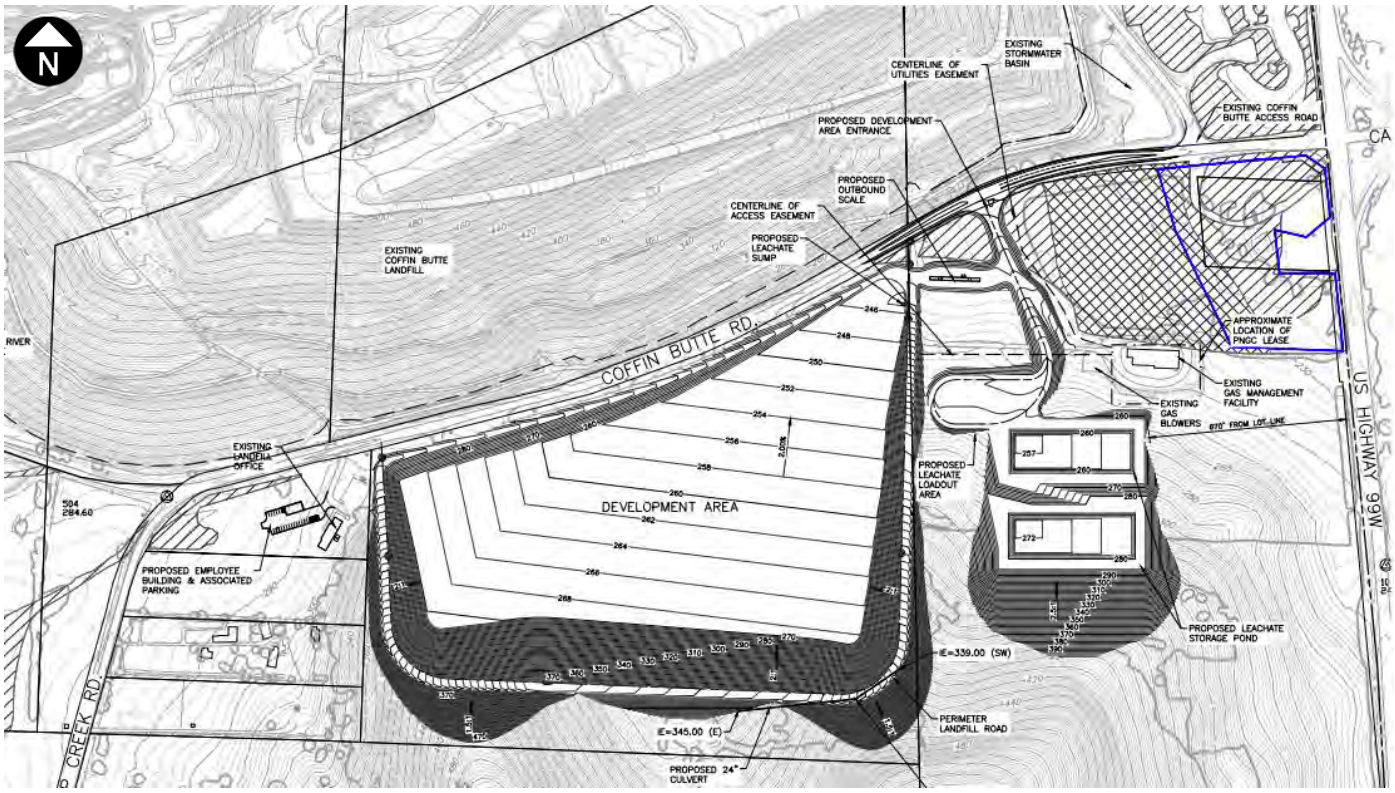


Figure 2. Preliminary Coffin Butte Landfill Development Plan.

This expansion area is intended to provide approximately six years of landfill capacity, allowing the established Coffin Butte site to function beyond the approximately 2026 lifespan of the current cells. When the new footprint is filled, landfill operations will then shift back to the north side of Coffin Butte Road within the current Knife River quarry location.

As a result of retaining the scales on the north side of Coffin Butte Road for the expansion there will be internal trips between the north and south sides of Coffin Butte Road. With the southern access serving commercial truck traffic a westbound left-turn lane has been proposed to avoid impacts to through travel on Coffin Butte Road. This preliminary turn lane design includes about 250 feet of queue storage, which can support up to four semitrucks at once (more than an 85th percentile queue). This extensive design provides a very high level of confidence that the storage will be adequate to avoid congestion along this low-volume section of Coffin Butte Road, though this design may be further refined as the civil plans progress.

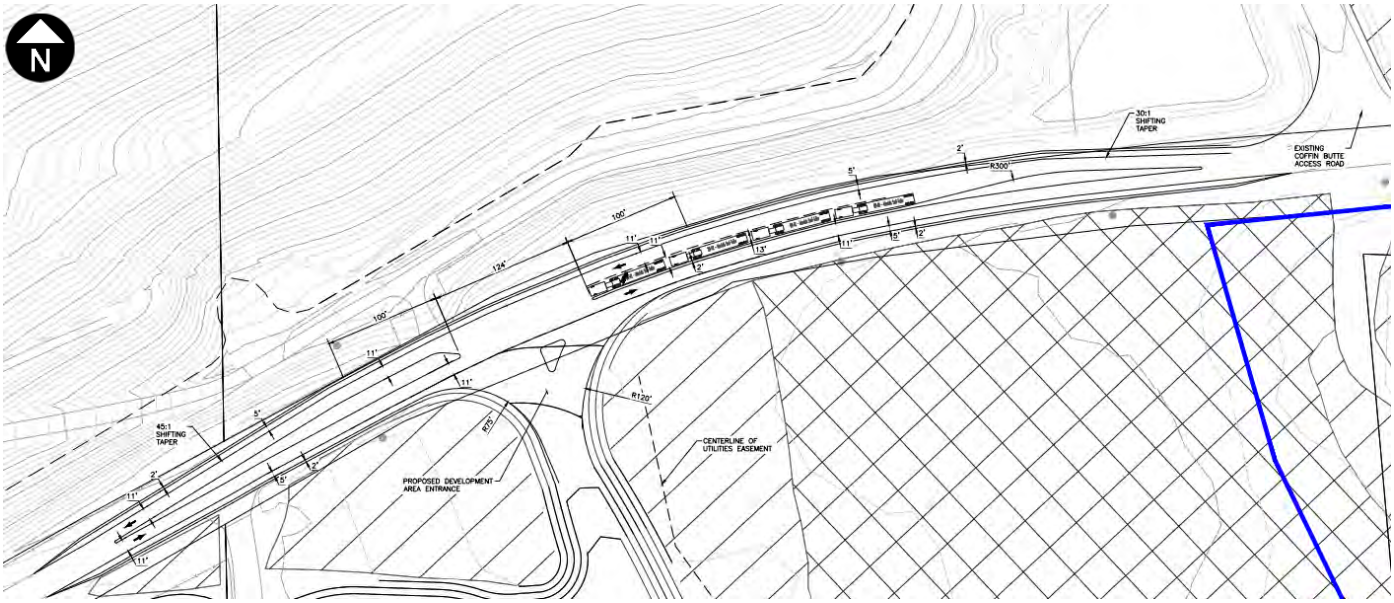


Figure 3. Preliminary Coffin Butte Road landfill expansion area entrance left-turn lane design.

SURROUNDING ROADWAY CHARACTERISTICS

Figure 4 illustrates the functional classification of the surrounding roadways as described within the Benton County Transportation System Plan. This plan shows that Tampico Road is classified as a *Major Collector,* Camp Adair Road east of Highway 99W is a *Minor Arterial,* and Highway 99W is classified as a *Principal Arterial*. Coffin Butte Road west of its intersection with Soap Creek Road and extending west to Wiles Road is a private road. Area roads are generally narrow two-lane roads with limited shoulders, with rural posted or statutory speeds between 45 and 55 miles per hour.

The new landfill entrance will be designed as a private road with wide turning radii capable of supporting large trucks, similar to the current entrance north of Coffin Butte Road. The entrance road will be paved, avoiding rock or debris from being pulled onto Coffin Butte Road.

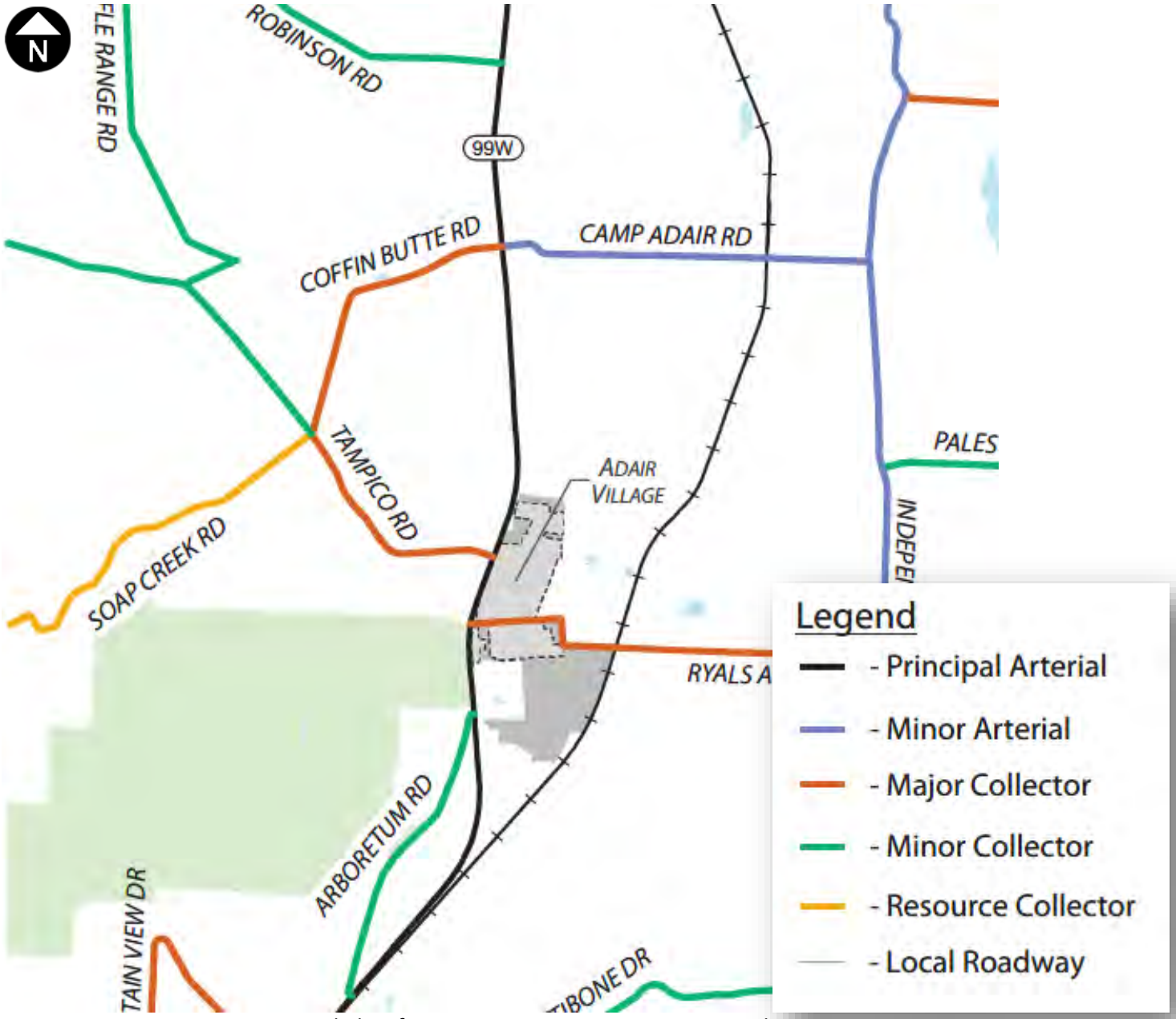


Figure 4. Benton County Functional Classification Map, Transportation System Plan

In January 2021 Benton County staff collected vehicular volume and classification data on Coffin Butte Road near its intersection with Soap Creek Road to assess the volume of trips and number of trucks per day near this section of Coffin Butte Road. The counts showed that traffic volumes were fairly consistent throughout the weekdays, with weekend volumes near the quarry about half of those reported on weekdays. The weekday volumes on Coffin Butte Road west of the landfill served about 243 average daily trips, with nearly 1/3 of these trips associated with trucks. This volume of trips equates to about one vehicle every two or three minutes during the peak hour of the day (see Figure 5).

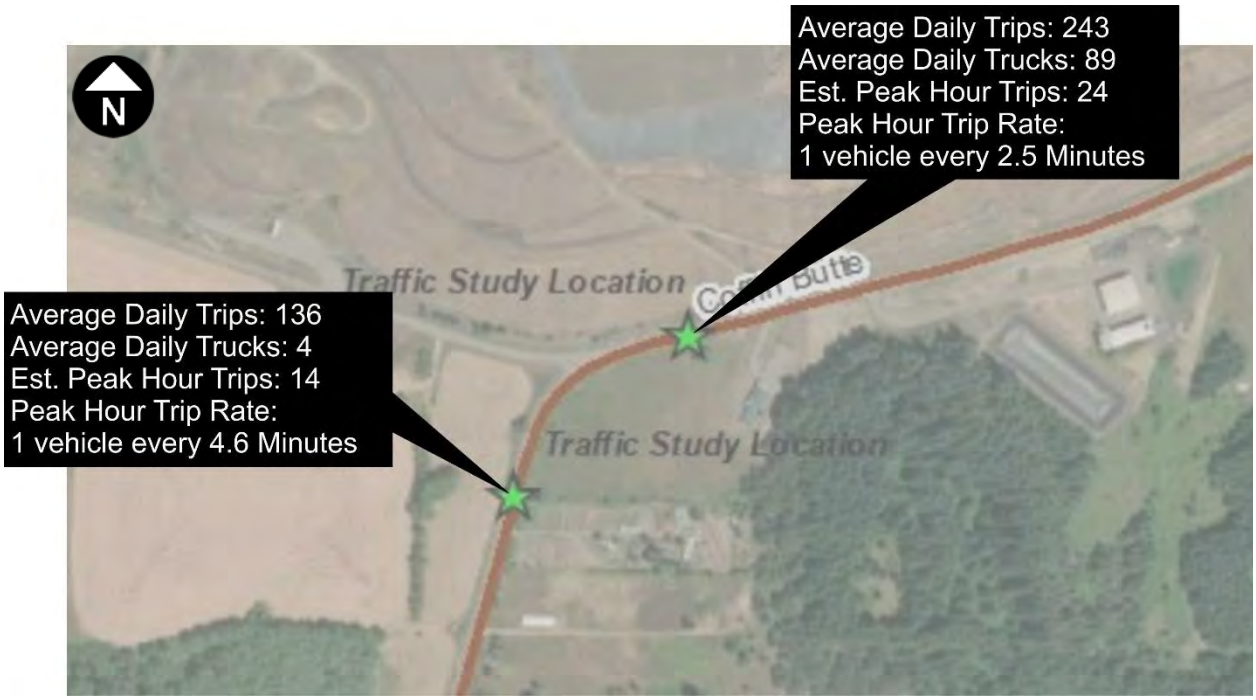


Figure 5. Summary of January 20, 2021 Traffic Study prepared by Benton County.

To confirm these County-provided traffic counts, a series of traffic counts were collected in mid-March 2021 throughout the study area. These traffic counts reflect peak commute period conditions during the 4:00 to 6:00 p.m. period, and are not intended to reflect the peak hour of the landfill or quarry operations but rather the most critical time period to access the Highway 99W system. This assessment is consistent with the time period assessed within Benton County's regional plans. Figure 6 illustrates the count locations and peak hour traffic volumes measured.

The counts show that during the peak evening commute hour the highway traffic is heavily biased in the northbound direction. The traffic counts show about 8 eastbound trips and 5 westbound trips within the section of Coffin Butte Road near the new access, which is a very low volume of conflicting traffic.

A third set of traffic counts was collected in January 2022 to again confirm travel patterns post-COVID pandemic and to assess a broader time period that is more reflective of peak quarry and landfill operations. This set of traffic counts again confirmed the very low traffic volumes throughout this area. During the peak hour on Coffin Butte Road (about 2:00 to 3:00 p.m.) this showed 16 westbound vehicles and 19 eastbound vehicles that would travel along Coffin Butte Road during this peak hour where the new access is located. Again, this is a very low volume of traffic that will not present any capacity-related needs, particularly with the separated westbound left-turn lane. These volumes, showing the individual peak hour throughout the system, are shown in Figure 7.

A fourth set of traffic counts was collected on September 19, 2023 at the NW Soap Creek Road/Coffin Butte Road and OR 99W/Coffin Butte Road intersections as well as at the existing landfill access on Coffin Butte Road and the Knife River Quarry access. These counts were conducted from 2:00 to 6:00 p.m. and showed similar traffic trends as the previous counts with volumes on the highway being predominantly in the northbound direction during the weekday p.m. peak hour. Coffin Butte Road continued to carry a relatively low volume of traffic outside of the vehicles heading to and from the existing landfill site. These volumes are shown in Figure 8. Comparison of the counts shows relatively stable conditions, with the 2023 traffic counts slightly higher based on the increased Knife River activity within the quarry site.

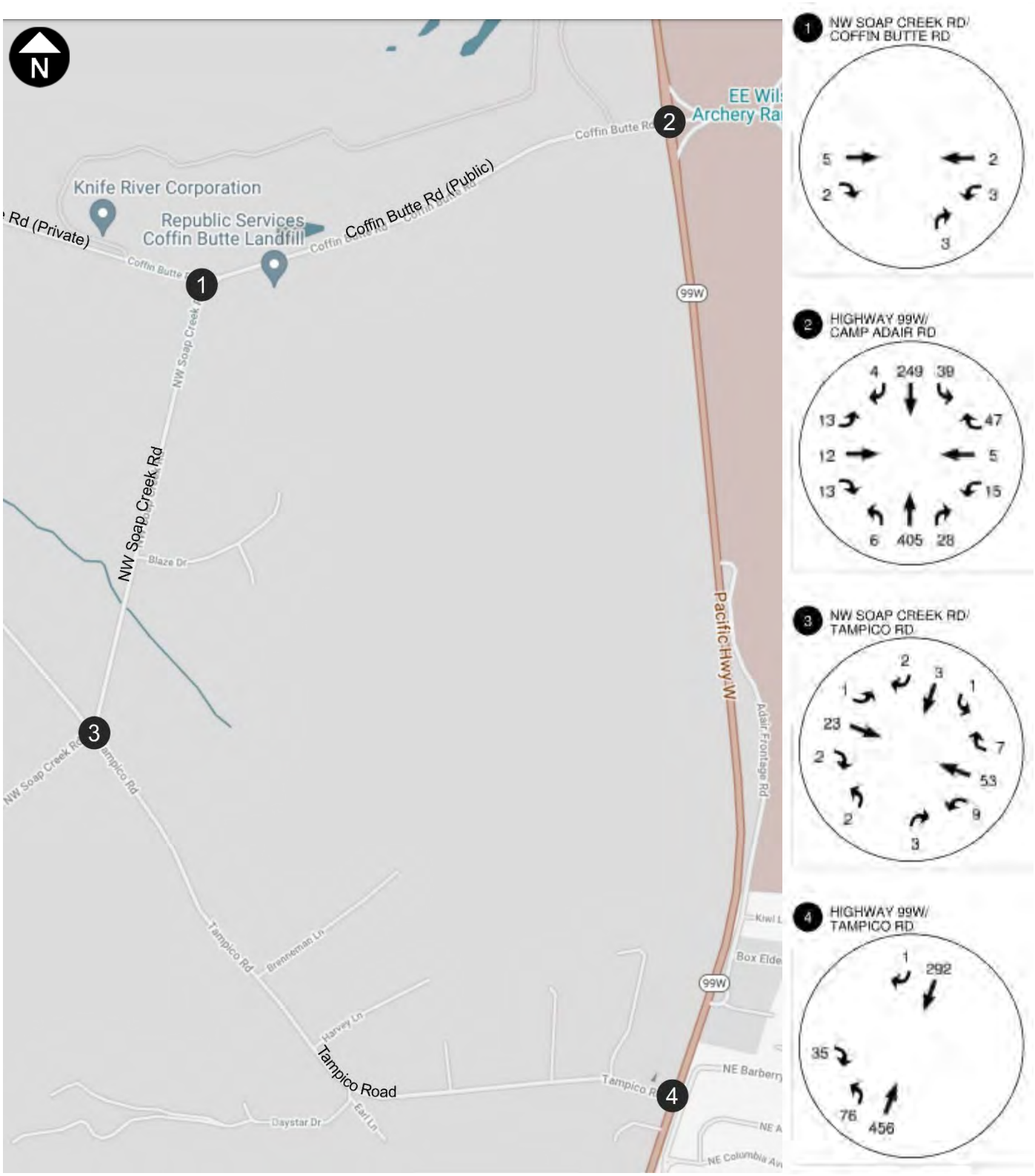
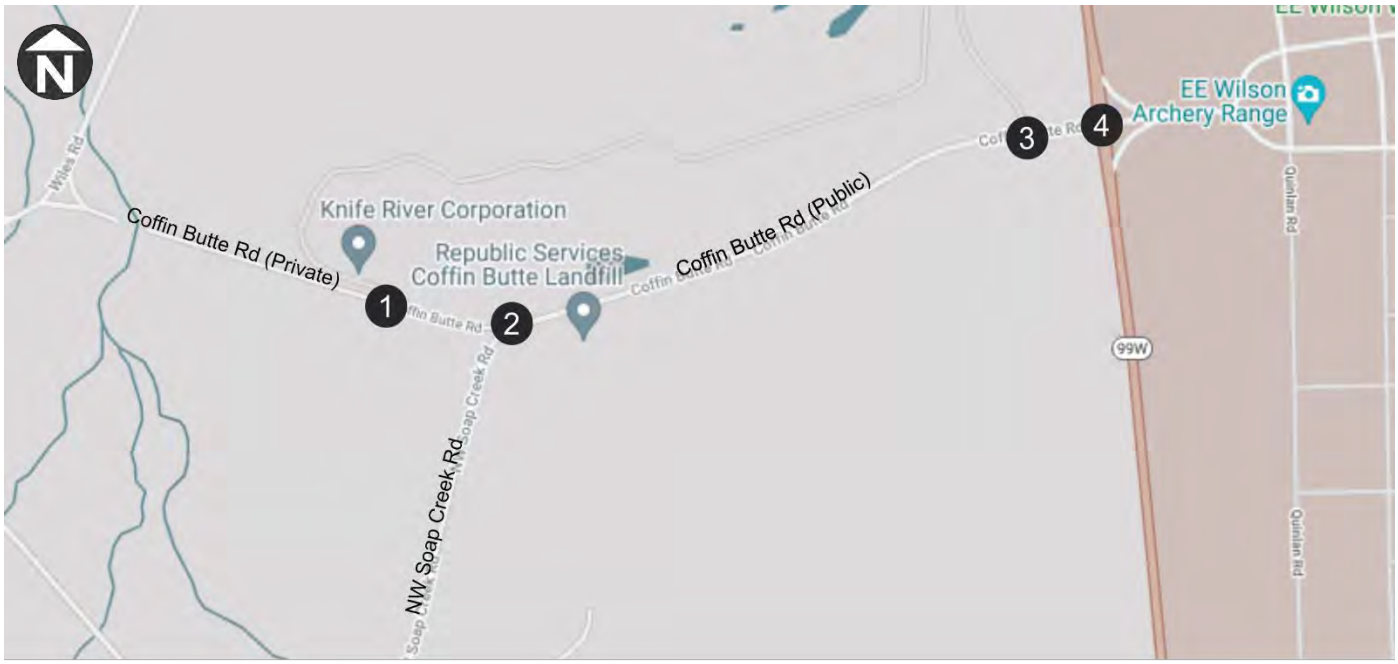
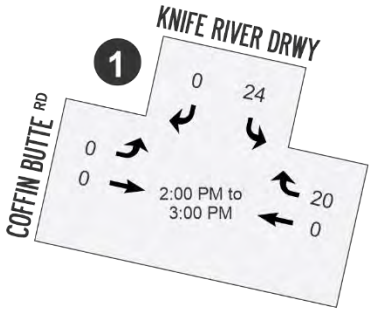
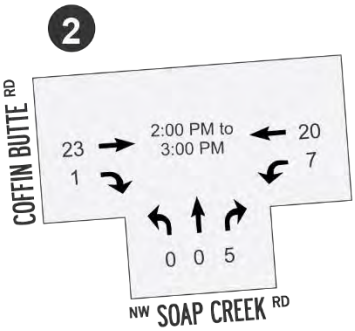


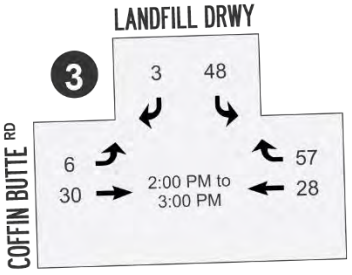
Figure 6. Peak evening commute hour traffic volumes. (Unadjusted mid-March 2021 traffic volumes)

Figure 7. Individual Peak Hour Traffic Counts, counts collected in mid-January 2022.









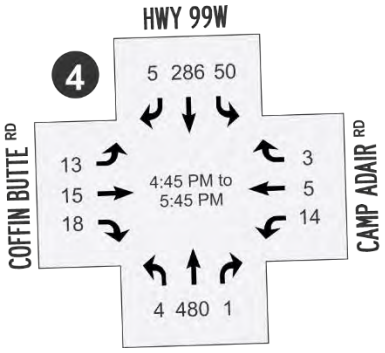


Figure 8. September 2023 Traffic Volumes (note that the peak highway volumes reflect a later peak hour than off-highway counts)

TRIP GENERATION ESTIMATES

Trip generation estimates are typically used to identify the impact of new development. Per County Code, the standard methodology for estimating trip generation is to consult the most current edition of the Institute of Transportation Engineers' (ITE) standard reference *Trip Generation, 11th Edition.* This manual offers a compilation of trip studies organized into specific categories based on use type. Unfortunately, the manual does not contain a category associated with landfill uses. The ITE manual typically correlates trip rates based upon a physical metric such as trips per square-foot, trips per number of students, or trips per employee. For a landfill, trip generation is not expected to correlate directly to the size of the facility itself, but rather to the population of the service area, tonnage of the facility, or potentially to the range of services provided. There are no changes proposed to the types of services provided, and so trip rates are expected to fluctuate only based on the population of the areas served.

Four other studies of transfer and recycling facilities were located online and reviewed to better understand the scale of these impacts. These facilities contain different characteristics than the Coffin Butte site and were located in larger urban areas, but provide useful information on facility characteristics and profiles that are expected to be similar to those of the Coffin Butte site. A summary of each of the studies reviewed is provided below:

- Cedar Hills Regional Landfill (HDR, 2010): This study provides limited information on the actual project as it did not include the overall report (only the transportation chapter), but provides useful time of day profiles for commercial (not self) haulers.
- Twin Creeks Landfill (HDR, 2016): This study assessed an increase from 750,000 tons per year to a maximum of 1,400,000 tons per year on the nearby system. This study showed a truck increase only, with +6 PM peak hour trucks given the dispersion of trucks throughout the day.
- Forward Landfill (Republic ITS, 2012): This study reflected post-recession traffic increases from the then-current level of 212 truckloads to its approved 620 truckloads per day (567-acre expansion to 751 acres). This study showed a +28 PM trip increase (3.3% of daily total).
- Factoria Recycling and Transfer Station (HDR, 2010). This study assessed a new facility that would support 600 tons per day by 2014. The study showed that it would generate a total of 57 trucks during the evening commute hour, generating a total of 114 p.m. inbound and outbound weekday p.m. peak hour trips).

Time of day distributions from actual log data of commercial- and self-haulers is provided in Figure 9. This shows that on weekdays the transfer center activity is elevated from around 10:00 a.m. until 4:00 p.m. This profile matches with the usage of the Coffin Butte site, which currently operates between 8:00 a.m. and 5:00 p.m. Monday through Saturday, with the facility closed on Sunday.

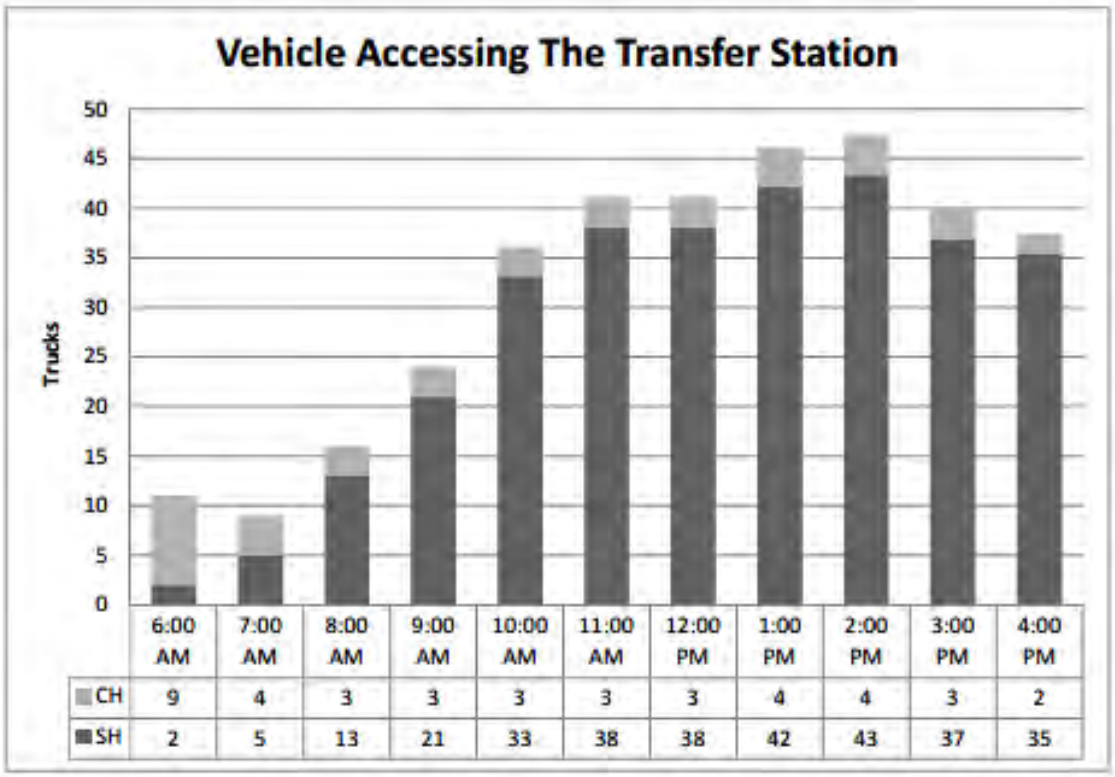


Figure 9. Factoria Trip Profiles (CH: Commercial Hauler, SH: Self-Hauler)
Source: HDR Factoria Recycling and Transfer Station TIA, 2010.

The general findings of this literature review indicated that trips were typically associated with tonnage, and it is expected that this will correlate to area population growth. As disposal services are considered a *utility,* these services are part of the trips generated by new developments throughout the region. While there is a point impact near the facility entrances, the regional impact of trash and recycling, and other similar services are accounted for within the individual development applications. These trip rates can fluctuate temporarily with building and development cycles, or with temporary events (such as past fire clean-up efforts).

The provision of the shift in active landfill area at Coffin Butte will allow the landfill to continue to support on-going growth in the region. Growth projections for the Linn-Benton area (see Figure 10) show population increases of approximately one percent annually, with a slightly declining rate of growth into the future. Linn County shows similar results, with one percent or lower rates into the 2040 horizon. The State of Oregon shows a total growth rate through 2040 that is only slightly higher at approximately 1.7%. These population trends are likely to dictate the rate of growth in landfill trips.

Population forecast by age in 2010 & 2040				
	Benton County		Oregon	
Age	2010	2040	2010	2040
0 to 4	3,778	4,527	237,556	317,024
5 to 9	4,109	4,443	237,214	317,456
10 to 14	4,466	4,839	242,553	324,469
15 to 19	8,789	8,224	254,860	321,532
20 to 24	13,763	12,502	253,048	328,685
25 to 29	5,926	6,211	265,033	339,951
30 to 34	4,488	5,693	259,111	346,862
35 to 39	4,227	5,239	251,163	341,211
40 to 44	4,368	5,493	248,362	345,342
45 to 49	5,013	6,325	262,879	361,003
50 to 54	5,725	6,203	276,196	349,254
55 to 59	5,924	5,959	273,423	337,313
60 to 64	4,723	5,340	236,143	297,787
65 to 69	3,196	4,644	169,847	268,516
70 to 74	2,188	3,736	120,194	235,769
75 to 79	1,823	3,420	91,601	208,589
80 to 84	1,462	2,993	74,019	171,551
85+	1,611	4,096	77,872	213,094
Total	85,579	99,886	3,831,074	5,425,408

Figure 10. Benton County Growth Projections.

The traffic counts that were collected on September 19, 2023 also help to quantify how the Coffin Butte landfill travel patterns operate today, highlighting the travel bias of Coffin Butte Landfill trips toward the Highway 99W corridor. Consistent with the landfill trip generation profile shown in Figure 9, traffic counts were collected throughout the study area over an extended time period to capture the 2:00 to 6:00 p.m. conditions at Coffin Butte.

The counts included the two existing accesses to the Coffin Butte landfill and Knife River Quarry to understand the existing trip characteristics of the site. The vehicles counted included both trucks and passenger cars for the landfill and quarry. As shown in Figure 11, the peak trip generation at these accesses during the count period was from 2:00 to 3:00 p.m. with 157 total vehicles. This number steadily declined to only 25 vehicles in the 5:00 to 6:00 p.m. hour. While there is a connection between the two sites, the vast majority of landfill trips are assumed to use the landfill access given the convenience to Coffin Butte Road and the location of the scales. During the peak hour, there were 114 trips recorded at the landfill access. This value matches the general scale of other landfill sites (note that in comparison to Figure 9, a vehicle generates an inbound and outbound trip).

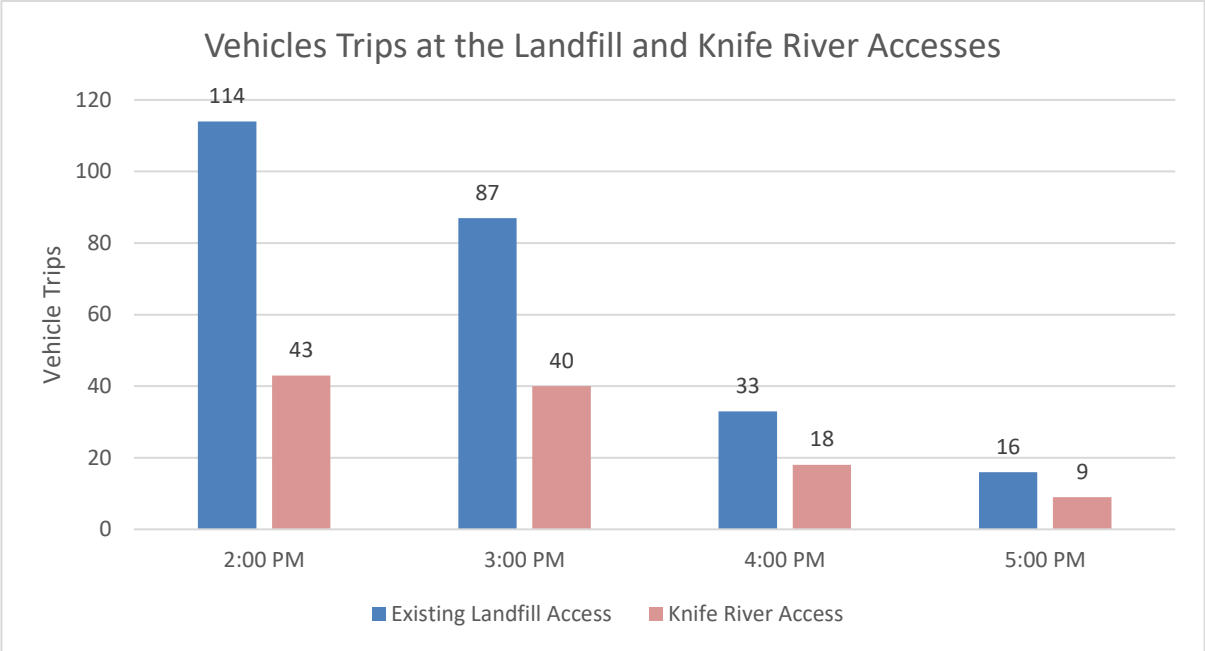
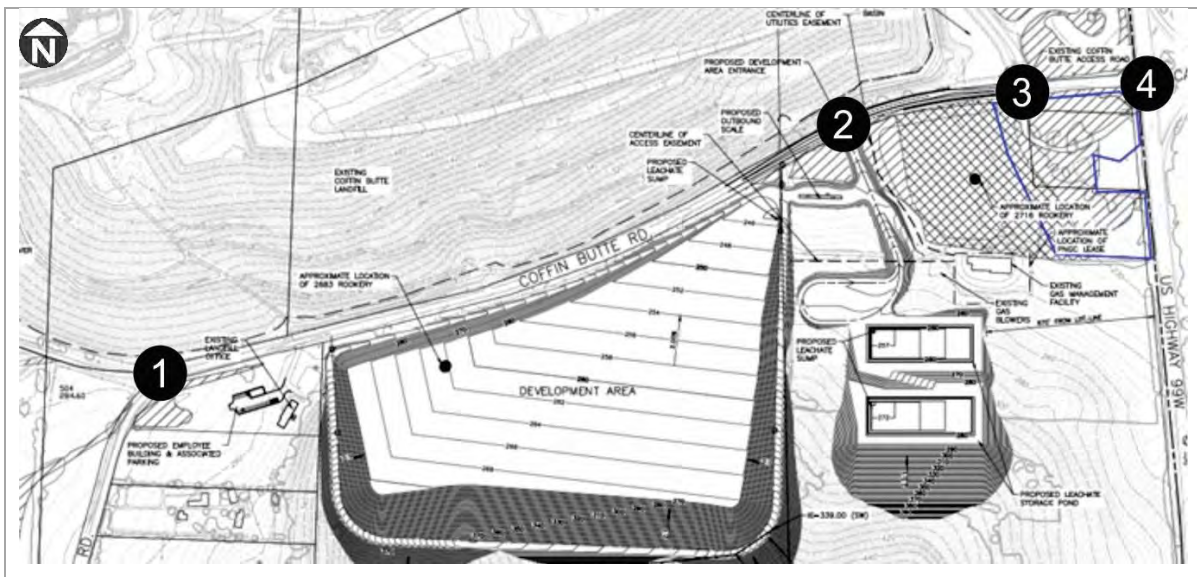


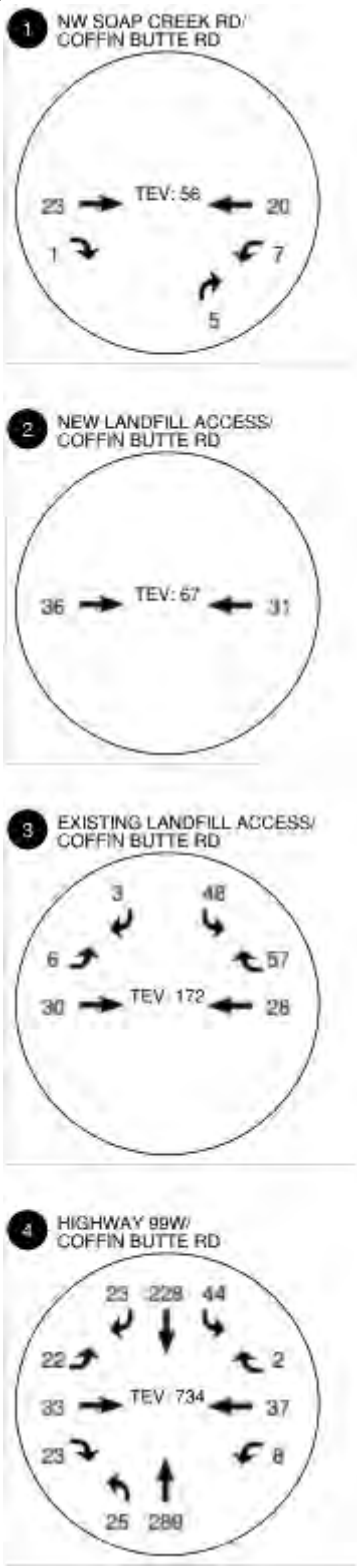
Figure 11. Existing Trip Profile, September 19, 2023.

In reviewing the travel patterns on Coffin Butte Road, during the peak 2:00 to 3:00 p.m. time period there were a total of 78 eastbound trips and 85 westbound trips to and from the highway. This is approximately 60-percent more than the January 2022 counts and can be attributed to the seasonal fluctuations of the landfill and quarry operations.

The traffic counts also separate truck trips from passenger vehicles, which provides an estimate of the number of commercial trucks within the traffic flow. This shows that 61% of the eastbound flow and 58% of the westbound flow on Coffin Butte Road is comprised of truck traffic. Based on this information, and in review of the layout of the proposed expansion site, Figure 12 illustrates the forecast traffic volumes on Coffin Butte Road during this 2:00 to 3:00 p.m. time period. This essentially shifts commercial truck trips to the new landfill site, retaining passenger vehicles in their current location. With trucks representing about 55% of the landfill trips during this hour it shows about 28 trucks entering the new expansion site (one truck every two minutes). Further, this shows no change in trips between the current landfill entrance and Highway 99W, or west of the new landfill entrance. The only segment of Coffin Butte Road that experiences a change in traffic volumes is the 740-foot segment of the roadway between the existing and proposed entrance.



Existing Traffic Volumes on Coffin Butte Road



Future Traffic Volumes with Expansion

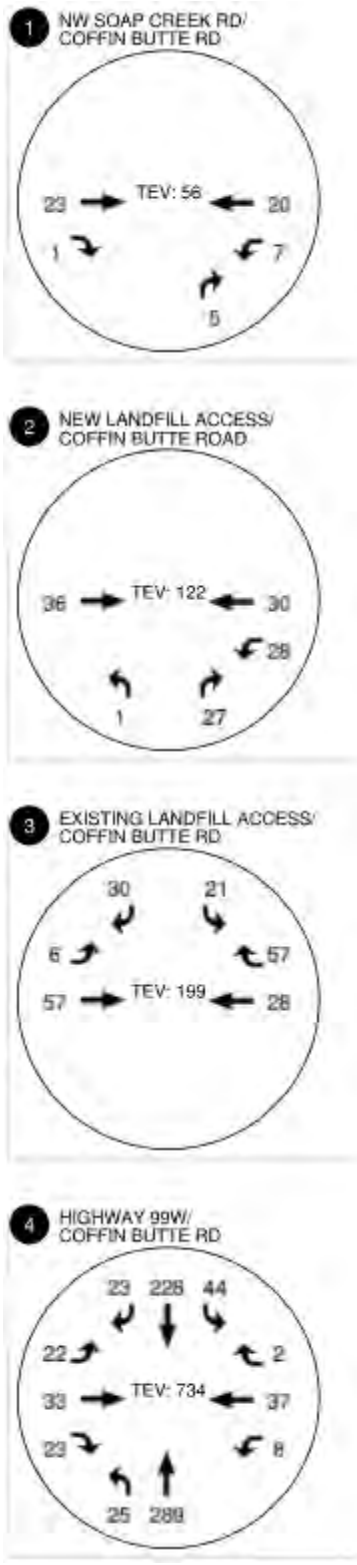


Figure 12. Year 2023 Existing and Rerouted Traffic Volumes, 2:00 to 3:00 p.m.

TRANSPORTATION OPERATIONS

The Benton County Transportation System Plan (TSP) was updated in 2019 and incorporated new mobility standards for its County roadways. The TSP identifies a two-tiered analysis standard for stop-sign controlled intersections:

- Intersection approaches with more than 20 vehicles during the weekday evening (4:00 to 6:00 p.m.) peak hour shall operate with a volume-to-capacity ratio of 0.90 or less during the spring or fall.
- No mobility targets apply to intersection approaches with less than 20 weekday p.m. peak hour trips.
- ODOT intersections are subject to the performance standards within Table 6 of the Oregon Highway Plan (OHP). For the stop-controlled Coffin Butte Road intersection with Highway 99W this requires a volume-to-capacity ratio of 0.75 or less.[1]

To show the adequacy of the transportation system to support these travel demands, an operational analysis was prepared to review the functionality of the access locations with the landfill expansion area. As summarized in Table 1, both of the landfill access intersections are shown to operate with very low delays (Level of Service "A") and well within County standards with current traffic volumes that are rerouted to reflect the modified configuration. As the landfill will serve the same population within the same location, it will continue to operate very similarly to its current conditions which are also well within acceptable County standards. Even with a 50% increase in the traffic volumes (reflective of population/tonnage growth far exceeding Benton County projections through 2040 as shown in Figure 10), the operations remain well within acceptable standards on this low volume road. Even with 50% growth both accesses will operate at Level of Service "B".

There is no change to external trips beyond what could occur today assuming continued use of the Coffin Butte landfill site, and therefore no additional transportation impact beyond the two accesses. Accordingly, further assessment of ODOT facilities or other County facilities is not provided.

Table 1. Summary of Operational Analysis (Existing Volumes with Expansion, 2:00 p.m. to 3:00 p.m.)

Intersection	Benton County Operational Standard	Level of Service	Intersection Delay	Volume to Capacity Ratio	95th Percentile Queue	Acceptable?
Existing Coffin Butte Landfill Entrance	v/c ratio < 0.90	SB: LOS A	SB: 9.8 s	SB: 0.08	SB: 1 veh (75 feet)	Yes
Proposed Expansion Area Entrance	v/c ratio < 0.90	NB: LOS A	NB: 9.7 s	NB: 0.04	NB: 1 veh (75 feet)	Yes

[1] Local Interest Road intersection with a Regional Highway outside an Urban Growth Boundary on Rural Lands.

The operations analysis shows that with the division of trips between the existing site for passenger vehicles and the expansion area for trucks all of the study intersections operate well within acceptable County standards. Forecast outbound 95th percentile queues are a single vehicle, which could include truck trips, so was estimated to be about 75 feet. The storage lengths proposed exceed this demand.

COFFIN BUTTE ROADWAY CROSS-SECTION

The proposed landfill expansion on the south side of Coffin Butte Road will add a new access connection. This access will be located approximately 740 feet west of the existing Coffin Butte landfill access. This complies with Benton County's access spacing standards identified within Table 8 of the TSP, which indicate that a 475-foot spacing for roads with a statutory speed of 50 miles per hour or higher. The Republic Services team recognizes that while Coffin Butte Road is a low-volume street, with the elevated amount of commercial trips associated with the landfill and quarry and area speeds, separation of left-turning vehicles on Coffin Butte Road is desired to maximize patron and public safety.

Typically, a traffic study will assess left-turn lane warrants based on ODOT's methodology to assess whether this widening is necessary. The left-turn lane warrants are essentially a cost-benefit analysis to assess whether this separation should occur, weighing the cost of the improvement with the benefit provided through crash reduction. For the Coffin Butte Landfill, the safety of Republic Services employees, patrons, and the traveling public is of paramount importance in this area, particularly with the types of vehicles that are present. While ODOT left-turn lane warrants are not met given the low volumes on Coffin Butte Road (see Figure 13), this treatment is proposed as shown within the preliminary drawings. The left-turn lane provides an extensive queue storage area capable of supporting several trucks simultaneously, and includes standard tapers for a 55 mph facility. Within the impacted area of the widening the road is also being improved to Benton County's *Major Collector* standard, with bicycle lanes and shoulders as shown in Figure 14.

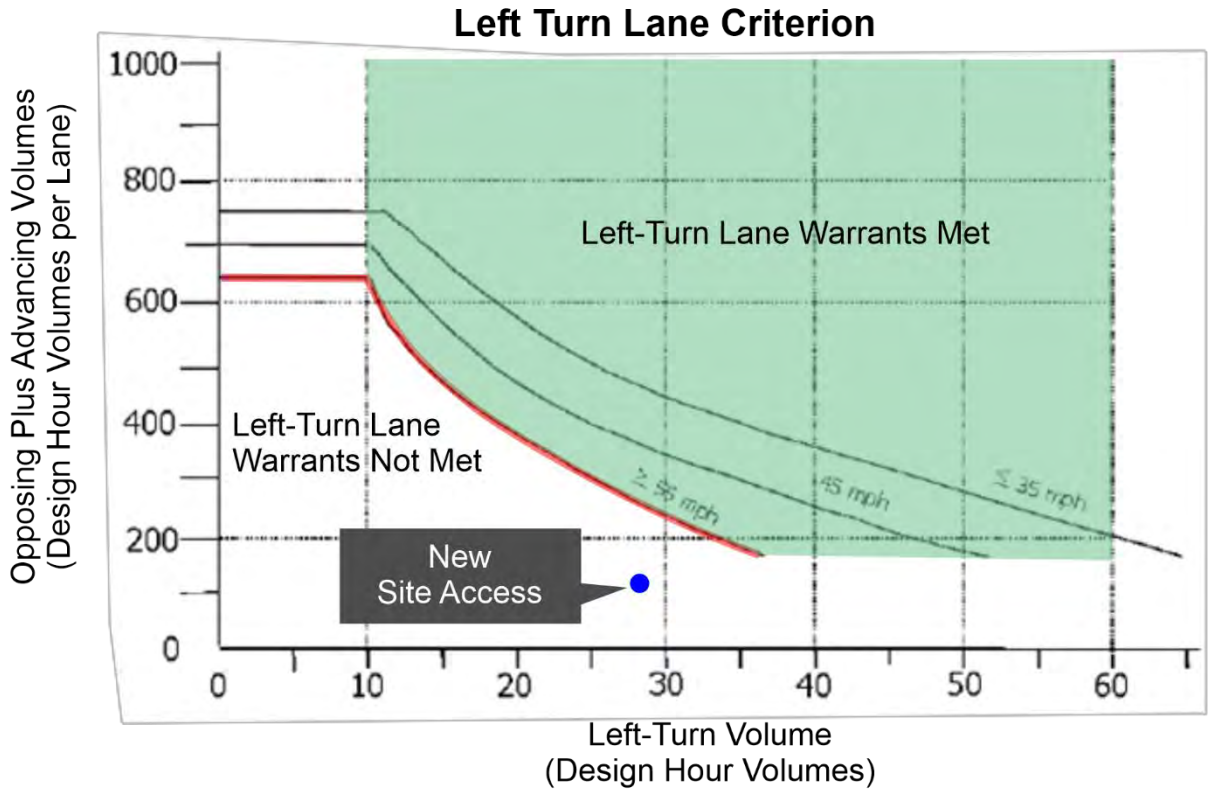


Figure 13. ODOT left-turn lane warrants showing the turn lane warrants are not met at the new access.

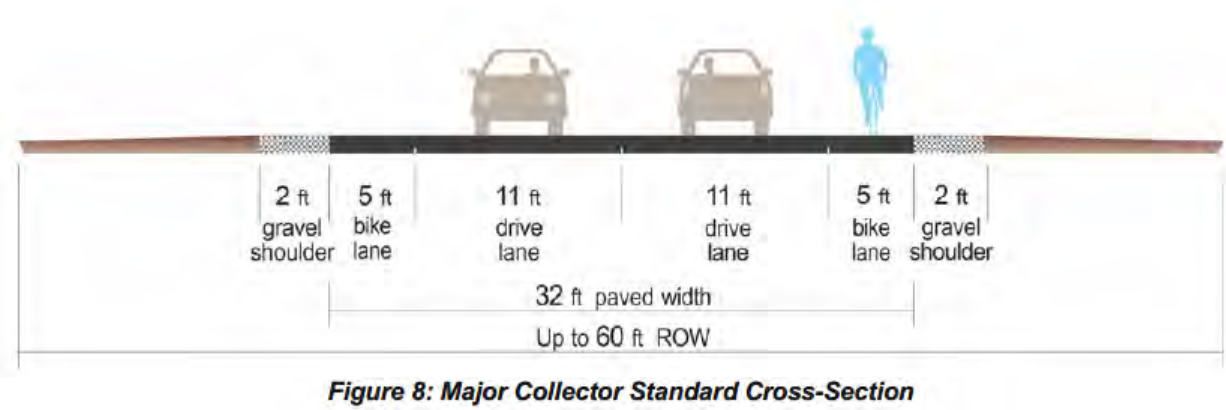


Figure 8: Major Collector Standard Cross-Section

Figure 14. Benton County Major Collector standard.

Since more than half the vehicles on Coffin Butte Road are commercial trucks, a wider roadway section is also being proposed. The preliminary design includes 12-foot travel lanes and a 14-foot center left-turn lane. This will improve separation for cyclists from the travel way, and help to accommodate these larger vehicles. Republic Services recognizes that this left-turn lane is not required per County standards, and the improvement is offered as a voluntary mitigation measure with the presumption that it is feasible as shown in the preliminary layout. Our team recognizes that there are adjacent roadside utilities and drainage areas, and while it is Republic Services intent to construct this improvement if approved by the County, if the design cannot be accommodated due to these (or other) constraints this voluntary improvement may be omitted.

ROADWAY SAFETY

Historical roadway safety was reviewed throughout the study area based on ODOT's most recent five years of available crash data. This review incorporates safety information for the most recent five-year period available, which spans from January 1, 2017 through December 31, 2021. Crash data was reviewed for the area bounded by Soap Creek Road, Coffin Butte Road, Tampico Road, and Highway 99W.

Crashes that are required for reporting to the DMV includes any collision that results in more than $1,500 (increased to $2,500 in 2018), collisions that result in any level of personal injury, and all collisions must involve one or more motor vehicle. ODOT crash records include collisions investigated by police and those that are self-reported, so the quality and completeness of data provided only reflects the inputs into the database and is not considered to be a fully complete or accurate indication of contributing factors.

- At 1:00 p.m. on August 4, 2017 a fatal collision was reported just south of Tampico Road on Highway 99W. The crash records indicate that tire failure led to a single-vehicle collision with the vehicle overturning. No other vehicles were involved and it did not appear from the available information that the vehicle struck any roadside objects causing the tire failure.
- There were no reported crashes along Coffin Butte Road or its continuation as Soap Creek Road during this review period.
- One collision was reported north of the Highway 99W/Tampico Road intersection. This included a motorist that swerved onto the shoulder prior to overturning. This collision did not result in any level of personal injury and the crash cause was cited as "other/improper driving."
- At 8:00 a.m. on January 7, 2019 a motorist on Tampico Road near Brenneman Lane drove onto the roadway ditch and overturned. No injuries were reported in this collision.
- At 2:00 p.m. on December 13, 2021 a fixed object collision happened at the Tampico Road/Harvey Lane intersection and was attributed to physical illness. It resulted in property damage only.
- Five collisions were reported at the Coffin Butte – Camp Adair intersection with Highway 99W during the five-year period:
    - An angle collision occurred on June 16, 2021 at 10:00 a.m. between a southbound through vehicle and an eastbound through vehicle. The crash was attributed to inattention and resulted in minor injuries (Injury B).
    - A crash with a deer or elk occurred just south of the intersection on August 21, 2021 at 10:00 p.m. No injuries were reported.
    - A turning collision was reported on June 25, 2020 around 9:00 a.m. The crash report cited inattention as the cause of the collision. The crash resulted in serious injuries.
    - An angle collision was reported on April 25, 2019 around 1:00 p.m. The crash resulted in minor injuries (Injury B). The crash report cited failure to yield the right-of-way and inattention as contributing factors.
    - An angle collision occurred on October 11, 2018 at 2:00 p.m. and resulted in property damage only. The crash reports cited failure to yield.

  Three of the five reported collisions at the Highway 99W intersection with Camp Adair Road resulted in some level of injuries.

There were no reported crashes at the Highway 99W/Tampico Road intersection during the review period, nor were there any crashes at the Tampico Road intersection with Soap Creek Road. Crashes within the study area were fairly low overall, and did not appear to identify any safety deficiencies. Intersection crash rates and comparison to ODOT's 90th percentile rates for similarly-configured rural intersections are provided in Table 2, and show that the crash rates remain below these thresholds.

Table 2. Intersection Crash Rates and ODOT Crash Rate Comparison

Intersection	Number of Reported Crashes (2017 to 2021)	Crashes per Million Entering Vehicles	>90th Percentile ODOT Crash Rate
Coffin Butte Road/ Soap Creek Road	0	0.00	No 3ST: 0.475
Coffin Butte Road/ Highway 99W	5	0.31	No 4ST: 1.080
Tampico Road/ Soap Creek Road	0	0.00	No 4ST: 1.080
Tampico Road/ Highway 99W	0	0.00	No 3ST: 0.475

Intersection Sight Distance

Intersection sight distance was field reviewed to ensure an adequate view of conflicting traffic was provided to drivers at the future public street/access locations, or to identify what sight line restrictions exist. The minimum recommended sight distance criteria based on the standard reference *A Policy on Geometric Design of Highways and Streets, 7th Edition* published by the American Association of State Highway and Transportation Officials (AASHTO) in 2018 (commonly referred to as the *Green Book*). This reference provides the recommended sight distances as measured from a height of 3.5 feet 14.5 feet from the edge of travel way at the access point serving the proposed development, based on the speed of the roadway. The AASHTO reference is based on conflicts between motorists traveling along the roadway and motorists completing movements at the intersection.

The topography of the area is generally flat with substantial sight lines in either direction of the proposed access location. There is an existing gated access nearly opposite the site that provides access to the perimeter road of the current landfill. Figure 15 illustrates the sight distance measurements and recommended minimum dimensions for this new access assuming installation of the left-turn lane and a statutory speed of 55 miles per hour.

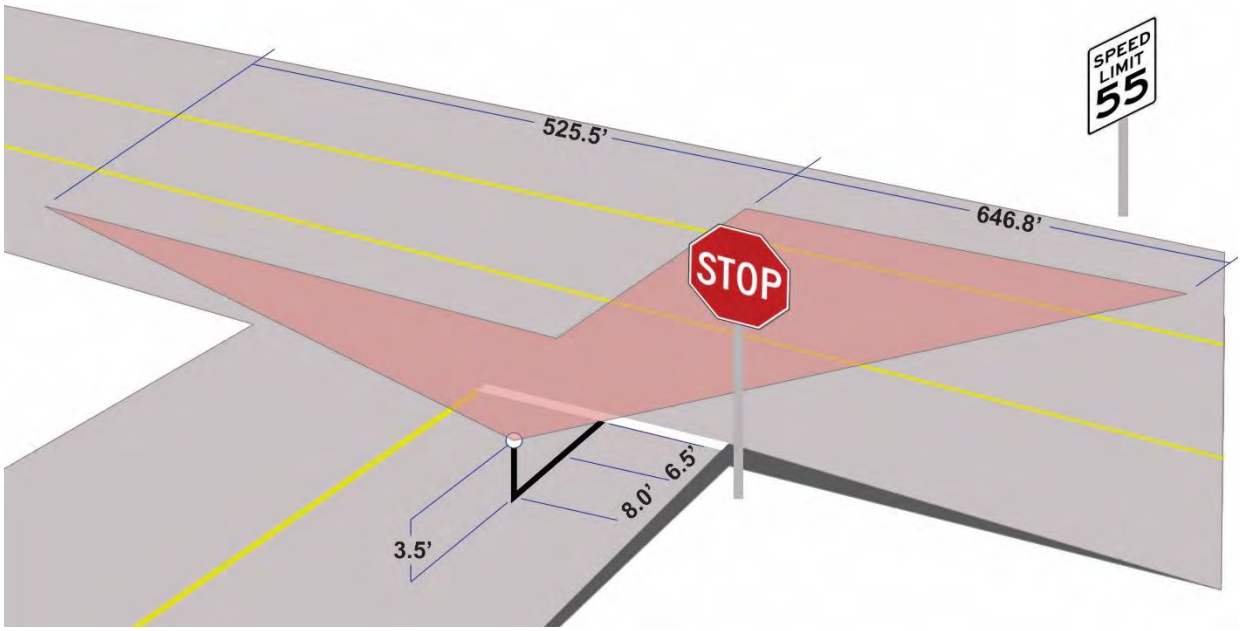


Figure 15. AASHTO minimum recommended intersection sight distance dimensions at the proposed landfill expansion access.

The site was visited and inventoried in May 2022 to verify the available sight lines at this entrance. Photos from the field review are provided in Figures 16 through 19, including passenger vehicle height (3.5 feet) and truck cab height (7.6 feet). This review shows that clear and unobstructed sight lines are available from this location, with sight lines of over 800 feet in either direction. Roadside vegetation toward the east (see Figures 18 and 19) should be removed to avoid partial occlusion of the views in this direction.

Figure 16. Proposed access location facing west along Coffin Butte Road (passenger vehicle height).

Figure 17. Proposed access location facing west along Coffin Butte Road (truck cab height).

Figure 18. Proposed access location facing east along Coffin Butte Road (passenger vehicle height).

Figure 19. Proposed access location facing east along Coffin Butte Road (truck cab height).

FINDINGS AND RECOMMENDATIONS

This report shows that the proposed landfill expansion provides minimal impacts to Benton County and ODOT transportation facilities. The proposed expansion site will not alter public trip routing, emergency ingress or egress, and it will retain the current landfill access routes. This layout maintains current functional designations identified in the County's Transportation System Plan and the design optimizes travel safety for patrons and employees.

As included within the preliminary civil plans, this application includes a voluntary proposal to widen Coffin Butte Road between the current entrance to the scales and the expansion area entrance and trim and/or remove existing vegetation within the sight lines. This widening will support separate left-turn lanes and will include shoulder widening per County standards and provide clear and unobstructed views of approaching motorists. Transportation patterns and landfill operations will effectively remain the same as they are today, and will function how they have already been approved to operate.

Thank you for the opportunity to provide these transportation materials for the Coffin Butte Landfill expansion. If you have any questions I can be reached at (503) 997-4473 or via email at joe@transightconsulting.com.

Attachments:

- Benton County Traffic Counts
- March 2021 Traffic Counts
- January 2022 Traffic Counts
- September 2023 Traffic Counts
- LOS Worksheets (Existing Weekday Afternoon Conditions)
- LOS Worksheets (Weekday Afternoon Conditions with 50% Growth)

Public Works Department
360 SW Avery Avenue
Corvallis, Oregon 97333
Phone: 541.766.6821

Memorandum

Date: January 20, 2021

To: Gordon Kurtz, Engineer Associate

Owen Millehrer, Civil Engineer

From: Thanh Huynh, Surveying and Engineering Intern

Subject: Coffin Butte Landfill Traffic Study

Coffin Butte RD #04451

Soap Creek RD #05450

Enclosed is a report of a traffic study conducted during two seven-day periods. The sites under investigation were along Coffin Butte Rd on either side of the entrance to the Coffin Butte Quarry, see attached map.

The purpose of this traffic study was to collect truck count and average daily traffic data. The equipment used to conduct this study was a Unicorn Vehicle Traffic Classifier. The vehicle traffic classifier records count, time, axle and speed. The data is compiled for each lane and for combined directions.

Table 1 indicates vehicle classification and average daily counts.

Table 1: Truck Counts and Average Daily Counts

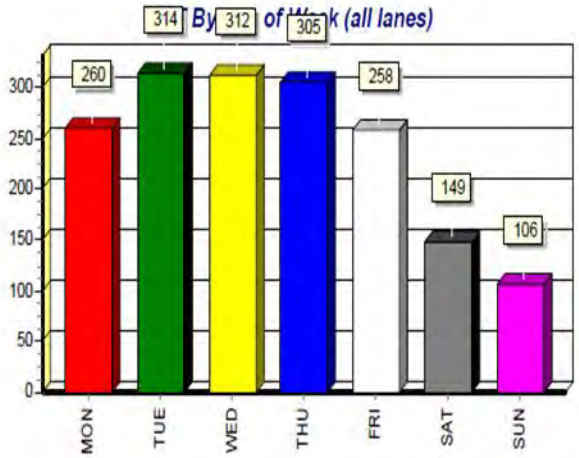
Road	Total Truck Counts	Avg. Truck Counts	ADT
Coffin Butte	628	89	243
Soap Creek	31	4	136

The traffic study report includes the following:

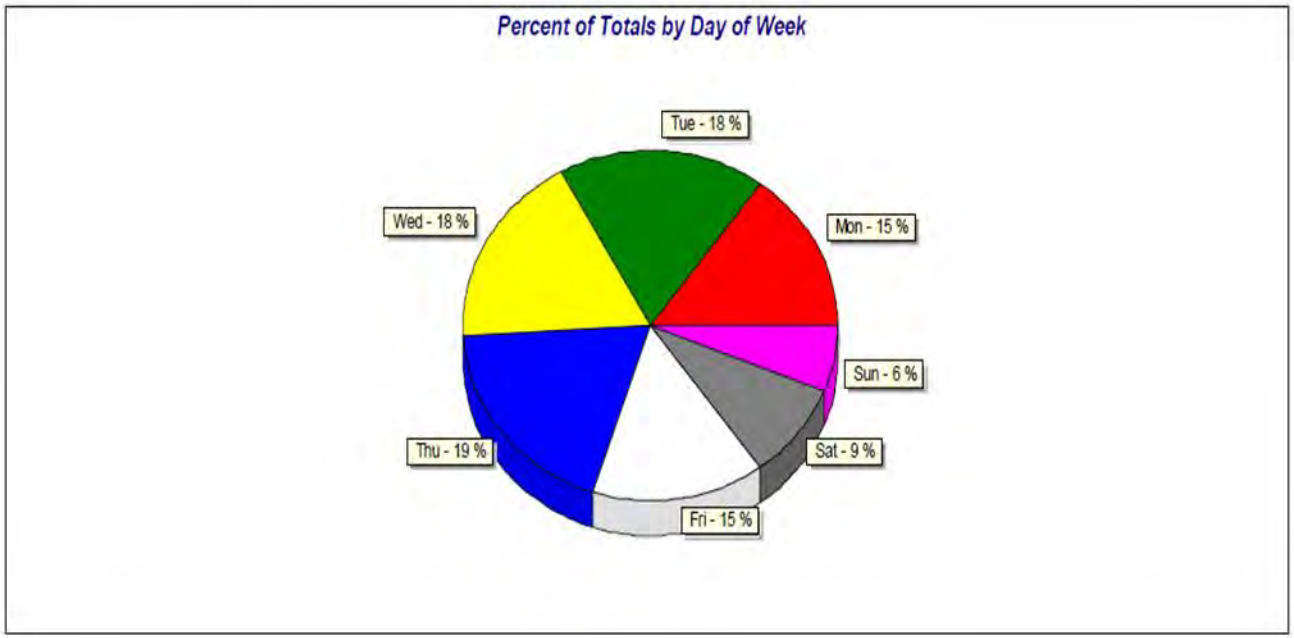
1. Map indicating traffic study sites.
2. Charts indicating Coffin Butte Rd and Soap Creek Rd average daily traffic.
3. Charts indicating Coffin Butte Rd and Soap Creek Rd axle class vs. volume.
4. Chart of vehicle classifications.

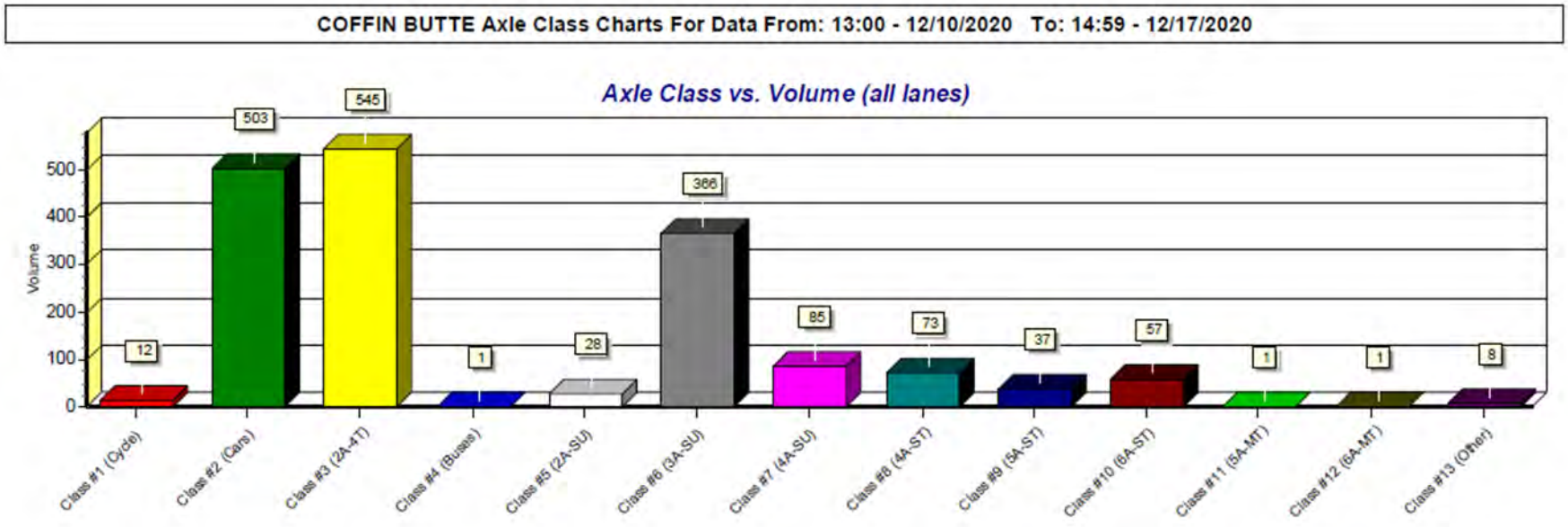
COFFIN BUTTE LANDFILL TRAFFIC STUDY SITES

COFFIN BUTTE Charts For Data From: 13:00 - 12/10/2020 To: 14:59 - 12/17/2020

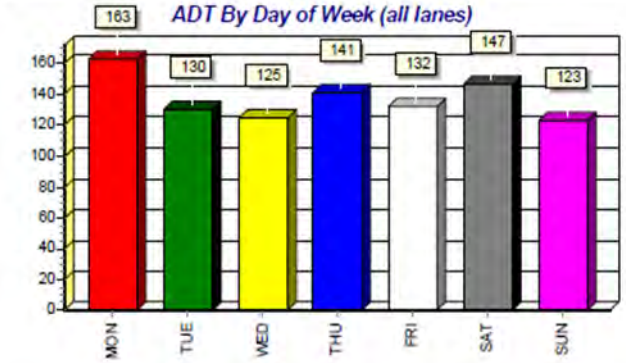


DAY	ADT	TOTAL	# DAYS
Mon	260	260	1.0
Tue	314	314	1.0
Wed	312	312	1.0
Thu	305	318	1.0
Fri	258	258	1.0
Sat	149	149	1.0
Sun	106	106	1.0

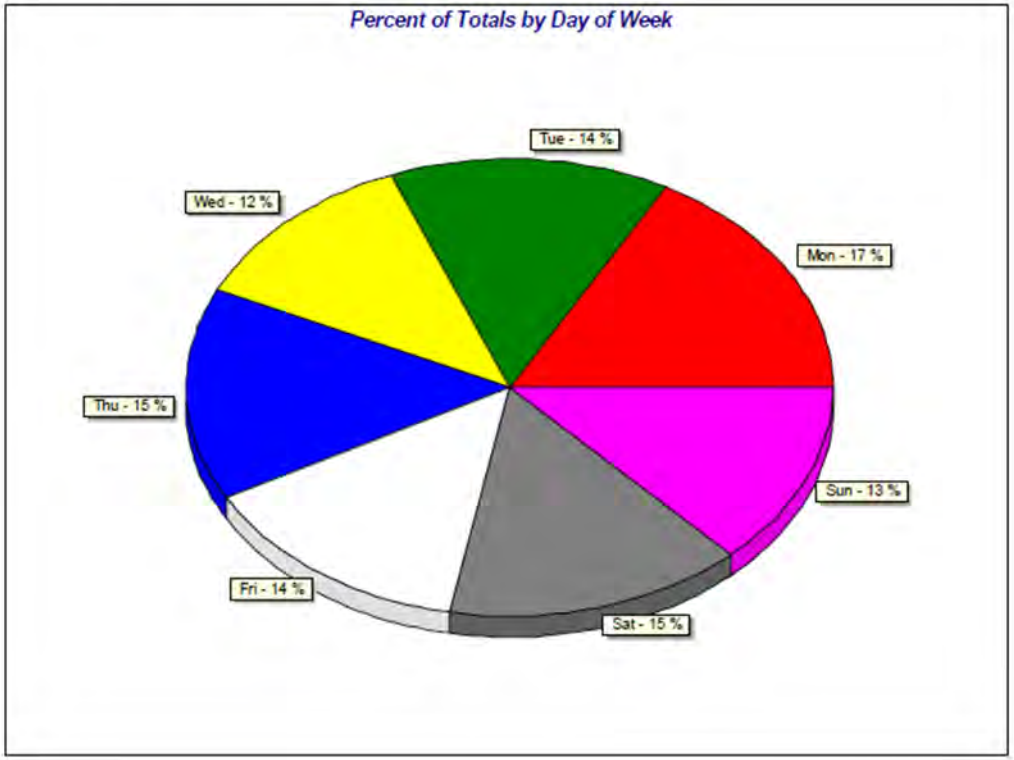



COFFIN BUTTE Axle Class Charts For Data From: 13:00 - 12/10/2020 To: 14:59 - 12/17/2020
Axle Class vs. Volume (all lanes)
Volume
0
100
200
300
400
500
12
503
545
1
28
366
85
73
37
57
1
1
8
Class #1 (Cycle)
Class #2 (Cars)
Class #3 (2A-4T)
Class #4 (Buses)
Class #5 (2A-SU)
Class #6 (3A-SU)
Class #7 (4A-SU)
Class #8 (4A-ST)
Class #9 (5A-ST)
Class #10 (6A-ST)
Class #11 (5A-MT)
Class #12 (6A-MT)
Class #13 (Other)

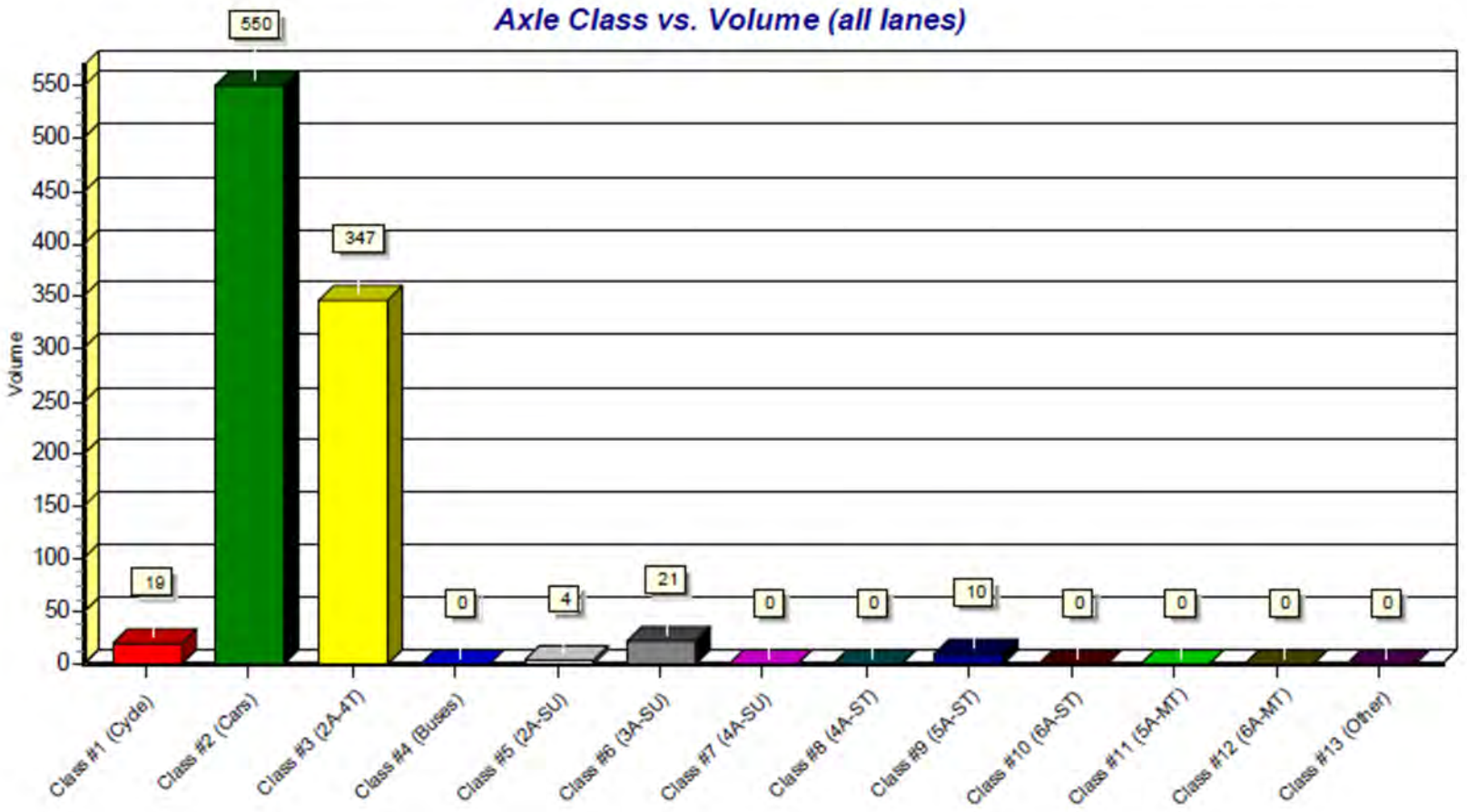
SOAP CREEK Charts For Data From: 16:00 - 01/13/2021 To: 14:59 - 01/20/2021



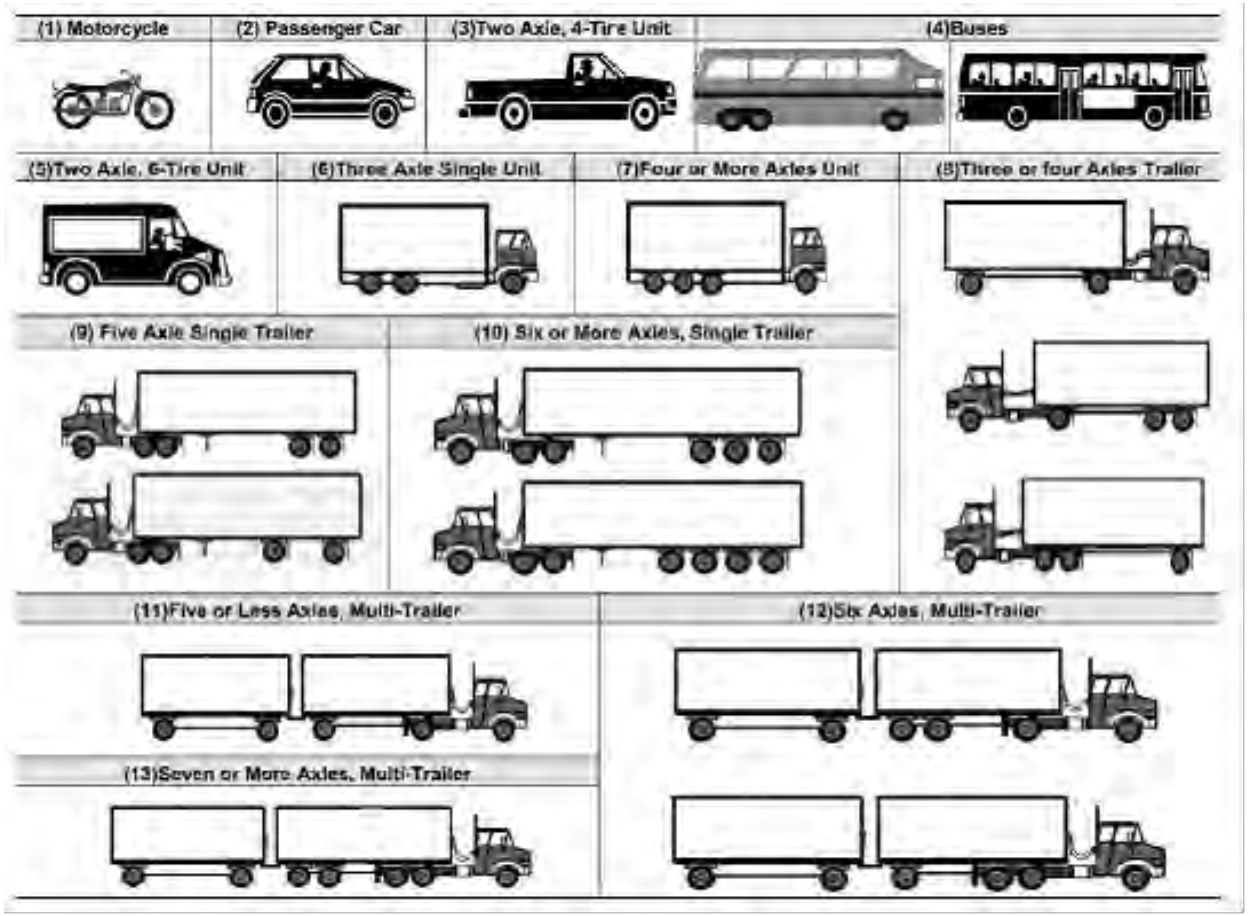
DAY	ADT	TOTAL	# DAYS
Mon	163	163	1.0
Tue	130	130	1.0
Wed	125	115	0.9
Thu	141	141	1.0
Fri	132	132	1.0
Sat	147	147	1.0
Sun	123	123	1.0



SOAP CREEK Axle Class Charts For Data From: 16:00 - 01/13/2021 To: 14:59 - 01/20/2021

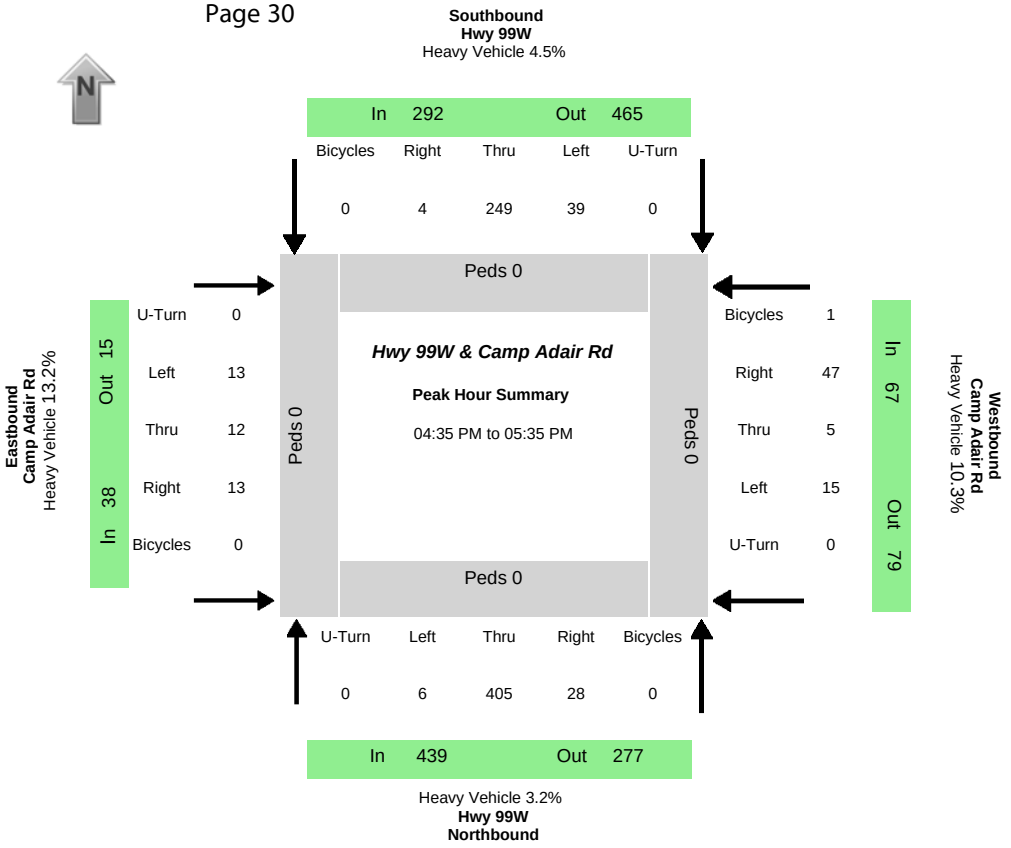


Vehicle Classification Chart



K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Hwy 99W*
E/W street	*Camp Adair Rd*
City, State	Monmouth OR
Site Notes	
Location	44.699580 - ?-123.220873
Start Date	Tuesday, March 16, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:35:00 PM
Peak 15 Min Start	05:10:00 PM
PHF (15-Min Int)	0.90



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
6	405	28	0	39	249	4	0	13	12	13	0	15	5	47	0	439	292	38	67	277	465	15	79

Percent Heavy Vehicles

0.0%	3.5%	0.0%	0.0%	7.7%	4.0%	0.0%	0.0%	23.1%	8.3%	7.7%	0.0%	0.0%	20.0%	12.8%	0.0%	3.2%	4.5%	13.2%	10.4%	4.0%	4.9%	6.7%	5.1%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1

PHV - Pedestrians

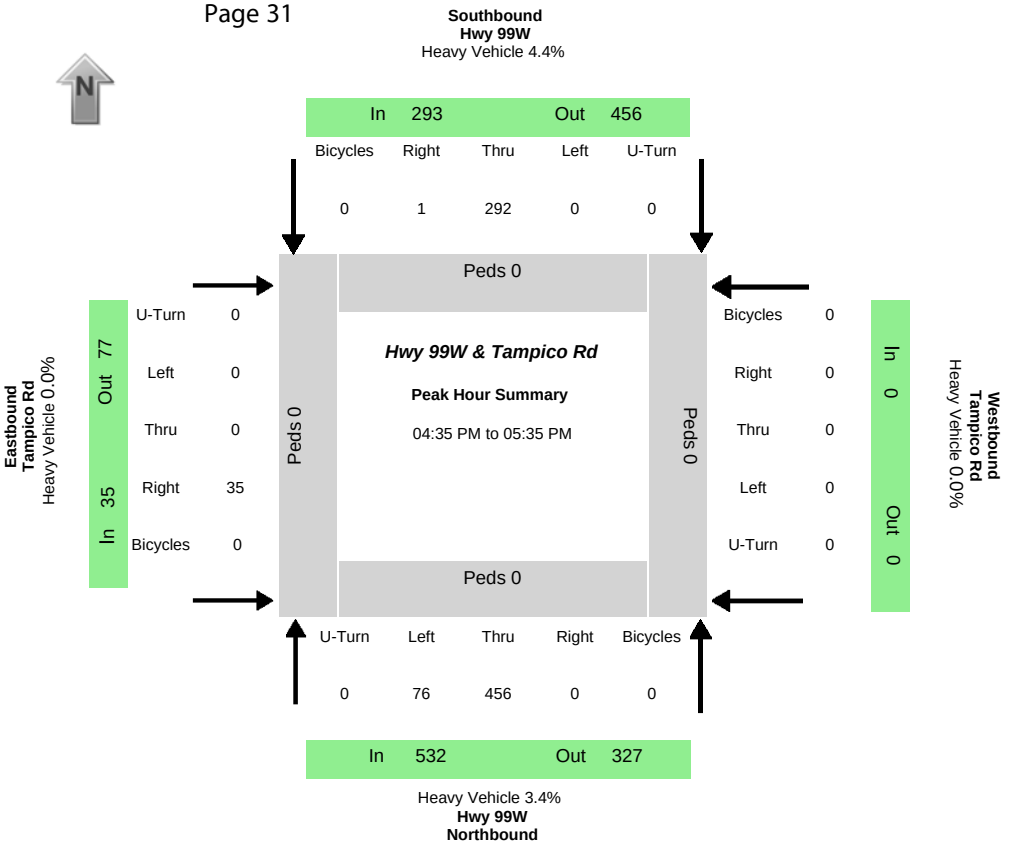
in Crosswalk				
NB	SB	EB	WB	**Sum**
0	0	0	0	0

All Vehicle Volumes

	Northbound Hwy 99W				Southbound Hwy 99W				Eastbound Camp Adair Rd				Westbound Camp Adair Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	3	35	0	0	6	26	2	0	3	0	1	0	0	1	2	0		
04:05:00 PM	2	20	2	0	3	29	0	0	1	1	2	0	0	0	3	0		
04:10:00 PM	0	24	3	0	1	18	2	0	1	2	3	0	3	1	1	0	201	
04:15:00 PM	2	30	0	0	3	12	3	0	0	1	4	0	0	1	5	0	183	
04:20:00 PM	0	29	3	0	3	33	1	0	2	1	2	0	1	5	2	0	202	
04:25:00 PM	0	19	3	0	10	22	1	0	0	0	3	0	0	2	0	0	203	
04:30:00 PM	0	28	4	0	1	24	0	0	3	2	2	0	2	0	3	0	211	
04:35:00 PM	3	39	1	0	3	15	0	0	2	1	2	0	1	0	7	0	203	
04:40:00 PM	0	34	5	0	0	19	1	0	2	0	1	0	0	0	3	0	208	
04:45:00 PM	1	37	2	0	4	20	0	0	1	3	0	0	1	0	2	0	210	
04:50:00 PM	1	41	4	0	3	15	0	0	0	0	2	0	2	0	4	0	208	
04:55:00 PM	1	21	3	0	2	22	2	0	1	0	1	0	5	0	8	0	209	821
05:00:00 PM	0	22	1	0	3	25	1	0	0	0	1	0	3	2	5	0	201	805
05:05:00 PM	0	28	1	0	1	16	0	0	0	2	1	0	0	1	3	0	182	795
05:10:00 PM	0	41	3	0	4	11	0	0	1	1	2	0	0	0	3	0	182	802
05:15:00 PM	0	38	0	0	8	35	0	0	0	2	0	0	2	1	3	0	208	830
05:20:00 PM	0	44	3	0	3	24	0	0	0	0	0	0	1	0	3	0	233	826
05:25:00 PM	0	29	2	0	2	22	0	0	2	1	1	0	0	1	4	0	231	830
05:30:00 PM	0	31	3	0	6	25	0	0	4	2	2	0	0	0	2	0	217	836
05:35:00 PM	0	37	1	0	3	26	0	0	1	1	0	0	0	0	3	0	211	834
05:40:00 PM	0	32	0	0	0	21	0	0	2	0	0	0	0	0	2	0	204	826
05:45:00 PM	0	41	0	0	3	21	1	0	1	0	0	0	0	0	0	0	196	822
05:50:00 PM	0	30	2	0	1	26	1	0	0	0	0	0	1	1	2	0	188	814
05:55:00 PM	1	27	2	0	3	16	0	0	0	0	0	0	1	0	1	0	182	799

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*Hwy 99W*
E/W street	*Tampico Rd*
City, State	Monmouth OR
Site Notes	
Location	44.676819 - ?-123.220746
Start Date	Tuesday, March 16, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:35:00 PM
Peak 15 Min Start	05:20:00 PM
PHF (15-Min Int)	0.89



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
76	456	0	0	0	292	1	0	0	0	35	0	0	0	0	0	532	293	35	0	327	456	77	0

Percent Heavy Vehicles

0.0%	3.9%	0.0%	0.0%	0.0%	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%	4.4%	0.0%	0.0%	4.0%	3.9%	0.0%	0.0%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHV - Pedestrians

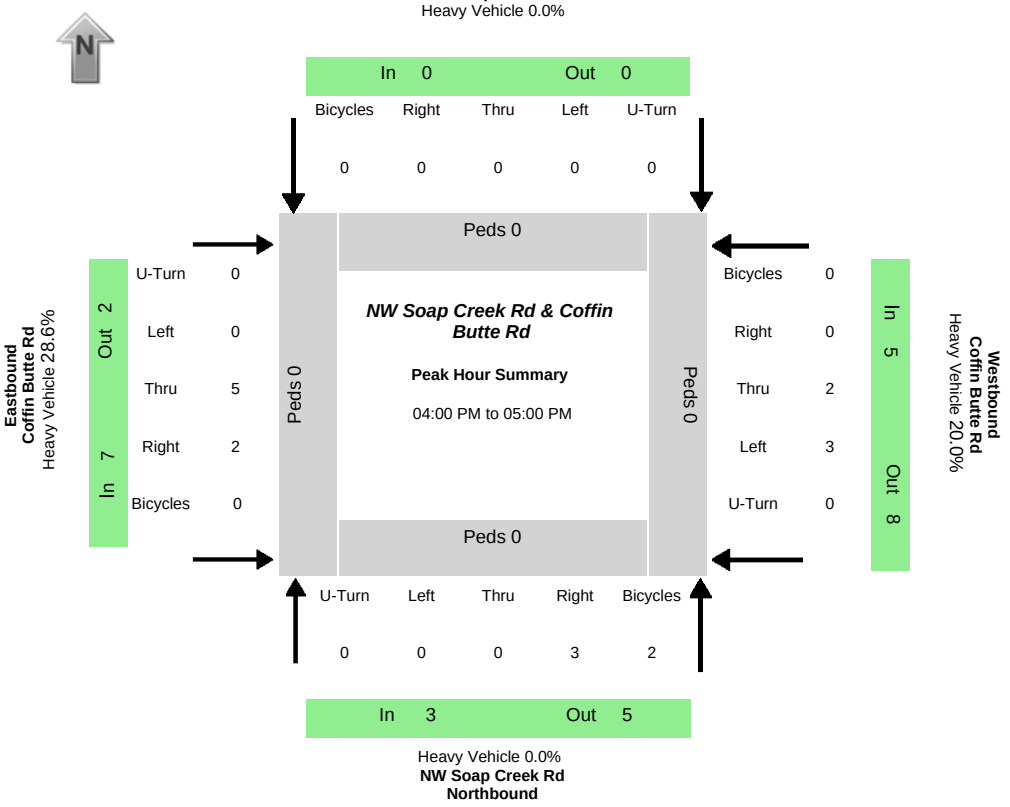
in Crosswalk				
NB	SB	EB	WB	Sum
0	0	0	0	0

All Vehicle Volumes

	Northbound Hwy 99W				Southbound Hwy 99W				Eastbound Tampico Rd				Westbound Tampico Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	3	35	0	0	0	23	0	0	0	0	5	0	0	0	0	0		
04:05:00 PM	6	45	0	0	0	27	0	0	0	0	4	0	0	0	0	0		
04:10:00 PM	2	30	0	0	0	12	0	0	0	0	2	0	0	0	0	0	194	
04:15:00 PM	5	26	0	0	0	31	0	0	1	0	4	0	0	0	0	0	195	
04:20:00 PM	7	37	0	0	0	16	0	0	0	0	1	0	0	0	0	0	174	
04:25:00 PM	7	32	0	0	0	17	0	0	0	0	5	0	0	0	0	0	189	
04:30:00 PM	3	26	0	0	0	22	0	0	0	0	4	0	0	0	0	0	177	
04:35:00 PM	4	34	0	0	0	26	0	0	0	0	4	0	0	0	0	0	184	
04:40:00 PM	6	42	0	0	0	31	0	0	0	0	2	0	0	0	0	0	204	
04:45:00 PM	6	39	0	0	0	18	0	0	0	0	4	0	0	0	0	0	216	
04:50:00 PM	7	44	0	0	0	29	0	0	0	0	3	0	0	0	0	0	231	
04:55:00 PM	5	33	0	0	0	23	0	0	0	0	1	0	0	0	0	0	212	799
05:00:00 PM	10	24	0	0	0	23	0	0	0	0	3	0	0	0	0	0	205	793
05:05:00 PM	3	33	0	0	0	24	1	0	0	0	1	0	0	0	0	0	184	773
05:10:00 PM	3	43	0	0	0	18	0	0	0	0	3	0	0	0	0	0	189	794
05:15:00 PM	8	45	0	0	0	16	0	0	0	0	0	0	0	0	0	0	198	796
05:20:00 PM	6	44	0	0	0	34	0	0	0	0	6	0	0	0	0	0	226	825
05:25:00 PM	8	40	0	0	0	18	0	0	0	0	3	0	0	0	0	0	228	833
05:30:00 PM	10	35	0	0	0	32	0	0	0	0	5	0	0	0	0	0	241	860
05:35:00 PM	8	26	0	0	0	23	0	0	1	0	4	0	0	0	0	0	213	854
05:40:00 PM	5	42	0	0	0	20	0	0	0	0	2	0	0	0	0	0	213	842
05:45:00 PM	6	26	0	0	0	26	0	0	1	0	1	0	0	0	0	0	191	835
05:50:00 PM	8	40	0	0	0	23	1	0	0	0	0	0	0	0	0	0	201	824
05:55:00 PM	1	24	0	0	0	19	1	0	0	0	5	0	0	0	0	0	182	812

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*NW Soap Creek Rd*
E/W street	*Coffin Butte Rd*
City, State	Monmouth OR
Site Notes	
Location	44.695984 - -123.235559
Start Date	Tuesday, March 16, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:00:00 PM
Peak 15 Min Start	04:30:00 PM
PHF (15-Min Int)	0.63



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	3	0	0	0	0	0	0	5	2	0	3	2	0	0	3	0	7	5	5	0	2	8

Percent Heavy Vehicles

0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	50.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	28.6%	20.0%	20.0%	0.0%	50.0%	12.5%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**
0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2

PHV - Pedestrians

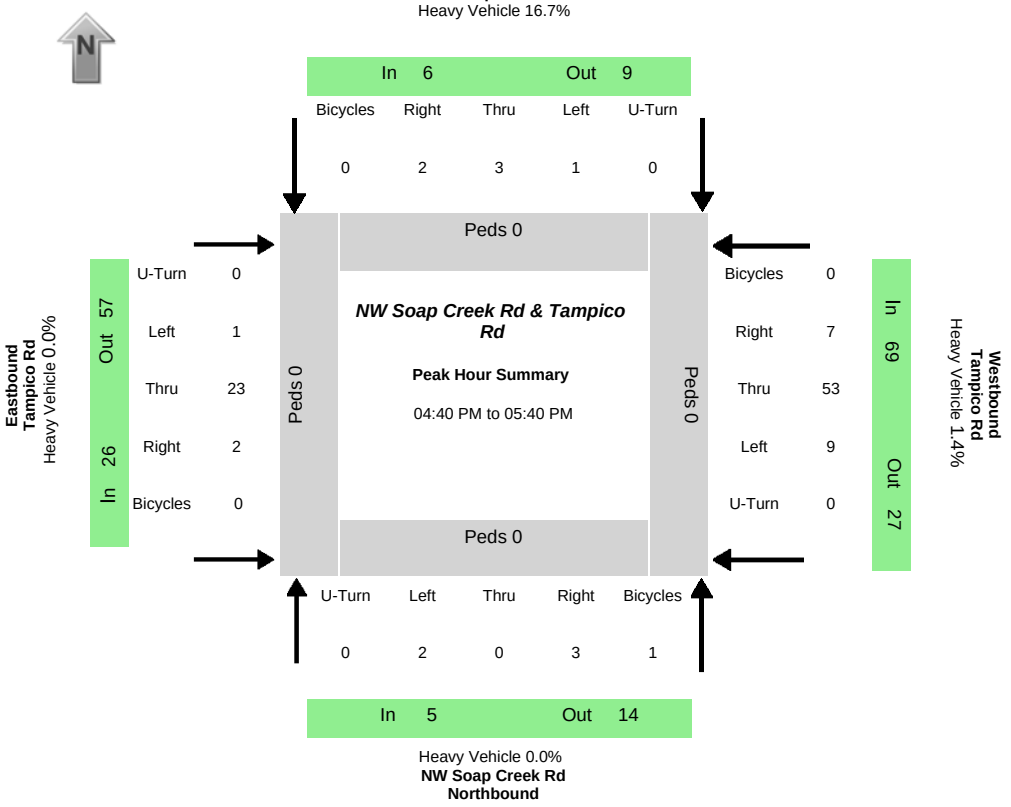
in Crosswalk				
NB	SB	EB	WB	**Sum**
0	0	0	0	0

All Vehicle Volumes

	Northbound NW Soap Creek Rd				Southbound NW Soap Creek Rd				Eastbound Coffin Butte Rd				Westbound Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
04:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0		
04:10:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	5	
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
04:25:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	
04:30:00 PM	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	4	
04:35:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
04:40:00 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	6	
04:45:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	14
05:05:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	13
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	12
05:15:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	15
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	12
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:55:00 PM	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	3	9

K-D-N
KEY DATA NETWORK

Data Provided by K-D-N.com 503-594-4224	
N/S street	*NW Soap Creek Rd*
E/W street	*Tampico Rd*
City, State	Monmouth OR
Site Notes	
Location	44.685389 - ?-123.239874
Start Date	Tuesday, March 16, 2021
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:40:00 PM
Peak 15 Min Start	05:25:00 PM
PHF (15-Min Int)	0.72



Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
2	0	3	0	1	3	2	0	1	23	2	0	9	53	7	0	5	6	26	69	14	8	57	27

Percent Heavy Vehicles

0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	16.7%	0.0%	1.4%	0.0%	12.5%	0.0%	3.7%

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

PHV - Pedestrians

in Crosswalk				
NB	SB	EB	WB	Sum
0	0	0	0	0

All Vehicle Volumes

	Northbound NW Soap Creek Rd				Southbound NW Soap Creek Rd				Eastbound Tampico Rd				Westbound Tampico Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
04:00:00 PM	0	0	2	0	0	0	0	0	0	3	0	0	0	1	0	0		
04:05:00 PM	0	0	1	0	0	0	0	0	0	2	0	0	0	4	0	0		
04:10:00 PM	0	0	1	0	0	1	1	0	0	3	0	0	0	2	0	0	21	
04:15:00 PM	1	0	0	0	1	0	0	0	0	1	0	0	1	4	0	0	23	
04:20:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	4	0	0	22	
04:25:00 PM	1	0	3	0	0	0	0	0	0	3	0	0	2	5	1	0	29	
04:30:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	2	2	0	0	27	
04:35:00 PM	0	0	0	0	1	0	1	0	1	3	0	0	0	2	0	0	29	
04:40:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	2	3	1	0	23	
04:45:00 PM	1	0	1	0	0	0	0	0	0	2	0	0	0	3	1	0	25	
04:50:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	1	3	1	0	24	
04:55:00 PM	0	0	0	0	0	0	0	0	0	1	1	0	1	5	1	0	24	97
05:00:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	3	1	0	23	98
05:05:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	3	5	0	0	25	100
05:10:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	1	2	0	0	21	97
05:15:00 PM	0	0	1	0	0	0	1	0	1	3	0	0	0	5	0	0	25	100
05:20:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	2	0	0	20	98
05:25:00 PM	0	0	0	0	0	1	0	0	0	2	1	0	0	9	1	0	29	97
05:30:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	1	4	0	0	27	100
05:35:00 PM	1	0	0	0	0	1	0	0	0	2	0	0	0	9	1	0	37	106
05:40:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1	5	0	0	30	104
05:45:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	8	0	0	30	105
05:50:00 PM	0	0	2	0	0	0	0	0	0	1	0	0	0	4	0	0	23	105
05:55:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	2	3	0	0	24	104

ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

Location: 1 Hwy 99 & Coffin Butte Rd PM

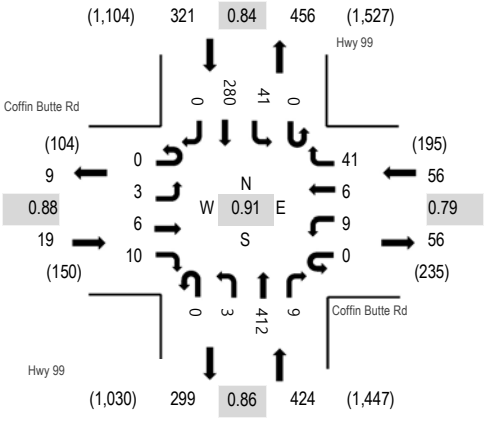
Date: Wednesday, January 13, 2022

Peak Hour: 04:35 PM - 05:35 PM

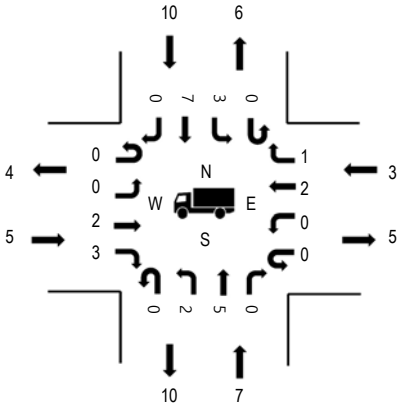
Peak 15-Minutes: 05:20 PM - 05:35 PM

Peak Hour

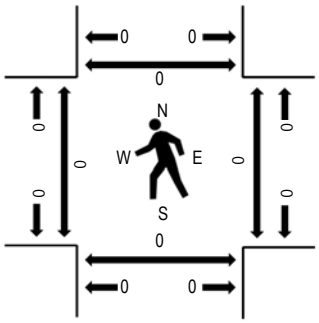
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	26.3%	0.88
WB	5.4%	0.79
NB	1.7%	0.86
SB	3.1%	0.84
All	3.0%	0.91

Traffic Counts - Motorized Vehicles

Interval Start Time	Coffin Butte Rd Eastbound				Coffin Butte Rd Westbound				Hwy 99 Northbound				Hwy 99 Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
2:00 PM	0	4	0	3	0	0	0	1	0	0	22	5	0	3	16	2	56	633
2:05 PM	0	0	0	0	0	1	0	3	0	2	13	1	0	3	9	3	35	629
2:10 PM	0	1	1	1	0	1	3	3	0	4	23	0	0	3	14	3	57	655
2:15 PM	0	1	0	3	0	1	0	0	0	0	29	1	0	1	17	1	54	650
2:20 PM	0	4	3	1	0	0	1	3	0	1	23	1	0	0	21	0	58	659
2:25 PM	0	2	2	0	0	0	0	2	0	1	24	1	0	2	5	2	41	656
2:30 PM	0	1	2	2	0	1	1	1	0	2	21	1	0	4	31	2	69	685
2:35 PM	0	4	1	3	0	0	1	2	0	0	12	0	0	2	14	1	40	677
2:40 PM	0	2	0	2	0	3	1	0	0	2	25	1	0	6	15	0	57	677
2:45 PM	0	1	2	0	0	3	1	1	0	4	14	2	0	3	11	1	43	688
2:50 PM	0	2	2	2	0	1	1	2	0	1	26	2	0	2	18	2	61	698
2:55 PM	0	1	0	1	0	1	1	3	0	3	22	0	0	0	30	0	62	700
3:00 PM	0	3	1	1	0	1	2	1	0	1	28	0	0	1	13	0	52	715
3:05 PM	0	0	1	4	0	2	1	2	0	0	28	0	0	4	19	0	61	721
3:10 PM	0	1	0	4	0	1	1	2	0	2	19	1	0	0	21	0	52	732
3:15 PM	0	1	3	4	0	1	1	3	0	0	29	3	0	0	17	1	63	735
3:20 PM	0	1	1	0	0	1	1	6	0	0	26	0	0	2	15	2	55	740
3:25 PM	0	2	0	1	0	1	1	3	0	3	31	3	0	5	20	0	70	752
3:30 PM	0	1	2	0	0	0	4	2	0	0	27	1	0	3	20	1	61	742
3:35 PM	0	0	2	1	0	1	0	1	0	2	21	2	0	1	9	0	40	734
3:40 PM	0	1	0	0	0	0	1	6	0	2	28	0	0	2	26	2	68	779
3:45 PM	0	1	0	1	0	1	1	0	0	3	25	2	0	6	13	0	53	777
3:50 PM	0	0	2	0	0	0	1	4	0	0	31	0	0	1	24	0	63	786
3:55 PM	0	2	3	1	0	0	0	3	0	3	37	1	0	6	21	0	77	790
4:00 PM	0	0	1	2	0	0	0	3	0	1	26	0	0	4	20	1	58	787
4:05 PM	0	2	2	1	0	1	1	4	0	0	34	3	0	4	20	0	72	791
4:10 PM	0	0	1	3	0	1	0	3	0	0	29	0	0	2	16	0	55	772
4:15 PM	0	0	0	1	0	0	1	2	0	1	40	2	0	1	20	0	68	785

Location: 1 Hwy 99 & Coffin Butte Rd PM

4:20 PM	0	1	3	0	0	0	3	2	0	2	25	2	0	2	27	0	67	774
4:25 PM	0	1	0	1	0	0	0	1	0	0	35	1	0	2	19	0	60	801
4:30 PM	0	2	3	0	0	0	0	5	0	0	22	1	0	5	14	1	53	806
4:35 PM	0	0	1	1	0	0	2	7	0	2	27	0	0	2	43	0	85	820
4:40 PM	0	0	2	0	0	0	1	3	0	0	28	1	0	5	26	0	66	802
4:45 PM	0	0	0	0	0	2	0	6	0	0	33	1	0	1	19	0	62	805
4:50 PM	0	0	1	0	0	0	0	3	0	1	28	1	0	2	31	0	67	813
4:55 PM	0	0	2	2	0	1	0	4	0	0	33	2	0	7	23	0	74	789
5:00 PM	0	0	0	0	0	1	0	3	0	0	33	0	0	5	20	0	62	761
5:05 PM	0	0	0	1	0	1	1	0	0	0	28	1	0	2	19	0	53	
5:10 PM	0	2	0	1	0	2	0	5	0	0	40	0	0	1	17	0	68	
5:15 PM	0	0	0	1	0	0	0	2	0	0	32	1	0	8	13	0	57	
5:20 PM	0	1	0	4	0	0	1	4	0	0	59	0	0	4	21	0	94	
5:25 PM	0	0	0	0	0	1	0	3	0	0	37	2	0	1	21	0	65	
5:30 PM	0	0	0	0	0	1	1	1	0	0	34	0	0	3	27	0	67	
5:35 PM	0	1	0	0	0	0	0	3	0	0	46	0	0	3	14	0	67	
5:40 PM	0	0	3	3	0	0	0	2	0	0	35	1	0	4	21	0	69	
5:45 PM	0	0	0	1	0	1	0	1	0	0	39	1	0	4	23	0	70	
5:50 PM	0	0	0	0	0	0	0	2	0	0	11	1	0	4	25	0	43	
5:55 PM	0	0	0	0	0	0	0	4	0	1	16	0	0	3	22	0	46	
Count Total	0	46	47	57	0	33	35	127	0	44	1,354	49	0	139	940	25	2,896	
Peak Hour	0	3	6	10	0	9	6	41	0	3	412	9	0	41	280	0	820	

Location: 1 Hwy 99 & Coffin Butte Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	5	1	1	0	7	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	0	3	0	3	6	2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0
2:10 PM	2	1	2	0	5	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0
2:15 PM	1	0	1	1	3	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:20 PM	6	1	1	0	8	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	1	1	0	1	3	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0
2:30 PM	3	5	1	7	16	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	4	1	1	1	7	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	1	3	1	1	6	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	1	3	0	2	6	2:45 PM	0	0	0	2	2	2:45 PM	0	0	0	0	0
2:50 PM	5	1	3	4	13	2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0
2:55 PM	1	3	0	1	5	2:55 PM	0	0	0	0	0	2:55 PM	0	0	0	0	0
3:00 PM	1	1	3	0	5	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	2	3	0	5	10	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	1	2	2	1	6	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	3	0	1	0	4	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	1	2	1	2	6	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	0	3	0	1	4	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	1	2	1	2	6	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	3	1	0	0	4	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	0	1	0	2	3	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	1	3	0	0	4	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	0	1	0	1	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	1	2	0	2	5	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	1	2	0	0	3	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	4	0	0	4	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	1	1	0	1	3	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	2	1	1	4	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	2	0	2	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	2	0	1	3	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	2	4	0	1	7	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	2	0	1	4	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	1	0	1	0	2	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	2	0	2	4	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	1	1	0	3	5	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	1	0	2	3	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	1	0	0	0	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	1	1	0	1	3	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	2	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	1	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	1	1	0	2	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	1	1	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	1	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	1	0	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	53	66	28	52	199	Count Total	0	0	0	2	2	Count Total	0	0	0	0	0
Peak Hour	5	7	3	10	25	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

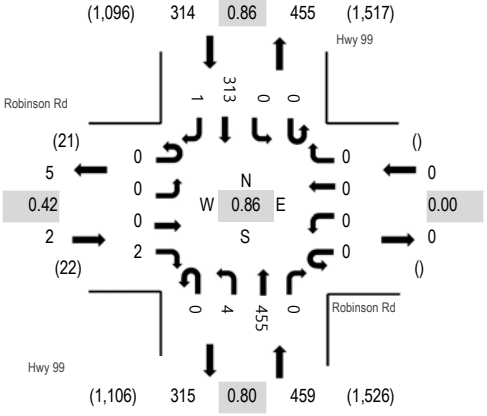
Location: 2 Hwy 99 & Robinson Rd PM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

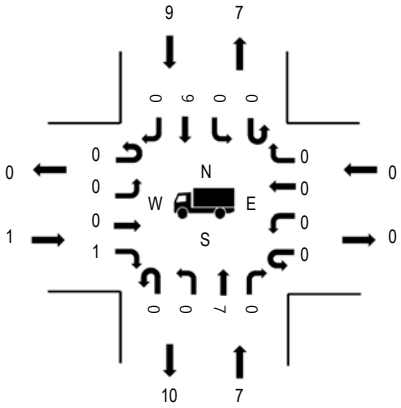
Location: 2 Hwy 99 & Robinson Rd PM
Date: Wednesday, January 13, 2022
Peak Hour: 04:35 PM - 05:35 PM
Peak 15-Minutes: 05:20 PM - 05:35 PM

Peak Hour

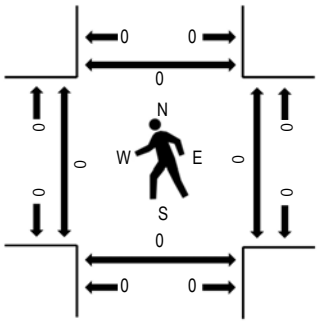
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	50.0%	0.42
WB	0.0%	0.00
NB	1.5%	0.80
SB	2.9%	0.86
All	2.2%	0.86

Traffic Counts - Motorized Vehicles

Interval Start Time	Robinson Rd Eastbound				Robinson Rd Westbound				Hwy 99 Northbound				Hwy 99 Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
2:00 PM	0	0	0	1	0	0	0	0	0	0	23	0	0	0	17	0	41	549
2:05 PM	0	0	0	0	0	0	0	0	0	0	22	0	0	0	18	0	40	549
2:10 PM	0	0	0	1	0	0	0	0	0	1	20	0	0	0	19	0	41	560
2:15 PM	0	0	0	0	0	0	0	0	0	0	32	0	0	0	17	0	49	568
2:20 PM	0	0	0	0	0	0	0	0	0	1	29	0	0	0	20	1	51	571
2:25 PM	0	0	0	1	0	0	0	0	0	1	21	0	0	0	22	0	45	565
2:30 PM	0	0	0	0	0	0	0	0	0	0	24	0	0	0	23	1	48	580
2:35 PM	0	0	0	0	0	0	0	0	0	0	26	0	0	0	23	0	49	591
2:40 PM	0	0	0	0	0	0	0	0	0	0	22	0	0	0	14	0	36	580
2:45 PM	0	0	0	0	0	0	0	0	0	0	18	0	0	0	20	0	38	594
2:50 PM	0	0	0	0	0	0	0	0	0	1	27	0	0	0	19	0	47	610
2:55 PM	0	1	0	4	0	0	0	0	0	0	31	0	0	0	28	0	64	629
3:00 PM	0	1	0	0	0	0	0	0	0	0	29	0	0	0	11	0	41	615
3:05 PM	0	0	0	0	0	0	0	0	0	0	28	0	0	0	23	0	51	642
3:10 PM	0	1	0	0	0	0	0	0	0	0	29	0	0	0	19	0	49	652
3:15 PM	0	1	0	0	0	0	0	0	0	2	29	0	0	0	20	0	52	658
3:20 PM	0	0	0	0	0	0	0	0	0	1	27	0	0	0	17	0	45	673
3:25 PM	0	0	0	1	0	0	0	0	0	0	34	0	0	0	25	0	60	686
3:30 PM	0	0	0	0	0	0	0	0	0	0	37	0	0	0	22	0	59	681
3:35 PM	0	0	0	0	0	0	0	0	0	0	24	0	0	0	14	0	38	676
3:40 PM	0	0	0	0	0	0	0	0	0	1	23	0	0	0	26	0	50	711
3:45 PM	0	0	0	1	0	0	0	0	0	0	29	0	0	0	24	0	54	728
3:50 PM	0	0	0	0	0	0	0	0	0	0	40	0	0	0	26	0	66	738
3:55 PM	0	0	0	0	0	0	0	0	0	0	26	0	0	0	24	0	50	732
4:00 PM	0	1	0	0	0	0	0	0	0	2	40	0	0	0	25	0	68	751
4:05 PM	0	0	0	2	0	0	0	0	0	0	39	0	0	0	20	0	61	741
4:10 PM	0	0	0	0	0	0	0	0	0	0	37	0	0	0	17	1	55	729

Location: 2 Hwy 99 & Robinson Rd PM

4:15 PM	0	0	0	1	0	0	0	0	0	0	35	0	0	0	31	0	67	728
4:20 PM	0	0	0	0	0	0	0	0	0	0	33	0	0	0	25	0	58	718
4:25 PM	0	1	0	0	0	0	0	0	0	1	34	0	0	0	19	0	55	746
4:30 PM	0	1	0	0	0	0	0	0	0	1	27	0	0	0	25	0	54	769
4:35 PM	0	0	0	1	0	0	0	0	0	0	33	0	0	0	39	0	73	775
4:40 PM	0	0	0	0	0	0	0	0	0	0	38	0	0	0	29	0	67	761
4:45 PM	0	0	0	0	0	0	0	0	0	1	37	0	0	0	26	0	64	772
4:50 PM	0	0	0	0	0	0	0	0	0	0	27	0	0	0	33	0	60	773
4:55 PM	0	0	0	0	0	0	0	0	0	0	35	0	0	0	34	0	69	750
5:00 PM	0	0	0	1	0	0	0	0	0	1	38	0	0	0	18	0	58	729
5:05 PM	0	0	0	0	0	0	0	0	0	0	26	0	0	0	23	0	49	
5:10 PM	0	0	0	0	0	0	0	0	0	0	39	0	0	0	15	0	54	
5:15 PM	0	0	0	0	0	0	0	0	0	0	36	0	0	0	20	1	57	
5:20 PM	0	0	0	0	0	0	0	0	0	1	61	0	0	0	24	0	86	
5:25 PM	0	0	0	0	0	0	0	0	0	1	46	0	0	0	31	0	78	
5:30 PM	0	0	0	0	0	0	0	0	0	0	39	0	0	0	21	0	60	
5:35 PM	0	0	0	0	0	0	0	0	0	1	37	0	0	0	21	0	59	
5:40 PM	0	0	0	0	0	0	0	0	0	0	49	0	0	0	29	0	78	
5:45 PM	0	1	0	0	0	0	0	0	0	0	37	0	0	0	27	0	65	
5:50 PM	0	0	0	0	0	0	0	0	0	0	17	0	0	0	20	0	37	
5:55 PM	0	0	0	0	0	0	0	0	0	0	19	0	0	0	29	0	48	
Count Total	0	8	0	14	0	0	0	0	0	17	1,509	0	0	0	1,092	4	2,644	
Peak Hour	0	0	0	2	0	0	0	0	0	4	455	0	0	0	313	1	775	

Location: 2 Hwy 99 & Robinson Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	0	3	0	2	5	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	0	3	0	0	3	2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0
2:10 PM	0	2	0	0	2	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0
2:15 PM	0	0	0	3	3	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:20 PM	0	3	0	0	3	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	0	3	0	4	7	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0
2:30 PM	0	0	0	3	3	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	0	3	0	1	4	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	0	2	0	1	3	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	0	2	0	3	5	2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0
2:50 PM	0	2	0	3	5	2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0
2:55 PM	0	2	0	0	2	2:55 PM	0	0	0	0	0	2:55 PM	0	0	0	0	0
3:00 PM	0	3	0	1	4	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	0	4	0	5	9	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	0	4	0	0	4	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	0	0	0	2	2	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	0	2	0	0	2	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	0	2	0	2	4	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	0	2	0	2	4	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	0	1	0	1	2	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	0	1	0	0	1	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	1	0	0	1	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	0	0	0	2	2	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	0	1	0	0	1	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	4	0	0	4	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	1	1	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	2	0	1	3	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	1	0	0	1	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	3	0	1	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	1	0	0	2	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	1	0	0	1	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	1	0	0	1	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	1	1	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	1	0	4	5	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	1	0	2	3	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	1	0	1	2	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	1	0	0	1	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	1	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	1	0	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	1	0	0	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	1	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	1	65	0	48	114	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	1	7	0	9	17	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

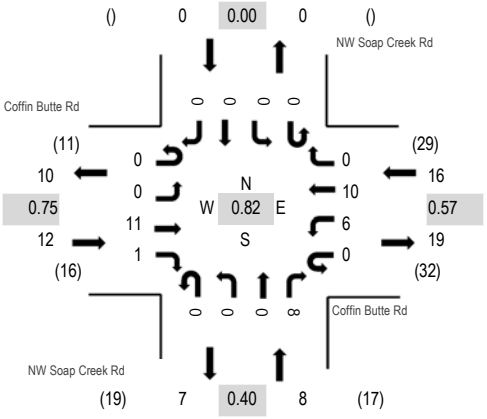
Location: 4 NW Soap Creek Rd & Coffin Butte Rd PM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

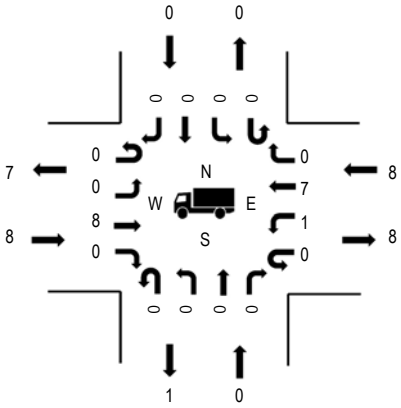
Location: 4 NW Soap Creek Rd & Coffin Butte Rd PM
Date: Wednesday, January 13, 2022
Peak Hour: 02:10 PM - 03:10 PM
Peak 15-Minutes: 02:10 PM - 02:25 PM

Peak Hour

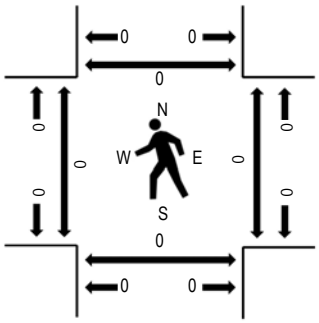
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	66.7%	0.75
WB	50.0%	0.57
NB	0.0%	0.40
SB	0.0%	0.00
All	44.4%	0.82

Traffic Counts - Motorized Vehicles

Interval Start Time	Coffin Butte Rd Eastbound				Coffin Butte Rd Westbound				NW Soap Creek Rd Northbound				NW Soap Creek Rd Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
2:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	31
2:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34
2:10 PM	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	4	36
2:15 PM	0	0	1	0	0	0	2	0	0	0	0	2	0	0	0	0	5	33
2:20 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	29
2:25 PM	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	4	28
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	26
2:35 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	25
2:40 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	24
2:45 PM	0	0	1	0	0	2	1	0	0	0	0	1	0	0	0	0	5	22
2:50 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	17
2:55 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15
3:00 PM	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	4	13
3:05 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	13
3:10 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	12
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	11
3:20 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	10
3:25 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2	11
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
3:35 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	12
3:40 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	14
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
3:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
3:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
4:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	4	13
4:05 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	9
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8

Location: 4 NW Soap Creek Rd & Coffin Butte Rd PM

4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
4:20 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	10
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
4:30 PM	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	3	9
4:35 PM	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	3	7
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
Count Total	0	0	15	1	0	18	11	0	0	0	0	17	0	0	0	0	62	
Peak Hour	0	0	11	1	0	6	10	0	0	0	0	8	0	0	0	0	36	

Location: 4 NW Soap Creek Rd & Coffin Butte Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	1	0	0	0	1	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0
2:10 PM	0	0	1	0	1	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0
2:15 PM	1	0	2	0	3	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:20 PM	1	0	0	0	1	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	2	0	0	0	2	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0
2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	0	0	1	0	1	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	0	0	1	0	1	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	1	0	1	0	2	2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0
2:50 PM	1	0	1	0	2	2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0
2:55 PM	1	0	0	0	1	2:55 PM	0	0	0	0	0	2:55 PM	0	0	0	0	0
3:00 PM	1	0	1	0	2	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	9	0	8	0	17	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	8	0	8	0	16	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

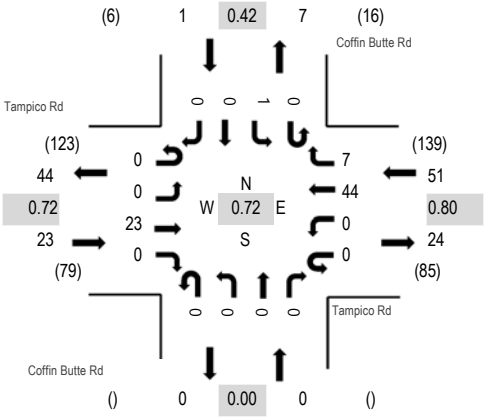
Location: 5 Coffin Butte Rd & Tampico Rd PM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

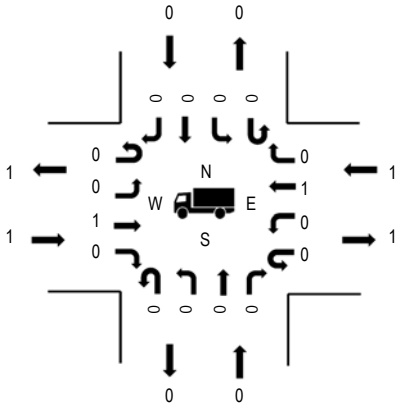
Location: 5 Coffin Butte Rd & Tampico Rd PM
Date: Wednesday, January 13, 2022
Peak Hour: 04:25 PM - 05:25 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

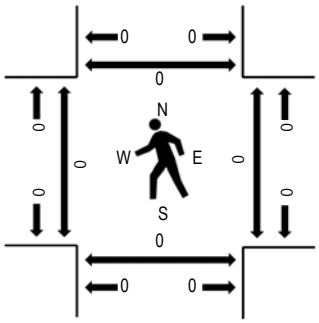
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.3%	0.72
WB	2.0%	0.80
NB	0.0%	0.00
SB	0.0%	0.42
All	2.7%	0.72

Traffic Counts - Motorized Vehicles

Interval Start Time	Tampico Rd Eastbound				Tampico Rd Westbound				Coffin Butte Rd Northbound				Coffin Butte Rd Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
2:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	46
2:05 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3	48
2:10 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	51
2:15 PM	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	5	57
2:20 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	57
2:25 PM	0	0	3	0	0	0	0	1	0	0	0	0	0	2	0	0	6	58
2:30 PM	0	0	4	0	0	0	1	0	0	0	0	0	0	1	0	0	6	55
2:35 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	52
2:40 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	55
2:45 PM	0	0	4	0	0	0	0	1	0	0	0	0	0	1	0	0	6	55
2:50 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	5	57
2:55 PM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	5	57
3:00 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4	56
3:05 PM	0	0	2	0	0	0	3	0	0	0	0	0	0	1	0	0	6	58
3:10 PM	0	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0	9	58
3:15 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5	53
3:20 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	50
3:25 PM	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	3	50
3:30 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	55
3:35 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	4	59
3:40 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	3	61
3:45 PM	0	0	1	0	0	0	7	0	0	0	0	0	0	0	0	0	8	61
3:50 PM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	5	66
3:55 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	67
4:00 PM	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	6	70
4:05 PM	0	0	2	0	0	0	3	1	0	0	0	0	0	0	0	0	6	65
4:10 PM	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	4	60

Location: 5 Coffin Butte Rd & Tampico Rd PM

4:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	66
4:20 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	71
4:25 PM	0	0	1	0	0	0	5	2	0	0	0	0	0	0	0	0	8	75
4:30 PM	0	0	2	0	0	0	4	1	0	0	0	0	0	0	0	0	7	70
4:35 PM	0	0	2	0	0	0	3	1	0	0	0	0	0	0	0	0	6	68
4:40 PM	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	3	63
4:45 PM	0	0	4	0	0	0	9	0	0	0	0	0	0	0	0	0	13	69
4:50 PM	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	6	58
4:55 PM	0	0	3	0	0	0	3	1	0	0	0	0	0	0	0	0	7	58
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	52
5:05 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
5:10 PM	0	0	2	0	0	0	6	1	0	0	0	0	0	1	0	0	10	
5:15 PM	0	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	7	
5:20 PM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	6	
5:25 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	
5:30 PM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	5	
5:35 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	
5:40 PM	0	0	2	0	0	0	6	1	0	0	0	0	0	0	0	0	9	
5:45 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	
5:50 PM	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	6	
5:55 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Count Total	0	0	79	0	0	0	123	16	0	0	0	0	0	6	0	0	224	
Peak Hour	0	0	23	0	0	0	44	7	0	0	0	0	0	1	0	0	75	

Location: 5 Coffin Butte Rd & Tampico Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	0	0	1	0	1	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0
2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0
2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0
2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0
2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0
2:55 PM	0	0	1	0	1	2:55 PM	0	0	0	0	0	2:55 PM	0	0	0	0	0
3:00 PM	1	0	0	0	1	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	0	1	0	2	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	2	0	3	0	5	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	1	0	1	0	2	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

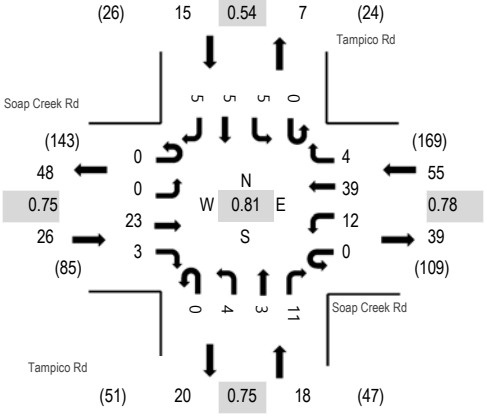
Location: 6 Tampico Rd & Soap Creek Rd PM

ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

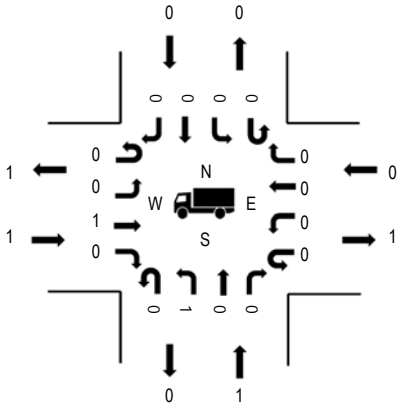
Location: 6 Tampico Rd & Soap Creek Rd PM
Date: Wednesday, January 13, 2022
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:45 PM - 05:00 PM

Peak Hour

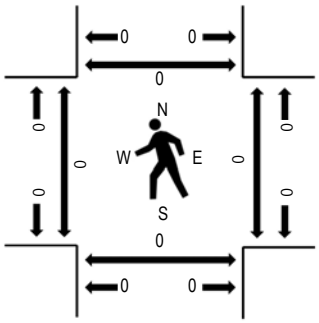
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.8%	0.75
WB	0.0%	0.78
NB	5.6%	0.75
SB	0.0%	0.54
All	1.8%	0.81

Traffic Counts - Motorized Vehicles

Interval Start Time	Soap Creek Rd Eastbound				Soap Creek Rd Westbound				Tampico Rd Northbound				Tampico Rd Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
2:00 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	60
2:05 PM	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	3	63
2:10 PM	0	0	2	0	0	1	3	0	0	0	0	0	0	0	0	0	6	70
2:15 PM	0	0	0	0	0	0	2	0	0	1	1	0	0	0	0	1	5	75
2:20 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	78
2:25 PM	0	2	3	0	0	0	1	0	0	0	0	1	0	0	0	0	7	80
2:30 PM	0	1	4	0	0	0	1	0	0	0	0	2	0	0	0	0	8	80
2:35 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	78
2:40 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	83
2:45 PM	0	1	3	1	0	1	2	0	0	0	0	0	0	0	1	0	9	85
2:50 PM	0	0	3	0	0	2	2	0	0	0	0	0	0	0	1	0	8	84
2:55 PM	0	0	2	0	0	0	3	0	0	0	0	2	0	0	0	0	7	79
3:00 PM	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	5	78
3:05 PM	0	0	2	0	0	1	4	0	0	0	0	1	0	1	0	1	10	90
3:10 PM	0	0	4	0	0	1	5	0	0	0	0	0	0	1	0	0	11	87
3:15 PM	0	0	0	0	0	1	5	1	0	0	1	0	0	0	0	0	8	82
3:20 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	3	76
3:25 PM	0	0	3	0	0	1	2	0	0	0	1	0	0	0	0	0	7	82
3:30 PM	0	0	0	0	0	1	4	0	0	0	0	0	0	1	0	0	6	85
3:35 PM	0	1	1	0	0	1	2	0	0	0	0	1	0	0	0	0	6	92
3:40 PM	0	0	2	0	0	1	2	0	0	0	0	0	0	0	0	0	5	97
3:45 PM	0	0	0	0	0	1	5	0	0	1	0	0	0	0	0	1	8	96
3:50 PM	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	3	104
3:55 PM	0	0	1	1	0	0	3	0	0	0	0	1	0	0	0	0	6	109
4:00 PM	0	0	3	1	0	2	3	0	0	1	1	1	0	1	3	1	17	114
4:05 PM	0	0	2	0	0	0	2	0	0	0	0	2	0	0	0	1	7	98
4:10 PM	0	0	0	0	0	1	4	0	0	0	0	0	0	1	0	0	6	94

Location: 6 Tampico Rd & Soap Creek Rd PM

4:15 PM	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2	100
4:20 PM	0	0	1	0	0	1	2	1	0	1	1	1	0	0	1	0	9	106
4:25 PM	0	0	1	0	0	2	4	0	0	1	0	0	0	0	0	2	10	104
4:30 PM	0	0	3	0	0	2	3	1	0	0	1	1	0	2	0	0	13	100
4:35 PM	0	0	2	0	0	1	4	0	0	0	0	2	0	0	1	1	11	96
4:40 PM	0	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	4	88
4:45 PM	0	0	4	1	0	2	7	1	0	1	0	0	0	0	0	0	16	92
4:50 PM	0	0	3	0	0	1	2	0	0	0	0	1	0	1	0	0	8	83
4:55 PM	0	0	3	1	0	0	5	0	0	0	0	2	0	0	0	0	11	82
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	75
5:05 PM	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	3	
5:10 PM	0	0	3	0	0	0	6	0	0	1	1	1	0	0	0	0	12	
5:15 PM	0	0	4	0	0	1	3	0	0	0	0	0	0	0	0	0	8	
5:20 PM	0	0	0	0	0	0	4	0	0	1	1	1	0	0	0	0	7	
5:25 PM	0	0	0	1	0	3	2	0	0	0	0	0	0	0	0	0	6	
5:30 PM	0	0	1	0	0	3	4	0	0	0	0	0	0	1	0	0	9	
5:35 PM	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	3	
5:40 PM	0	0	0	0	0	0	6	1	0	0	0	1	0	0	0	0	8	
5:45 PM	0	0	2	0	0	1	3	0	0	0	0	1	0	0	0	0	7	
5:50 PM	0	0	2	0	0	1	3	1	0	0	0	0	0	0	0	0	7	
5:55 PM	0	1	0	0	0	0	1	0	0	0	0	2	0	0	0	0	4	
Count Total	0	6	72	7	0	36	125	8	0	9	10	28	0	9	8	9	327	
Peak Hour	0	0	23	3	0	12	39	4	0	4	3	11	0	5	5	5	114	

Location: 6 Tampico Rd & Soap Creek Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	0	0	1	0	1	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0
2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0
2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0	2:15 PM	0	0	0	0	0
2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0
2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0
2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0
2:55 PM	0	0	1	0	1	2:55 PM	0	0	0	0	0	2:55 PM	0	0	0	0	0
3:00 PM	1	0	0	0	1	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	0	0	0	1	1	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0	3:35 PM	0	0	0	0	0
3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	1	0	0	1	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	1	0	0	0	1	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	2	1	2	1	6	Count Total	0	0	0	0	0	Count Total	0	0	0	0	0
Peak Hour	1	1	0	0	2	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

Location: 3 Hwy 99 & Tampico Rd PM

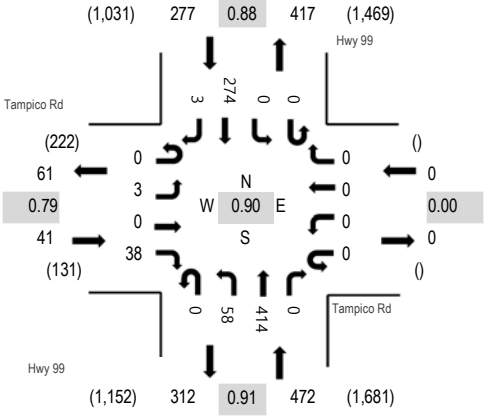
Date: Monday, January 18, 2021

Peak Hour: 03:40 PM - 04:40 PM

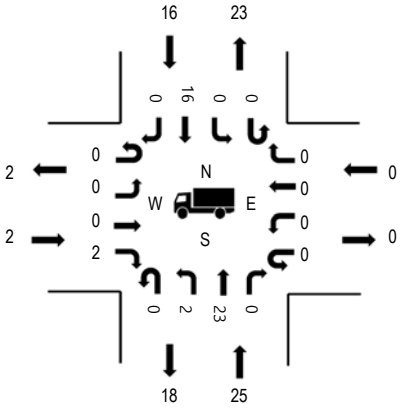
Peak 15-Minutes: 04:10 PM - 04:25 PM

Peak Hour

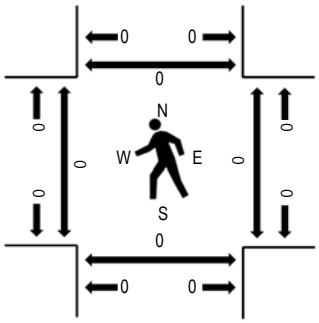
Motorized Vehicles



Heavy Vehicles



Pedestrians



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	4.9%	0.79
WB	0.0%	0.00
NB	5.3%	0.91
SB	5.8%	0.88
All	5.4%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	Tampico Rd Eastbound				Tampico Rd Westbound				Hwy 99 Northbound				Hwy 99 Southbound					Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total	
2:00 PM	0	1	0	3	0	0	0	0	0	5	26	0	0	0	21	0	56	618
2:05 PM	0	0	0	7	0	0	0	0	0	1	21	0	0	0	19	0	48	616
2:10 PM	0	0	0	1	0	0	0	0	0	9	22	0	0	0	12	0	44	633
2:15 PM	0	1	0	3	0	0	0	0	0	2	18	0	0	0	26	0	50	641
2:20 PM	0	0	0	0	0	0	0	0	0	1	13	0	0	0	22	0	36	658
2:25 PM	0	0	0	4	0	0	0	0	0	6	27	0	0	0	19	1	57	668
2:30 PM	0	0	0	2	0	0	0	0	0	3	21	0	0	0	30	0	56	690
2:35 PM	0	0	0	2	0	0	0	0	0	1	20	0	0	0	24	1	48	682
2:40 PM	0	0	0	4	0	0	0	0	0	4	26	0	0	0	18	0	52	680
2:45 PM	0	0	0	4	0	0	0	0	0	1	23	0	0	0	24	0	52	697
2:50 PM	0	0	0	4	0	0	0	0	0	3	26	0	0	0	21	0	54	717
2:55 PM	0	0	0	5	0	0	0	0	0	4	31	0	0	0	25	0	65	733
3:00 PM	0	0	0	2	0	0	0	0	0	2	28	0	0	0	22	0	54	723
3:05 PM	0	0	0	2	0	0	0	0	0	5	36	0	0	0	22	0	65	727
3:10 PM	0	0	0	0	0	0	0	0	0	3	31	0	0	0	18	0	52	717
3:15 PM	0	0	0	2	0	0	0	0	0	4	33	0	0	0	28	0	67	752
3:20 PM	0	0	0	3	0	0	0	0	0	2	25	0	0	0	16	0	46	750
3:25 PM	0	0	0	2	0	0	0	0	0	4	36	0	0	0	37	0	79	772
3:30 PM	0	0	0	2	0	0	0	0	0	4	32	0	0	0	10	0	48	759
3:35 PM	0	0	0	3	0	0	0	0	0	8	20	0	0	0	15	0	46	767
3:40 PM	0	1	0	6	0	0	0	0	0	7	31	0	0	0	24	0	69	790
3:45 PM	0	0	0	2	0	0	0	0	0	8	41	0	0	0	21	0	72	777
3:50 PM	0	0	0	0	0	0	0	0	0	5	43	0	0	0	21	1	70	765
3:55 PM	0	0	0	2	0	0	0	0	0	6	32	0	0	0	15	0	55	766
4:00 PM	0	0	0	4	0	0	0	0	0	3	27	0	0	0	24	0	58	776
4:05 PM	0	0	0	3	0	0	0	0	0	6	24	0	0	0	22	0	55	776
4:10 PM	0	1	0	5	0	0	0	0	0	6	45	0	0	0	30	0	87	781
4:15 PM	0	0	0	2	0	0	0	0	0	7	39	0	0	0	16	1	65	759

Location: 3 Hwy 99 & Tampico Rd PM

4:20 PM	0	0	0	3	0	0	0	0	0	2	36	0	0	0	27	0	68	766
4:25 PM	0	1	0	2	0	0	0	0	0	4	40	0	0	0	19	0	66	777
4:30 PM	0	0	0	4	0	0	0	0	0	4	24	0	0	0	23	1	56	756
4:35 PM	0	0	0	5	0	0	0	0	0	0	32	0	0	0	32	0	69	771
4:40 PM	0	0	0	2	0	0	0	0	0	5	28	0	0	0	21	0	56	756
4:45 PM	0	0	0	2	0	0	0	0	0	4	30	0	0	0	24	0	60	760
4:50 PM	0	0	0	3	0	0	0	0	0	3	42	0	0	0	23	0	71	766
4:55 PM	0	0	0	1	0	0	0	0	0	8	35	0	0	0	21	0	65	748
5:00 PM	0	0	0	4	0	0	0	0	0	5	29	0	0	0	20	0	58	726
5:05 PM	0	0	0	2	0	0	0	0	0	8	34	0	0	0	16	0	60	
5:10 PM	0	0	0	2	0	0	0	0	0	4	34	0	0	0	25	0	65	
5:15 PM	0	0	0	2	0	0	0	0	0	6	47	0	0	0	17	0	72	
5:20 PM	0	0	0	4	0	0	0	0	0	6	37	0	0	0	32	0	79	
5:25 PM	0	0	0	2	0	0	0	0	0	5	20	0	0	0	18	0	45	
5:30 PM	0	0	0	3	0	0	0	0	0	9	38	0	0	0	21	0	71	
5:35 PM	0	0	0	0	0	0	0	0	0	4	33	0	0	0	17	0	54	
5:40 PM	0	0	0	3	0	0	0	0	0	3	40	0	0	0	14	0	60	
5:45 PM	0	0	0	3	0	0	0	0	0	5	35	0	0	0	23	0	66	
5:50 PM	0	0	0	0	0	0	0	0	0	7	28	0	0	0	18	0	53	
5:55 PM	0	0	0	0	0	0	0	0	0	5	25	0	0	0	13	0	43	
Count Total	0	5	0	126	0	0	0	0	0	217	1,464	0	0	0	1,026	5	2,843	
Peak Hour	0	3	0	38	0	0	0	0	0	58	414	0	0	0	274	3	790	

Location: 3 Hwy 99 & Tampico Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
2:00 PM	1	3	0	2	6	2:00 PM	0	0	0	0	0	2:00 PM	0	0	0	0	0
2:05 PM	0	2	0	3	5	2:05 PM	0	0	0	0	0	2:05 PM	0	0	0	0	0
2:10 PM	0	2	0	1	3	2:10 PM	0	0	0	0	0	2:10 PM	0	0	0	0	0
2:15 PM	0	3	0	1	4	2:15 PM	0	2	0	0	2	2:15 PM	0	0	0	0	0
2:20 PM	0	1	0	3	4	2:20 PM	0	0	0	0	0	2:20 PM	0	0	0	0	0
2:25 PM	0	3	0	1	4	2:25 PM	0	0	0	0	0	2:25 PM	0	0	0	0	0
2:30 PM	0	3	0	3	6	2:30 PM	0	0	0	0	0	2:30 PM	0	0	0	0	0
2:35 PM	0	3	0	1	4	2:35 PM	0	0	0	0	0	2:35 PM	0	0	0	0	0
2:40 PM	0	3	0	1	4	2:40 PM	0	0	0	0	0	2:40 PM	0	0	0	0	0
2:45 PM	0	1	0	2	3	2:45 PM	0	0	0	0	0	2:45 PM	0	0	0	0	0
2:50 PM	0	2	0	1	3	2:50 PM	0	0	0	0	0	2:50 PM	0	0	0	0	0
2:55 PM	0	4	0	7	11	2:55 PM	0	0	0	0	0	2:55 PM	0	0	0	0	0
3:00 PM	0	2	0	2	4	3:00 PM	0	0	0	0	0	3:00 PM	0	0	0	0	0
3:05 PM	0	4	0	4	8	3:05 PM	0	0	0	0	0	3:05 PM	0	0	0	0	0
3:10 PM	0	1	0	0	1	3:10 PM	0	0	0	0	0	3:10 PM	0	0	0	0	0
3:15 PM	0	3	0	0	3	3:15 PM	0	0	0	0	0	3:15 PM	0	0	0	0	0
3:20 PM	0	2	0	1	3	3:20 PM	0	0	0	0	0	3:20 PM	0	0	0	0	0
3:25 PM	0	2	0	2	4	3:25 PM	0	0	0	0	0	3:25 PM	0	0	0	0	0
3:30 PM	0	4	0	2	6	3:30 PM	0	0	0	0	0	3:30 PM	0	0	0	0	0
3:35 PM	0	3	0	1	4	3:35 PM	1	0	0	0	1	3:35 PM	0	0	0	0	0
3:40 PM	1	1	0	2	4	3:40 PM	0	0	0	0	0	3:40 PM	0	0	0	0	0
3:45 PM	0	4	0	1	5	3:45 PM	0	0	0	0	0	3:45 PM	0	0	0	0	0
3:50 PM	0	3	0	2	5	3:50 PM	0	0	0	0	0	3:50 PM	0	0	0	0	0
3:55 PM	0	5	0	1	6	3:55 PM	0	0	0	0	0	3:55 PM	0	0	0	0	0
4:00 PM	0	2	0	1	3	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	2	0	0	2	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	2	0	0	2	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	0	0	2	2	4:15 PM	0	1	0	0	1	4:15 PM	0	0	0	0	0
4:20 PM	0	1	0	2	3	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	2	0	1	3	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	2	0	2	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	1	0	2	4	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	3	0	1	4	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	1	0	2	3	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	2	0	0	2	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	1	0	0	1	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	1	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	2	0	2	4	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	1	0	1	2	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	1	0	2	3	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	2	0	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	1	0	0	1	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	2	0	0	2	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	1	0	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	1	0	0	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	3	94	0	63	160	Count Total	1	3	0	0	4	Count Total	0	0	0	0	0
Peak Hour	2	25	0	16	43	Peak Hour	0	1	0	0	1	Peak Hour	0	0	0	0	0

Rally Traffic

N/S street:	***OR 99W***
E/W street:	***Coffin Butte Rd***
City, State	Adair Village OR
Study ID #	1020
Location	44.69957 -123.2
Start Date	Tuesday, September 19, 2023
Start Time	02:00:00 PM
Peak Hour Start	
Peak 15 Min Start	
PHF (15-Min Int)	

Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Percent Heavy Vehicles

PHV- Bicycles																	PHV - Pedestrians				
Northbound				Southbound				Eastbound				Westbound					in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**	NB	SB	EB	WB	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

All Vehicle Volumes

	Northbound				Southbound				Eastbound				Westbound					
	OR 99W				OR 99W				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	2	21	0	1	4	19	2	0	3	3	0	0	0	1	0	0		
02:05:00 PM	3	17	0	0	5	15	4	0	1	5	1	0	2	5	0	0		
02:10:00 PM	2	28	0	0	1	19	1	0	1	2	1	0	0	2	0	0	164	
02:15:00 PM	3	20	0	0	6	18	2	0	1	1	3	0	1	10	0	0	172	
02:20:00 PM	1	22	0	0	6	25	0	0	4	2	2	0	2	4	0	0	184	
02:25:00 PM	3	33	0	0	4	18	1	0	2	3	2	0	0	4	0	0	196	
02:30:00 PM	2	26	0	0	4	16	4	0	1	1	0	0	1	5	0	0	192	
02:35:00 PM	2	27	0	0	2	26	4	0	0	5	2	0	0	2	0	0	193	
02:40:00 PM	1	24	0	0	1	28	2	0	1	3	3	0	2	0	0	0	190	
02:45:00 PM	0	23	0	0	1	17	1	0	1	3	3	0	0	0	0	0	181	
02:50:00 PM	2	20	0	0	8	14	2	0	3	5	3	0	0	3	1	0	172	
02:55:00 PM	3	28	0	0	2	13	0	0	4	1	3	0	0	1	1	0	161	1805
03:00:00 PM	2	21	0	0	1	17	0	0	0	4	0	0	1	2	0	0	158	1963
03:05:00 PM	3	28	0	0	4	20	0	0	2	2	1	0	2	2	0	0	160	2123
03:10:00 PM	2	37	0	0	3	18	0	0	1	4	2	0	0	0	1	0	173	2132
03:15:00 PM	3	44	0	0	8	42	4	0	0	2	3	0	1	2	1	0	234	2194
03:20:00 PM	2	19	0	0	7	20	4	0	1	8	2	0	1	6	0	0	241	2251
03:25:00 PM	0	12	0	0	5	18	0	0	3	1	2	0	0	1	0	0	217	2272
03:30:00 PM	5	50	0	0	7	19	1	0	1	0	3	0	0	2	0	0	193	2273
03:35:00 PM	1	39	0	0	5	16	1	0	3	3	2	0	1	4	1	0	200	2280
03:40:00 PM	0	19	0	0	3	18	0	0	3	3	2	0	0	4	0	0	210	2300
03:45:00 PM	0	5	0	0	11	20	1	0	1	5	2	0	0	2	0	0	174	2293
03:50:00 PM	2	40	0	0	4	17	0	0	1	3	1	0	1	1	0	0	167	2288
03:55:00 PM	2	73	0	0	1	30	0	0	0	4	1	0	0	2	0	0	226	2353
04:00:00 PM	4	45	0	0	6	28	0	0	0	2	1	0	1	2	0	0	264	2459

Rally Traffic

04:05:00 PM	1	26	0	0	3	25	0	0	0	4	3	0	1	1	0	0	259	2558
04:10:00 PM	2	41	0	0	4	25	1	0	0	1	0	0	0	1	0	0	221	2606
04:15:00 PM	2	41	0	0	5	24	0	0	1	3	1	0	0	1	0	0	212	2584
04:20:00 PM	0	36	0	0	4	17	0	0	0	2	2	0	0	1	0	0	211	2554
04:25:00 PM	0	33	0	0	1	5	0	0	2	1	2	0	0	2	0	0	184	2521
04:30:00 PM	1	29	0	0	1	12	0	0	0	0	2	0	0	2	0	0	154	2482
04:35:00 PM	0	24	0	0	12	46	1	0	1	2	1	0	2	0	0	0	181	2463
04:40:00 PM	3	39	0	0	2	27	0	0	0	3	3	0	1	1	0	0	211	2464
04:45:00 PM	3	43	0	0	6	21	1	0	1	1	0	0	1	0	0	0	239	2529
04:50:00 PM	0	28	0	0	3	19	1	0	1	1	1	0	0	1	1	0	206	2568
04:55:00 PM	0	39	0	0	2	30	0	0	0	1	1	0	3	0	0	0	206	2548
05:00:00 PM	0	48	0	0	6	27	0	0	1	3	1	0	0	0	0	0	218	2502
05:05:00 PM	0	36	0	0	2	14	2	0	1	2	0	0	0	1	0	0	220	2463
05:10:00 PM	0	46	0	0	0	23	0	0	1	1	1	0	1	1	0	0	218	2460
05:15:00 PM	0	38	0	0	9	24	0	0	0	0	1	0	1	0	1	0	206	2454
05:20:00 PM	0	49	0	0	2	19	0	0	2	0	1	0	5	0	0	0	226	2469
05:25:00 PM	0	41	0	0	5	28	0	0	2	1	3	0	0	1	0	0	233	2518
05:30:00 PM	0	52	1	0	9	31	0	0	2	3	6	0	3	1	0	0	267	2631
05:35:00 PM	1	39	0	0	2	20	1	0	1	2	2	0	0	0	0	0	256	2706
05:40:00 PM	0	21	0	0	4	30	0	0	1	0	1	0	0	0	1	0	233	2728
05:45:00 PM	0	36	0	0	8	16	0	0	0	3	0	0	1	0	1	0	190	2679
05:50:00 PM	0	34	0	0	5	17	0	0	0	1	0	0	0	0	0	0	180	2653
05:55:00 PM	0	26	0	0	3	16	0	0	0	4	1	0	0	1	0	0	173	2620

Bicycles on Road

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	OR 99W				OR 99W				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4
03:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
03:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4

Rally Traffic

03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
03:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
03:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
04:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
04:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Passenger vehicles and light trucks

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	OR 99W				OR 99W				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	19	0	1	4	18	1	0	1	1	0	0	0	0	0	0		
02:05:00 PM	2	16	0	0	1	14	0	0	0	2	0	0	2	2	0	0		
02:10:00 PM	0	25	0	0	0	19	0	0	0	0	0	0	0	1	0	0	127	
02:15:00 PM	1	20	0	0	5	18	2	0	1	1	2	0	0	6	0	0	137	
02:20:00 PM	0	21	0	0	4	24	0	0	2	1	1	0	1	1	0	0	155	
02:25:00 PM	1	32	0	0	4	16	1	0	1	2	0	0	0	3	0	0	169	
02:30:00 PM	1	25	0	0	4	14	2	0	0	0	0	0	1	3	0	0	163	
02:35:00 PM	1	27	0	0	2	25	0	0	0	1	2	0	0	1	0	0	166	
02:40:00 PM	1	24	0	0	1	27	1	0	0	2	2	0	2	0	0	0	166	
02:45:00 PM	0	21	0	0	0	16	0	0	0	1	2	0	0	0	0	0	157	
02:50:00 PM	1	19	0	0	6	13	0	0	1	2	1	0	0	0	1	0	142	
02:55:00 PM	2	27	0	0	2	13	0	0	1	0	1	0	0	1	0	0	128	1510
03:00:00 PM	0	17	0	0	1	15	0	0	0	3	0	0	0	0	0	0	124	1634
03:05:00 PM	1	26	0	0	4	19	0	0	1	1	1	0	2	1	0	0	136	1770
03:10:00 PM	2	34	0	0	3	17	0	0	0	2	1	0	0	0	1	0	149	1792
03:15:00 PM	0	43	0	0	6	40	2	0	0	0	1	0	1	1	1	0	208	1863
03:20:00 PM	2	16	0	0	5	17	2	0	0	2	1	0	1	1	0	0	198	1906

Rally Traffic

03:25:00 PM	0	12	0	0	5	16	0	0	3	0	1	0	0	0	0	0	177	1914
03:30:00 PM	4	48	0	0	6	19	1	0	0	0	1	0	0	0	0	0	157	1908
03:35:00 PM	1	37	0	0	5	16	1	0	0	1	1	0	1	2	0	0	176	1918
03:40:00 PM	0	18	0	0	2	18	0	0	2	0	1	0	0	1	0	0	181	1933
03:45:00 PM	0	4	0	0	11	19	1	0	1	2	1	0	0	1	0	0	146	1922
03:50:00 PM	1	38	0	0	4	15	0	0	0	1	1	0	1	0	0	0	142	1922
03:55:00 PM	0	68	0	0	1	30	0	0	0	2	1	0	0	2	0	0	204	1998
04:00:00 PM	3	43	0	0	6	28	0	0	0	1	1	0	1	2	0	0	246	2120
04:05:00 PM	1	25	0	0	3	22	0	0	0	2	3	0	1	1	0	0	243	2227
04:10:00 PM	2	40	0	0	4	25	1	0	0	1	0	0	0	1	0	0	211	2289
04:15:00 PM	2	40	0	0	5	21	0	0	0	2	1	0	0	1	0	0	199	2280
04:20:00 PM	0	35	0	0	4	17	0	0	0	0	0	0	0	0	0	0	198	2280
04:25:00 PM	0	32	0	0	1	5	0	0	2	0	1	0	0	1	0	0	168	2271
04:30:00 PM	1	29	0	0	0	11	0	0	0	0	2	0	0	1	0	0	141	2255
04:35:00 PM	0	24	0	0	12	46	1	0	1	2	1	0	2	0	0	0	174	2253
04:40:00 PM	3	38	0	0	2	27	0	0	0	3	3	0	1	0	0	0	206	2278
04:45:00 PM	2	41	0	0	5	20	1	0	1	0	0	0	1	0	0	0	232	2364
04:50:00 PM	0	28	0	0	3	18	1	0	1	0	1	0	0	0	1	0	196	2418
04:55:00 PM	0	38	0	0	1	28	0	0	0	1	1	0	2	0	0	0	193	2407
05:00:00 PM	0	47	0	0	6	26	0	0	1	2	1	0	0	0	0	0	207	2368
05:05:00 PM	0	34	0	0	2	13	2	0	1	1	0	0	0	1	0	0	208	2333
05:10:00 PM	0	45	0	0	0	23	0	0	1	0	0	0	1	1	0	0	208	2330
05:15:00 PM	0	38	0	0	9	23	0	0	0	0	1	0	1	0	0	0	197	2328
05:20:00 PM	0	48	0	0	2	19	0	0	2	0	1	0	5	0	0	0	220	2350
05:25:00 PM	0	40	0	0	5	25	0	0	2	1	2	0	0	1	0	0	225	2407
05:30:00 PM	0	52	1	0	9	30	0	0	2	3	6	0	3	0	0	0	259	2525
05:35:00 PM	1	39	0	0	2	20	1	0	1	2	2	0	0	0	0	0	249	2600
05:40:00 PM	0	20	0	0	3	28	0	0	1	0	1	0	0	0	1	0	227	2621
05:45:00 PM	0	35	0	0	8	16	0	0	0	3	0	0	1	0	1	0	185	2574
05:50:00 PM	0	32	0	0	4	17	0	0	0	1	0	0	0	0	0	0	172	2550
05:55:00 PM	0	26	0	0	3	16	0	0	0	3	1	0	0	1	0	0	168	2525
	FHWA 4-13 -Truck/Multi-Unit/Heavy Trucks																	
	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	OR 99W				OR 99W				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	2	2	0	0	0	1	1	0	2	2	0	0	0	1	0	0		
02:05:00 PM	1	1	0	0	4	1	4	0	1	3	1	0	0	3	0	0		
02:10:00 PM	2	3	0	0	1	0	1	0	1	2	1	0	0	1	0	0	37	
02:15:00 PM	2	0	0	0	1	0	0	0	0	0	1	0	1	4	0	0	35	
02:20:00 PM	1	1	0	0	2	1	0	0	2	1	1	0	1	3	0	0	29	
02:25:00 PM	2	1	0	0	0	2	0	0	1	1	2	0	0	1	0	0	27	
02:30:00 PM	1	1	0	0	0	2	2	0	1	1	0	0	0	2	0	0	29	
02:35:00 PM	1	0	0	0	0	1	4	0	0	4	0	0	0	1	0	0	27	
02:40:00 PM	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	24	
02:45:00 PM	0	2	0	0	1	1	1	0	1	2	1	0	0	0	0	0	24	
02:50:00 PM	1	1	0	0	2	1	2	0	2	3	2	0	0	3	0	0	30	
02:55:00 PM	1	1	0	0	0	0	0	0	3	1	2	0	0	0	1	0	33	295
03:00:00 PM	2	4	0	0	0	2	0	0	0	1	0	0	1	2	0	0	34	329

Rally Traffic

03:05:00 PM	2	2	0	0	0	1	0	0	1	1	0	0	0	1	0	0	24	353
03:10:00 PM	0	3	0	0	0	1	0	0	1	2	1	0	0	0	0	0	24	340
03:15:00 PM	3	1	0	0	2	2	2	0	0	2	2	0	0	1	0	0	26	331
03:20:00 PM	0	3	0	0	2	3	2	0	1	6	1	0	0	5	0	0	43	345
03:25:00 PM	0	0	0	0	0	2	0	0	0	1	1	0	0	1	0	0	40	358
03:30:00 PM	1	2	0	0	1	0	0	0	1	0	2	0	0	2	0	0	36	365
03:35:00 PM	0	2	0	0	0	0	0	0	3	2	1	0	0	2	1	0	24	362
03:40:00 PM	0	1	0	0	1	0	0	0	1	3	1	0	0	3	0	0	29	367
03:45:00 PM	0	1	0	0	0	1	0	0	0	3	1	0	0	1	0	0	28	371
03:50:00 PM	1	2	0	0	0	2	0	0	1	2	0	0	0	1	0	0	25	366
03:55:00 PM	2	5	0	0	0	0	0	0	0	2	0	0	0	0	0	0	22	355
04:00:00 PM	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	18	339
04:05:00 PM	0	1	0	0	0	3	0	0	0	2	0	0	0	0	0	0	16	331
04:10:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	317
04:15:00 PM	0	1	0	0	0	3	0	0	1	1	0	0	0	0	0	0	13	304
04:20:00 PM	0	1	0	0	0	0	0	0	0	2	2	0	0	1	0	0	13	274
04:25:00 PM	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	16	250
04:30:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	13	227
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	210
04:40:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	186
04:45:00 PM	1	2	0	0	1	1	0	0	0	1	0	0	0	0	0	0	7	165
04:50:00 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	10	150
04:55:00 PM	0	1	0	0	1	2	0	0	0	0	0	0	1	0	0	0	13	141
05:00:00 PM	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	11	134
05:05:00 PM	0	2	0	0	0	1	0	0	0	1	0	0	0	0	0	0	12	130
05:10:00 PM	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	10	130
05:15:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	9	126
05:20:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	119
05:25:00 PM	0	1	0	0	0	3	0	0	0	0	1	0	0	0	0	0	8	111
05:30:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	8	106
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	106
05:40:00 PM	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	6	107
05:45:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	105
05:50:00 PM	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	8	103
05:55:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	95

Pedestrians Crossing					15 Min	1 HR
Time	NB	SB	EB	WB	Sum	Sum
02:00:00 PM	0	0	0	0		
02:05:00 PM	0	0	0	0		
02:10:00 PM	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	
02:20:00 PM	0	0	0	0	0	
02:25:00 PM	0	0	0	0	0	
02:30:00 PM	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	

Rally Traffic

02:55:00 PM	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0
03:45:00 PM	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0
04:00:00 PM	0	0	0	0		
04:05:00 PM	0	0	0	0		
04:10:00 PM	0	0	0	0	1	
04:15:00 PM	0	0	0	0	1	
04:20:00 PM	0	0	0	0	1	
04:25:00 PM	0	0	0	0	2	
04:30:00 PM	0	0	0	0	2	
04:35:00 PM	0	0	0	0	1	
04:40:00 PM	0	0	0	0	0	
04:45:00 PM	0	0	0	0	1	
04:50:00 PM	0	0	0	0	1	
04:55:00 PM	0	0	0	0	2	5
05:00:00 PM	0	0	0	0	1	5
05:05:00 PM	0	0	0	0	1	4
05:10:00 PM	0	0	0	0	0	4
05:15:00 PM	0	0	0	0	2	6
05:20:00 PM	0	0	0	0	2	5
05:25:00 PM	0	0	0	0	2	4
05:30:00 PM	0	0	0	0	0	4
05:35:00 PM	0	0	0	0	0	4
05:40:00 PM	0	0	0	0	0	4
05:45:00 PM	0	0	0	0	0	3
05:50:00 PM	0	0	0	0	0	3
05:55:00 PM	0	0	0	0	0	2

Rally Traffic

N/S street:	***Landfill Entrance***
E/W street:	***Coffin Butte Rd***
City, State	Adair Village OR
Study ID #	1020
Location	44.69942 -123.2
Start Date	Tuesday, September 19, 2023
Start Time	04:00:00 PM
Peak Hour Start	
Peak 15 Min Start	
PHF (15-Min Int)	

Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Percent Heavy Vehicles

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHV - Pedestrians

in Crosswalk				
NB	SB	EB	WB	**Sum**
0	0	0	0	0

All Vehicle Volumes

	Northbound				Southbound				Eastbound				Westbound					
	Landfill Entrance				Landfill Entrance				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	2	0	1	0	2	4	0	0	0	2	4	0		
02:05:00 PM	0	0	0	0	3	0	0	0	0	4	0	0	0	7	4	0		
02:10:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	1	6	0	43	
02:15:00 PM	0	0	0	0	4	0	0	0	1	1	0	0	0	5	9	0	48	
02:20:00 PM	0	0	0	0	5	0	0	0	2	4	0	0	0	1	4	0	46	
02:25:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	4	6	0	51	
02:30:00 PM	0	0	0	0	1	0	0	0	0	3	0	0	0	3	7	0	45	
02:35:00 PM	0	0	0	0	5	0	0	0	0	3	0	0	0	0	7	0	44	
02:40:00 PM	0	0	0	0	7	0	1	0	1	3	0	0	0	1	2	0	44	
02:45:00 PM	0	0	0	0	3	0	1	0	0	2	0	0	0	0	1	0	37	
02:50:00 PM	0	0	0	0	6	0	0	0	0	1	0	0	0	3	4	0	36	
02:55:00 PM	0	0	0	0	8	0	0	0	0	1	0	0	0	1	3	0	34	428
03:00:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	2	2	0	36	464
03:05:00 PM	0	0	0	0	4	0	0	0	0	2	0	0	0	2	3	0	33	497
03:10:00 PM	0	0	0	0	4	0	0	0	1	0	0	0	0	1	3	0	29	483
03:15:00 PM	0	0	0	0	4	0	0	0	0	3	0	0	0	5	5	0	37	472
03:20:00 PM	0	0	0	0	7	0	0	0	0	4	0	0	0	4	5	0	46	472
03:25:00 PM	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	43	464
03:30:00 PM	0	0	0	0	3	0	1	0	0	2	0	0	0	4	4	0	40	459
03:35:00 PM	0	0	0	0	6	0	1	0	0	2	0	0	0	4	2	0	35	450
03:40:00 PM	0	0	0	0	6	0	0	0	0	3	0	0	0	1	3	0	42	448
03:45:00 PM	0	0	0	0	5	0	1	0	0	1	0	0	0	3	0	0	38	449
03:50:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	3	1	0	32	445
03:55:00 PM	0	0	0	0	2	0	0	0	1	3	0	0	0	2	2	0	29	440
04:00:00 PM	0	0	0	0	0	0	1	0	0	4	0	0	0	4	1	0	29	433

Rally Traffic

04:05:00 PM	0	0	0	0	1	0	0	0	0	4	0	0	0	1	2	0	28	428
04:10:00 PM	0	0	0	0	2	0	1	0	0	2	0	0	0	1	3	0	27	426
04:15:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	21	410
04:20:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	1	0	0	19	383
04:25:00 PM	0	0	0	0	2	0	1	0	0	2	0	0	0	2	0	0	17	357
04:30:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	1	2	0	19	336
04:35:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	0	1	0	19	320
04:40:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	4	0	0	19	297
04:45:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	1	3	0	21	280
04:50:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	18	266
04:55:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	13	250
05:00:00 PM	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	0	10	231
05:05:00 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	2	1	0	14	217
05:10:00 PM	0	0	0	0	0	0	3	0	0	2	0	0	0	1	0	0	18	208
05:15:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	14	201
05:20:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0	13	195
05:25:00 PM	0	0	0	0	3	0	0	0	0	5	0	0	0	0	0	0	15	193
05:30:00 PM	0	0	0	0	2	0	1	0	0	8	0	0	0	1	0	0	26	200
05:35:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	24	205
05:40:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	21	207
05:45:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10	196
05:50:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	7	185
05:55:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	7	179

Bicycles on Road

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	Landfill Entrance				Landfill Entrance				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Rally Traffic

03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Passenger vehicles and light trucks

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	Landfill Entrance				Landfill Entrance				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	1	0	1	0	2	2	0	0	0	2	0	0		
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	11	
02:15:00 PM	0	0	0	0	2	0	0	0	0	1	0	0	0	3	6	0	15	
02:20:00 PM	0	0	0	0	3	0	0	0	2	2	0	0	0	0	1	0	22	
02:25:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	2	4	0	28	
02:30:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4	0	22	
02:35:00 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	0	2	0	20	
02:40:00 PM	0	0	0	0	4	0	1	0	1	1	0	0	0	1	1	0	21	
02:45:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	16	
02:50:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	14	
02:55:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	1	2	0	11	180
03:00:00 PM	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	14	194
03:05:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	1	1	0	14	208
03:10:00 PM	0	0	0	0	2	0	0	0	1	0	0	0	0	1	2	0	14	211
03:15:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1	0	14	210
03:20:00 PM	0	0	0	0	1	0	0	0	0	3	0	0	0	0	3	0	17	205

Rally Traffic

03:25:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	13	190
03:30:00 PM	0	0	0	0	1	0	1	0	0	0	0	0	0	3	2	0	16	184
03:35:00 PM	0	0	0	0	1	0	1	0	0	1	0	0	0	2	2	0	16	180
03:40:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	18	177
03:45:00 PM	0	0	0	0	4	0	0	0	0	0	0	0	0	2	0	0	17	178
03:50:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	13	177
03:55:00 PM	0	0	0	0	2	0	0	0	1	2	0	0	0	2	0	0	16	182
04:00:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	13	181
04:05:00 PM	0	0	0	0	1	0	0	0	0	3	0	0	0	1	1	0	16	183
04:10:00 PM	0	0	0	0	1	0	1	0	0	1	0	0	0	1	3	0	16	185
04:15:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	16	187
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	180
04:25:00 PM	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	7	174
04:30:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	9	167
04:35:00 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	0	1	0	14	165
04:40:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	3	0	0	16	163
04:45:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	2	0	16	162
04:50:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	13	162
04:55:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	9	155
05:00:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	7	149
05:05:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	2	1	0	10	143
05:10:00 PM	0	0	0	0	0	0	3	0	0	1	0	0	0	1	0	0	13	140
05:15:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	11	135
05:20:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0	12	137
05:25:00 PM	0	0	0	0	2	0	0	0	0	5	0	0	0	0	0	0	14	144
05:30:00 PM	0	0	0	0	2	0	1	0	0	8	0	0	0	0	0	0	24	159
05:35:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	22	167
05:40:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	20	171
05:45:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10	165
05:50:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	7	159
05:55:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	6	156
	FHWA 4-13 -Truck/Multi-Unit/Heavy Trucks																	
	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	Landfill Entrance				Landfill Entrance				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	0	4	0		
02:05:00 PM	0	0	0	0	3	0	0	0	0	4	0	0	0	6	4	0		
02:10:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	1	4	0	32	
02:15:00 PM	0	0	0	0	2	0	0	0	1	0	0	0	0	2	3	0	33	
02:20:00 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	1	3	0	24	
02:25:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	2	2	0	23	
02:30:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	2	3	0	23	
02:35:00 PM	0	0	0	0	3	0	0	0	0	1	0	0	0	0	5	0	24	
02:40:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	0	1	0	23	
02:45:00 PM	0	0	0	0	2	0	1	0	0	2	0	0	0	0	1	0	21	
02:50:00 PM	0	0	0	0	3	0	0	0	0	1	0	0	0	3	3	0	22	
02:55:00 PM	0	0	0	0	5	0	0	0	0	1	0	0	0	0	1	0	23	248
03:00:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	0	22	270

Rally Traffic

03:05:00 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	1	2	0	19	289
03:10:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	15	272
03:15:00 PM	0	0	0	0	3	0	0	0	0	3	0	0	0	3	4	0	23	262
03:20:00 PM	0	0	0	0	6	0	0	0	0	1	0	0	0	4	2	0	29	267
03:25:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	30	274
03:30:00 PM	0	0	0	0	2	0	0	0	0	2	0	0	0	1	2	0	24	275
03:35:00 PM	0	0	0	0	5	0	0	0	0	1	0	0	0	2	0	0	19	270
03:40:00 PM	0	0	0	0	3	0	0	0	0	3	0	0	0	1	2	0	24	271
03:45:00 PM	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	21	271
03:50:00 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	3	0	0	19	268
03:55:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	13	258
04:00:00 PM	0	0	0	0	0	0	1	0	0	3	0	0	0	3	0	0	16	252
04:05:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	12	245
04:10:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	11	241
04:15:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	223
04:20:00 PM	0	0	0	0	3	0	0	0	0	2	0	0	0	1	0	0	9	203
04:25:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	10	183
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	10	169
04:35:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	155
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	134
04:45:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	5	118
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	104
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	95
05:00:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	3	82
05:05:00 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	4	74
05:10:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	68
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	66
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	58
05:25:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	49
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	41
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	38
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	36
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
05:55:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	23

Pedestrians					15 Min	1 HR
Time	NB	SB	EB	WB	Sum	Sum
02:00:00 PM	0	0	0	0		
02:05:00 PM	0	0	0	0		
02:10:00 PM	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	
02:20:00 PM	0	0	3	0	3	
02:25:00 PM	0	0	3	0	6	
02:30:00 PM	0	0	0	0	6	
02:35:00 PM	0	0	0	0	3	
02:40:00 PM	0	2	0	0	2	
02:45:00 PM	0	0	2	0	4	
02:50:00 PM	0	0	0	0	4	

Rally Traffic

02:55:00 PM	0	0	1	0	3	31
03:00:00 PM	0	0	2	0	3	34
03:05:00 PM	0	0	0	0	3	37
03:10:00 PM	0	0	0	0	2	39
03:15:00 PM	0	0	2	0	2	41
03:20:00 PM	0	0	0	0	2	40
03:25:00 PM	0	0	0	0	2	36
03:30:00 PM	0	0	2	0	2	32
03:35:00 PM	0	0	0	0	2	31
03:40:00 PM	0	0	0	0	2	31
03:45:00 PM	0	0	1	0	1	28
03:50:00 PM	0	0	1	0	2	26
03:55:00 PM	0	0	0	0	2	25
04:00:00 PM	0	0	0	0		
04:05:00 PM	0	0	0	0		
04:10:00 PM	0	0	0	0	1	
04:15:00 PM	0	0	0	0	1	
04:20:00 PM	0	0	0	0	1	
04:25:00 PM	0	0	0	0	2	
04:30:00 PM	0	0	0	0	2	
04:35:00 PM	0	0	0	0	1	
04:40:00 PM	0	0	0	0	0	
04:45:00 PM	0	0	0	0	1	
04:50:00 PM	0	0	0	0	1	
04:55:00 PM	0	0	0	0	2	5
05:00:00 PM	0	0	0	0	1	5
05:05:00 PM	0	0	0	0	1	4
05:10:00 PM	0	0	0	0	0	4
05:15:00 PM	0	0	2	0	2	6
05:20:00 PM	0	0	0	0	2	5
05:25:00 PM	0	0	11	0	2	4
05:30:00 PM	0	0	0	0	0	4
05:35:00 PM	0	0	0	0	0	4
05:40:00 PM	0	0	0	0	0	4
05:45:00 PM	0	0	0	0	0	3
05:50:00 PM	0	0	0	0	0	3
05:55:00 PM	0	0	0	0	0	2

Rally Traffic

N/S street:	***NW Soap Creek Rd***
E/W street:	***Coffin Butte Rd***
City, State	Adair Village OR
Study ID #	1020
Location	44.69598 -123.2
Start Date	Tuesday, September 19, 2023
Start Time	02:00:00 PM
Peak Hour Start	
Peak 15 Min Start	
PHF (15-Min Int)	

Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Percent Heavy Vehicles

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PHV - Pedestrians

in Crosswalk				
NB	SB	EB	WB	**Sum**
0	0	0	0	0

All Vehicle Volumes

	Northbound				Southbound				Eastbound				Westbound					
	NW Soap Creek Rd				NW Soap Creek Rd				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	0	0	0	0	3	0	1	0	0	0	4	0		
02:05:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0		
02:10:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	1	3	0	17	
02:15:00 PM	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	14	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	16	
02:25:00 PM	0	1	0	0	0	0	0	0	3	0	0	0	0	1	1	0	16	
02:30:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	14	
02:35:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	13	
02:40:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	10	
02:45:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	11	
02:50:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	9	
02:55:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	9	129
03:00:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	8	137
03:05:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	9	146
03:10:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	1	2	0	11	140
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	11	137
03:20:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	10	131
03:25:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	1	3	0	11	126
03:30:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	2	3	0	15	127
03:35:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	0	17	131
03:40:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	1	1	0	16	137
03:45:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	14	140
03:50:00 PM	0	2	0	0	0	0	0	0	1	0	1	0	0	2	2	0	18	149
03:55:00 PM	0	1	0	0	0	0	0	0	3	0	0	0	0	1	1	0	19	159
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	17	168

Rally Traffic

04:05:00 PM	0	1	0	0	0	0	0	0	2	0	0	0	0	2	0	0	14	173
04:10:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	171
04:15:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	8	168
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	162
04:25:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	156
04:30:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	145
04:35:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	3	2	0	9	137
04:40:00 PM	0	2	0	0	0	0	0	0	1	0	0	0	0	1	1	0	12	133
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12	131
04:50:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	7	120
04:55:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	104
05:00:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	6	93
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6	85
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	81
05:15:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	77
05:20:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	77
05:25:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	78
05:30:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	7	81
05:35:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	79
05:40:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	73
05:45:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	64
05:50:00 PM	0	1	0	0	0	0	0	0	2	0	0	0	0	1	0	0	6	63
05:55:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	66

Bicycles on Road

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	NW Soap Creek Rd				NW Soap Creek Rd				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Rally Traffic

03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Passenger vehicles and light trucks

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	NW Soap Creek Rd				NW Soap Creek Rd				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		
02:05:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:10:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	5	
02:15:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	6	
02:25:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	6	
02:30:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	7	
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	
02:55:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	45
03:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	47
03:05:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	49
03:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	46
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	43
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	38

Rally Traffic

03:25:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	3	35
03:30:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	2	1	0	8	36
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	10	39
03:40:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	9	44
03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	46
03:50:00 PM	0	2	0	0	0	0	0	0	0	0	1	0	0	2	1	0	8	53
03:55:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	58
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	10	66
04:05:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	7	71
04:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	75
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	77
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	77
04:25:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	76
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	69
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	4	63
04:40:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6	60
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	7	63
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	59
04:55:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	54
05:00:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	4	48
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	46
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	44
05:15:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	44
05:20:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	47
05:25:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	51
05:30:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	7	57
05:35:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	60
05:40:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	60
05:45:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	56
05:50:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	5	57
05:55:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	60
	FHWA 4-13 -Truck/Multi-Unit/Heavy Trucks																	
	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	NW Soap Creek Rd				NW Soap Creek Rd				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
02:00:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	4	0		
02:05:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0		
02:10:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	12	
02:15:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	9	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	10	
02:25:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	10	
02:30:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	7	
02:35:00 PM	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	6	
02:40:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	6	
02:45:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	9	
02:50:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	8	
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	84
03:00:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	6	90

Rally Traffic

03:05:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	7	97
03:10:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	9	94
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	9	94
03:20:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	9	93
03:25:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	8	91
03:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	91
03:35:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	7	92
03:40:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	7	93
03:45:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	0	10	94
03:50:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	10	96
03:55:00 PM	0	0	0	0	0	0	0	0	3	0	0	0	0	1	1	0	12	101
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	102
04:05:00 PM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	7	102
04:10:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	96
04:15:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	91
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	85
04:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	80
04:30:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	76
04:35:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	5	74
04:40:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	6	73
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	68
04:50:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	61
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	50
05:00:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	45
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	39
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	37
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
05:50:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	6
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6

Pedestrians					15 Min	1 HR
Time	NB	SB	EB	WB	Sum	Sum
02:00:00 PM	0	0	0	0		
02:05:00 PM	0	0	0	0		
02:10:00 PM	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	
02:20:00 PM	0	0	0	0	0	
02:25:00 PM	0	0	0	0	0	
02:30:00 PM	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	

Rally Traffic

02:55:00 PM	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0
03:45:00 PM	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0
05:40:00 PM	0	0	0	0	0	0
05:45:00 PM	0	0	0	0	0	0
05:50:00 PM	0	0	0	0	0	0
05:55:00 PM	0	0	0	0	0	0

Rally Traffic

N/S street:	***Knife River Quarry***
E/W street:	***Coffin Butte Rd***
City, State	Adair Village OR
Study ID #	1020
Location	44.69638 -123.2
Start Date	Tuesday, September 19, 2023
Start Time	02:00:00 PM
Peak Hour Start	
Peak 15 Min Start	
PHF (15-Min Int)	

Peak-Hour Volumes (PHV)

Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Percent Heavy Vehicles

PHV- Bicycles

Northbound				Southbound				Eastbound				Westbound					PHV - Pedestrians in Crosswalk				
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	**Sum**	NB	SB	EB	WB	**Sum**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

All Vehicle Volumes

	Northbound				Southbound				Eastbound				Westbound					
	Knife River Quarry				Knife River Quarry				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0		
##	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0		
##	0	0	0	0	6	0	0	0	0	0	0	0	0	0	3	0	16	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	16	
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	15	
##	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	11	
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	14	
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	13	
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	10	
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	6	
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	6	113
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	8	121
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	9	130
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	8	122
##	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	8	114
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	7	106
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	10	105
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	10	101
##	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	10	98
##	0	0	0	0	4	0	0	0	0	0	0	0	0	0	3	0	13	101
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	12	107
##	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	14	115
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	10	119

##	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	1	13	124
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	10	125
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	9	126
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	122
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	118
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3	111
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	104
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	97
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	87
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	6	81
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	73
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	67
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	56
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	49
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	44
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	43
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	41
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	39
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	38
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	37
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
##	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	24
##	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	23

Bicycles on Road

	Northbound				**Southbound**				**Eastbound**				**Westbound**					
	Knife River Quarry				Knife River Quarry				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Passenger vehicles and light trucks

		Northbound				**Southbound**				**Eastbound**				**Westbound**					
		Knife River Quarry				Knife River Quarry				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time		Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	19

##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	15
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	4	13
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	16
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	21
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	23
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	24
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	24
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	24
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	2
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	3
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	7
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	9
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	13
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	16
		FHWA 4-13 -Truck/Multi-Unit/Heavy Trucks																	
		Northbound				**Southbound**				**Eastbound**				**Westbound**					
		Knife River Quarry				Knife River Quarry				Coffin Butte Rd				Coffin Butte Rd				15 Min	1 HR
Time		Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0		
##		0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0		
##		0	0	0	0	5	0	0	0	0	0	0	0	0	0	3	0	15	
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	14	
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	13	
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	9	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	11	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	9	
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	7	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	6	
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	6	95

##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	7	102
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	8	110
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7	102
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	7	95
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	6	88
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	9	88
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	9	86
##		0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	9	86
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	9	88
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	8	91
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	9	94
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	8	96
##		0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	11	100
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	9	101
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	8	102
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	99
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	96
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3	90
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	84
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	78
##		0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	72
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	6	70
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	67
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	63
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	54
##		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	47
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	41
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	38
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
##		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

Pe de					15 Min	1 HR
Time	NB	SB	EB	WB	Sum	Sum
##	0	0	0	0		
##	0	0	0	0		
##	0	0	0	0	0	
##	0	0	0	0	0	
##	0	0	0	0	0	
##	0	0	0	0	0	
##	0	0	0	0	0	
##	0	0	0	0	0	
##	0	0	0	0	0	
##	0	0	0	0	0	

Rally Traffic

##	0	0	0	0	0	
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0	0	0
##	0	0	0	0		
##	0	0	0	0		
##	0	0	0	0	1	
##	0	0	0	0	1	
##	0	0	0	0	1	
##	0	0	0	0	2	
##	0	0	0	0	2	
##	0	0	0	0	1	
##	0	0	0	0	0	
##	0	0	0	0	1	
##	0	0	0	0	1	
##	0	0	0	0	2	5
##	0	0	0	0	1	5
##	0	0	0	0	1	4
##	0	0	0	0	0	4
##	0	0	0	0	2	6
##	0	0	0	0	2	5
##	0	0	0	0	2	4
##	0	0	0	0	0	4
##	0	0	0	0	0	4
##	0	0	0	0	0	4
##	0	0	0	0	0	3
##	0	0	0	0	0	3
##	0	0	0	0	0	2

Intersection	
Int Delay, s/veh	4.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	36	0	28	30	1	27
Future Vol, veh/h	36	0	28	30	1	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	61	0	100	57	100	100
Mvmt Flow	44	0	34	37	1	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	44	0	149	44
Stage 1	-	-	-	-	44	-
Stage 2	-	-	-	-	105	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1112	-	659	805
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	723	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1112	-	639	805
Mov Cap-2 Maneuver	-	-	-	-	639	-
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	701	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	798	-	-	1112	-
HCM Lane V/C Ratio	0.043	-	-	0.031	-
HCM Control Delay (s)	9.7	-	-	8.3	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	57	28	57	21	30
Future Vol, veh/h	6	57	28	57	21	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	17	84	61	60	0	93
Mvmt Flow	7	68	33	68	25	36

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	101	0	-	0	149	67
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	82	-
Critical Hdwy	4.27	-	-	-	6.4	7.13
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.353	-	-	-	3.5	4.137
Pot Cap-1 Maneuver	1403	-	-	-	848	792
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	946	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1403	-	-	-	844	792
Mov Cap-2 Maneuver	-	-	-	-	844	-
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	946	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1403	-	-	-	813
HCM Lane V/C Ratio	0.005	-	-	-	0.075
HCM Control Delay (s)	7.6	-	-	-	9.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	36	0	28	30	1	27
Future Vol, veh/h	36	0	28	30	1	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	250	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	61	0	100	57	100	100
Mvmt Flow	66	0	51	55	2	49

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	66	0	223	66
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	157	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1088	-	591	780
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	680	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1088	-	563	780
Mov Cap-2 Maneuver	-	-	-	-	563	-
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	769	-	-	1088	-
HCM Lane V/C Ratio	0.067	-	-	0.047	-
HCM Control Delay (s)	10	-	-	8.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	57	28	57	21	30
Future Vol, veh/h	6	57	28	57	21	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	17	84	61	60	0	93
Mvmt Flow	11	102	50	102	38	54

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	152	0	-	0	225	101
Stage 1	-	-	-	-	101	-
Stage 2	-	-	-	-	124	-
Critical Hdwy	4.27	-	-	-	6.4	7.13
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.353	-	-	-	3.5	4.137
Pot Cap-1 Maneuver	1342	-	-	-	768	755
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	907	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1342	-	-	-	762	755
Mov Cap-2 Maneuver	-	-	-	-	762	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	907	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1342	-	-	-	758
HCM Lane V/C Ratio	0.008	-	-	-	0.12
HCM Control Delay (s)	7.7	-	-	-	10.4
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

TRANSIGHT CONSULTING, LLC
Transportation Engineering and Planning Services

Date:	April 28, 2025
To:	Benton County Engineering and Planning
From:	Joe Bessman, PE
Project Reference No.:	1539
Project Name:	Coffin Butte Landfill Expansion Staff Review Responses

The purpose of this memorandum is to provide a response to comments received on the proposed Coffin Butte landfill Expansion. The traffic study was finalized in February 2024 and formally submitted to Benton County as part of the overall land use application in October 2024. Comments were received from Benton County on April 9, 2025. This memorandum provides a summary of the comments received, followed by our responses.

Comment 1: There are no peak hour traffic counts included for the weekday a.m. peak hour or Saturday conditions.

Response: The analysis presented within the TIA follows the same scoping guidance from the prior application and targets traffic conditions during the critical weekday evening peak hour, which is the same analysis period assessed within the Benton County Transportation System Plan. This is also the same time period ODOT applies to develop its design hour volumes, though as noted within the County's adopted Transportation System Plan, the County's mobility standards apply "during the highest one-hour period on an average weekday (typically, but not always the evening peak period between 4:00 p.m. and 6:00 p.m. during the spring or fall)."

To respond to this comment and the specific verbiage within the County's adopted TSP, new weekday traffic counts were collected at the landfill entrance on Thursday, April 10, 2025 between 7:00 a.m. and 9:00 p.m. The trip generation profile of the Thursday count on Camp Adair Road is provided in Figure 1, which shows the peak hour of the landfill occurring in the late morning hours and tapering off during the evening commute period.

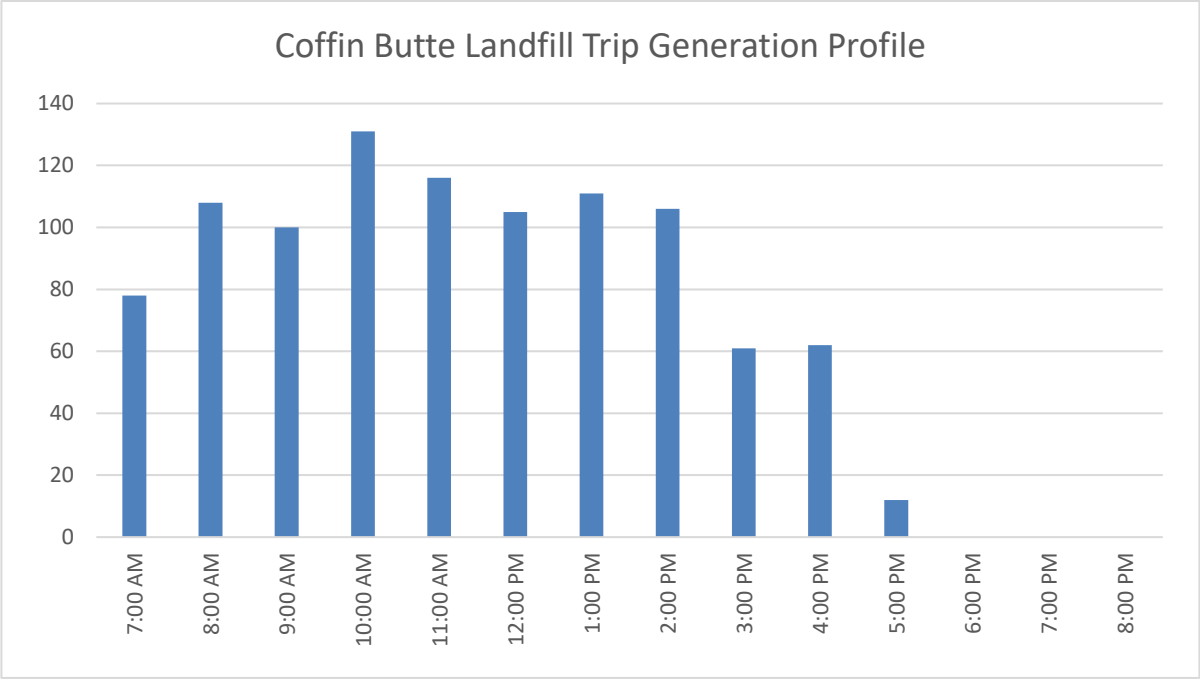


Figure 1. Camp Adair Road/Coffin Butte Entrance Traffic Volume Profile. *Count date: April 10, 2025.*

The hour with the highest total entering volume occurred between 10:25 a.m. and 11:25 a.m. and is therefore the study time period for this off-highway analysis as it is the "highest one-hour period on an average weekday." Traffic volumes during this late-morning period included 173 total vehicles entering, exiting, or passing by the landfill entrance, equivalent to about three vehicles per minute. This time period from the 2025 traffic counts is one vehicle higher than the September 2023 traffic counts that showed 172 total vehicles between 2:00 and 3:00 p.m. A comparison of the traffic volumes at the landfill entrance are illustrated in Figure 2.

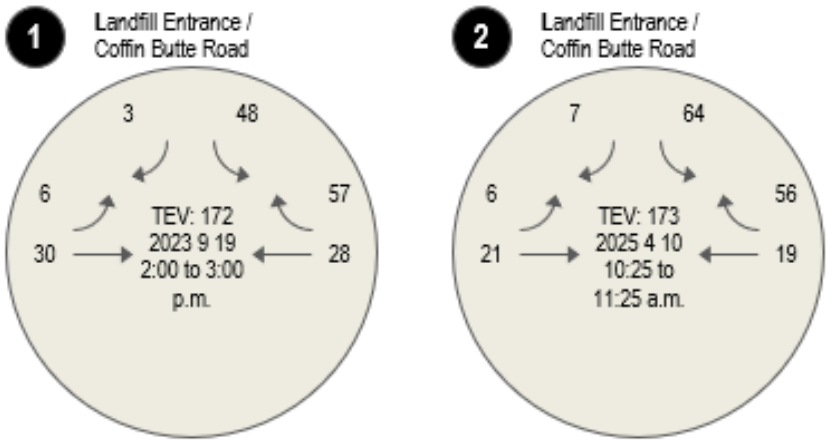


Figure 2. Traffic Count Comparison. *TEV: Total Entering Vehicles*

The traffic operations presented within the TIA were revisited using the 10:25 to 11:25 a.m. traffic counts. Using the same modeling as the prior analysis with the updated traffic count, this revised analysis continues to show Level of Service "B" with very low delays and queuing during the peak fifteen minutes of the weekday peak hour under current traffic conditions, with 10.3 seconds of delay for the critical stop-sign controlled exit from the landfill.

The proposed modifications to the site will require that outbound commercial trucks exit the existing scales and turn right onto Coffin Butte Road, then turn left into the expansion landfill site on the south side of Coffin Butte Road. Taking a very conservative approach and assuming that every recorded truck within the traffic counts is a "commercial vehicle", this would then modify the traffic volumes at the existing landfill entrance and at the new expansion site to the values shown in Figure 3, routing up to 52 trucks per hour to the expansion site (or just less than one truck per minute during the peak hour). Assuming six percent area growth to adjust to the build-out year, the operational analysis still shows LOS "B" or LOS "A" conditions at the existing landfill access and the proposed expansion entrance.

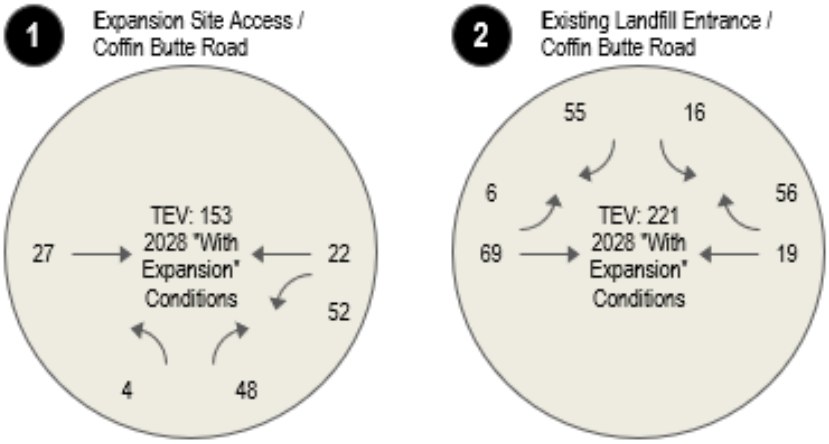


Figure 3. Adjusted "With Expansion" Traffic Volumes, Year 2028 Weekday 10:25 a.m. Analysis
TEV: Total Entering Vehicles

Even with the conservative analysis assumptions this analysis of "weekday peak hour conditions" does not change the prior analysis findings or recommendations, which remain at Level of Service "B" or better.

Staff also inquired about a Saturday analysis. A Saturday analysis was not conducted as the County's Transportation System Plan (and ODOT methodology) specifically reference weekday conditions within their respective plans and the ODOT Analysis Procedures Manual. To address this concern, a Saturday traffic count was collected on April 12, 2025 at the landfill entrance between noon and 3:00 p.m. The peak observed hour occurred between 1:00 p.m. and 2:00 p.m., and during this time period the landfill experienced 2/3 the volume of traffic as the weekday 10:25 a.m. analysis. Accordingly, it was found to not be the critical analysis period, and a Saturday analysis would not comply with the County's "weekday" analysis requirement.

Comment 2: Traffic Counts Contained within the TIA are over One-Year Old.

Response: Traffic counts have been obtained at the Coffin Butte landfill multiple times over the past five years, as summarized within the traffic study. This includes the following count dates:

- January 20, 2021 traffic counts collected by Benton County (72-hour tube counts)
- March 2021 traffic counts collected by Key Data Network (Turning Movement Counts)
- January 2022 traffic counts again collected by Key Data Network (Turning Movement Counts)
- September 19, 2023 traffic counts collected by Rally Traffic (Turning Movement Counts)
- New Thursday, April 10, 2025 and Saturday, April 12, 2025 traffic counts (Turning Movement Counts)

While the traffic report was finalized in February 2024, the report was formally submitted to Benton County as part of the overall land use application in July 2024, with the September 19, 2023 traffic counts then still within one year of the submittal.

As noted in the report, all sets of data collected in this area showed stable traffic patterns outside of the highway system, with very low total roadway volumes (fewer than one vehicle per minute) and limited fluctuation, with the elevated September 2023 counts showing higher activity at the adjacent Knife River Quarry (there were 44 peak hour trips during the counts that entered or exited the quarry site). For comparison, Table 1 summarizes the total entering trips captured during the peak hour within the various traffic counts (all of which are included and summarized in the submitted report).

Table 1. Summary of Historical Traffic Counts, Total Entering Vehicles

Location	March 2021 Weekday Traffic Counts	January 2022 Weekday Traffic Counts	September 2023 Weekday Traffic Counts	April 2025 Weekday Traffic Counts
Highway 99W/ Coffin Butte Rd	836 Vehicles *(Peak PM Commute Hour)*	820 Vehicles *(Peak PM Commute Hour)*	894 Vehicles *(Peak PM Commute Hour)*	805 Vehicles *(Peak PM Commute Hour)*
Coffin Butte/ Soap Creek Rd	15 Vehicles *(Peak PM Commute Hour)*	36 Vehicles *(Afternoon Peak Hour)*	56 Vehicles *(Afternoon Peak Hour)*	No Data
Coffin Butte Road/ Landfill Entrance	No Data	No Data	172 Total Vehicles 114 Landfill Trips (63 in, 51 out) *(Afternoon Peak Hour)*	173 Total Vehicles 133 Landfill Trips (62 in, 71 out) *(10:25 to 11:25 a.m.)*

The traffic study showed that all of the off-highway intersections operate with very low delays at Level of Service "A". The only change that has occurred within this area is the completion of the adjacent Knife River quarry operations; the new April 2025 traffic counts show 53 bi-directional peak hour trips (10:25 to 11:25 a.m.) headed west of the Coffin Butte Landfill Entrance, or less than one vehicle per minute, and about half of these trips were some classification of truck. There were no observed cyclists on Coffin Butte Road within the new 7:00 a.m. to 9:00 p.m. traffic counts.

To ensure that the most recent traffic counts remain valid given the additional time that has elapsed, or to validate that area conditions and traffic patterns have not changed, new traffic counts were collected at the Coffin Butte Road/Coffin Butte Landfill Entrance on Thursday, April 10, 2025 between 7:00 a.m. and 9:00 p.m. and along Highway 99W at Coffin Butte Road between 2:00 and 5:15 p.m.[1] to provide midweek data during the afternoon and evening peak commute hour. The [unadjusted] April traffic counts identified an overall peak hourly volume at the Coffin Butte Road/Highway 99W intersection between 3:55 and 4:55 p.m. of 805 total entering vehicles, which was a lower but consistent value with the 2021, 2022 and 2023 traffic counts.

Comment 3: There is no Highway 99W/Coffin Butte Road Analysis within the TIA.

Response: The purpose of the traffic study is to assess the change in trips from what was previously approved at the existing Coffin Butte regional landfill. There is no change in impacts at the Highway 99W/Coffin Butte Road intersection, or along Coffin Butte Road west of the new expansion area. The only transportation impact with this application occurs along Coffin Butte Road between the existing entrance and the proposed expansion site entrance. Commercial trucks will use the current scales to weigh in, then return onto Coffin Butte Road and enter the new landfill area before returning back toward Highway 99W (impacting only Coffin Butte Road). This configuration retains the extensive queuing area currently in place

[1] The data collection equipment had been scheduled to capture 2:00 to 6:00 p.m. but failed at 5:15 p.m.; traffic volumes were already declining following the recorded 3:55 to 4:55 p.m. peak hour.

that will help to avoid any back-ups onto Coffin Butte Road. The highway turning movements, traffic characteristics, and landfill traffic volumes on the highway (and Coffin Butte Road west of the expansion site) will not be affected based on whether the active landfill area is on the north or south side of Coffin Butte Road.

ODOT considers a project to have a potential impact and requires analysis when there are more than 50 peak hour trips added to a highway intersection, when new access or modifications of an existing access (Change of Use) occurs (Division 051), or if a project includes a plan or land use amendment that could increase traffic onto the highway system (e.g., text amendment or zone change). None of the access criteria listed within Division -051 are triggered with this application, and the project is zoned outright for its continued use as a regional landfill. Accordingly, while the landfill is located near Highway 99W, analysis of this intersection is not required and would only provide an informational role within the report if it were included, as there is no change in highway impacts with this application.

If Benton County has not provided a copy of the traffic study to ODOT our team will directly provide a copy to ODOT for confirmation of the analysis assumptions and the study area.

NEXT STEPS

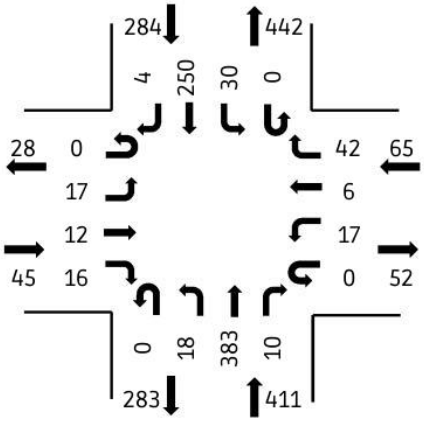
We appreciate the thoughtful and respectful comments received to date on the application and look forward to additional coordination with impacted stakeholders in response to the proposed Coffin Butte Landfill plan to support continued operations of the regional landfill services in its current location. Thank you for your time and consideration; I can be reached with questions at joe@transightconsulting.com or at (503) 997-4473.

Attachments:

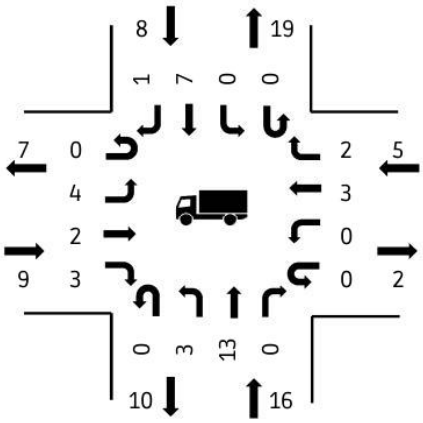
- Supplemental 2025 Traffic Count Worksheets
- Existing and “With Expansion” 10:25 a.m. Analysis Worksheets

Location: 99W & Coffin Butte Rd
Date: 2025-04-10
Peak Hour Start: 03:55 PM
Peak 15 Minute Start: 04:00 PM
Peak Hour Factor: 0.94

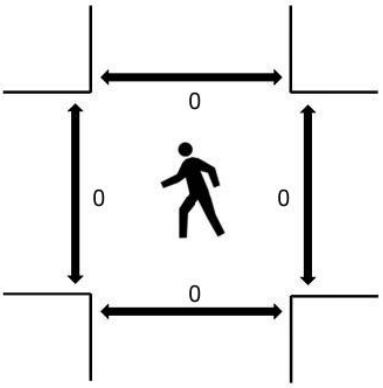
Motorized Vehicles



Heavy Vehicles



Pedestrians



(peak hour)

All Vehicle Volumes

Time	NB (99W)					SB (99W)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
02:00:00 PM	4	23	1	0	0	0	14	1	0	0	0	1	1	0	0	0	2	2	0	0		
02:05:00 PM	4	21	1	0	0	4	19	1	0	0	8	4	1	0	0	1	1	0	0	0		
02:10:00 PM	2	37	4	0	0	1	16	2	0	0	0	1	1	0	0	3	0	1	0	0	182	
02:15:00 PM	1	14	3	0	0	3	19	0	0	0	3	2	3	0	0	0	0	1	0	0	182	
02:20:00 PM	4	20	0	0	0	5	23	1	0	0	0	0	0	0	0	0	1	1	0	0	172	
02:25:00 PM	0	21	1	0	0	4	9	0	0	0	3	2	5	0	0	3	3	3	0	0	158	
02:30:00 PM	2	20	0	0	0	1	16	3	0	0	0	2	2	0	0	2	2	4	0	0	163	
02:35:00 PM	0	21	0	0	0	1	24	6	0	0	3	5	1	0	0	0	2	5	0	0	176	
02:40:00 PM	3	20	2	0	0	1	23	0	0	0	1	6	2	0	0	0	6	2	0	0	188	
02:45:00 PM	0	21	0	0	0	3	16	3	0	0	1	2	1	0	0	0	1	2	0	0	184	
02:50:00 PM	1	26	2	0	0	3	23	0	0	0	8	0	4	0	0	1	1	0	0	0	185	
02:55:00 PM	3	24	0	0	0	2	15	2	0	0	0	3	2	0	0	0	3	3	0	0	176	704
03:00:00 PM	3	26	1	0	0	3	20	0	0	0	2	2	0	0	0	2	1	8	0	0	194	723
03:05:00 PM	1	23	2	0	0	3	16	0	0	0	1	4	4	0	0	0	1	1	0	0	181	714
03:10:00 PM	1	38	2	0	0	0	22	0	0	0	3	4	3	0	0	2	0	2	0	0	201	723
03:15:00 PM	2	24	2	0	0	2	18	0	0	0	2	0	1	0	0	0	1	3	0	0	188	729
03:20:00 PM	1	32	1	0	0	0	18	0	0	0	0	0	1	0	0	0	3	3	0	0	191	733
03:25:00 PM	2	29	0	0	0	4	18	0	0	0	3	4	2	0	0	3	1	5	0	0	185	750
03:30:00 PM	1	25	3	0	0	1	10	0	0	0	1	1	3	0	0	2	3	2	0	0	182	748
03:35:00 PM	0	38	0	0	0	1	13	0	0	0	1	1	1	0	0	1	1	2	0	0	182	739
03:40:00 PM	1	35	0	0	0	2	34	0	0	0	2	0	1	0	0	0	2	1	0	0	189	751
03:45:00 PM	0	30	1	0	0	4	16	0	0	0	2	1	0	0	0	0	2	1	0	0	194	758
03:50:00 PM	0	19	1	0	0	3	32	2	0	0	0	0	1	0	0	0	0	3	0	0	196	750
03:55:00 PM	0	35	0	0	0	4	17	0	0	0	1	0	3	0	0	2	1	3	0	0	184	759
04:00:00 PM	1	40	2	0	0	3	24	0	0	0	0	1	2	0	0	4	1	2	0	0	207	771
04:05:00 PM	4	24	1	0	0	2	21	0	0	0	1	1	0	0	0	2	0	3	0	0	205	774
04:10:00 PM	2	32	0	0	0	6	24	1	0	0	1	1	1	0	0	1	2	3	0	0	213	771
04:15:00 PM	0	27	0	0	0	1	17	0	0	0	1	1	0	0	0	0	1	2	0	0	183	766
04:20:00 PM	4	32	0	0	0	2	28	2	0	0	1	2	1	0	0	3	0	5	0	0	204	787
04:25:00 PM	2	34	3	0	0	3	23	0	0	0	0	0	3	0	0	0	1	6	0	0	205	791
04:30:00 PM	1	22	0	0	0	0	20	0	0	0	1	1	1	0	0	2	0	2	0	0	205	789
04:35:00 PM	1	36	0	0	0	1	16	0	0	0	0	2	2	0	0	3	0	4	0	0	190	795
04:40:00 PM	3	33	1	0	0	1	20	0	0	0	2	1	1	0	0	0	0	3	0	0	180	782
04:45:00 PM	0	35	2	0	0	4	28	1	0	0	3	0	1	0	0	0	0	5	0	0	209	804
04:50:00 PM	0	33	1	0	0	3	12	0	0	0	6	2	1	0	0	0	0	4	0	0	206	805
04:55:00 PM	0	34	0	0	0	2	24	0	0	0	0	2	2	0	0	0	0	2	0	0	207	805
05:00:00 PM	0	31	2	0	0	4	27	0	0	0	0	2	3	0	0	1	0	2	0	0	200	797
05:05:00 PM	0	34	1	0	0	3	18	0	0	0	0	2	0	0	0	0	0	2	0	0	198	798
05:10:00 PM	1	46	0	0	0	5	24	0	0	0	0	1	0	0	0	0	0	0	0	0	209	801
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	751
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	671
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	596
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	546
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	481
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	416
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	337
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	275
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209

Car Volumes

Time	NB (99W)					SB (99W)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
02:00:00 PM	2	21	1	0	0	0	11	1	0	0	0	1	0	0	0	0	1	2	0	0		
02:05:00 PM	3	17	0	0	0	4	18	0	0	0	1	4	0	0	0	1	0	0	0	0		
02:10:00 PM	0	34	3	0	0	1	13	0	0	0	0	1	0	0	0	3	0	1	0	0	144	
02:15:00 PM	0	13	3	0	0	2	17	0	0	0	3	2	1	0	0	0	0	0	0	0	145	
02:20:00 PM	3	19	0	0	0	5	22	0	0	0	0	0	0	0	0	0	1	1	0	0	148	
02:25:00 PM	0	21	1	0	0	4	7	0	0	0	0	1	3	0	0	2	0	3	0	0	134	
02:30:00 PM	0	19	0	0	0	1	15	1	0	0	0	1	2	0	0	1	1	4	0	0	138	
02:35:00 PM	0	20	0	0	0	1	23	5	0	0	2	5	0	0	0	0	1	5	0	0	149	
02:40:00 PM	1	17	2	0	0	1	23	0	0	0	0	3	0	0	0	0	2	2	0	0	158	
02:45:00 PM	0	19	0	0	0	2	15	0	0	0	1	2	1	0	0	0	1	2	0	0	156	
02:50:00 PM	0	26	2	0	0	1	23	0	0	0	4	0	2	0	0	1	1	0	0	0	154	
02:55:00 PM	2	23	0	0	0	2	13	2	0	0	0	1	2	0	0	0	2	2	0	0	152	588
03:00:00 PM	2	23	1	0	0	1	17	0	0	0	1	1	0	0	0	2	0	8	0	0	165	604
03:05:00 PM	1	23	1	0	0	2	14	0	0	0	0	2	2	0	0	0	0	1	0	0	151	602
03:10:00 PM	1	32	2	0	0	0	22	0	0	0	1	3	0	0	0	2	0	1	0	0	166	610
03:15:00 PM	1	24	2	0	0	2	17	0	0	0	1	0	1	0	0	0	1	2	0	0	161	620
03:20:00 PM	1	25	1	0	0	0	17	0	0	0	0	0	1	0	0	0	3	3	0	0	166	620
03:25:00 PM	1	28	0	0	0	4	18	0	0	0	2	2	2	0	0	3	0	5	0	0	167	643
03:30:00 PM	1	24	3	0	0	1	10	0	0	0	0	1	2	0	0	1	2	1	0	0	162	644
03:35:00 PM	0	38	0	0	0	1	12	0	0	0	1	1	0	0	0	1	1	2	0	0	168	639
03:40:00 PM	1	34	0	0	0	2	32	0	0	0	0	0	1	0	0	0	2	1	0	0	176	661
03:45:00 PM	0	28	1	0	0	3	15	0	0	0	0	1	0	0	0	0	1	1	0	0	180	668
03:50:00 PM	0	19	1	0	0	2	30	1	0	0	0	0	1	0	0	0	0	3	0	0	180	665
03:55:00 PM	0	33	0	0	0	4	17	0	0	0	0	0	3	0	0	2	0	3	0	0	169	678
04:00:00 PM	1	39	2	0	0	3	23	0	0	0	0	1	2	0	0	4	0	1	0	0	195	698
04:05:00 PM	3	23	1	0	0	2	21	0	0	0	0	1	0	0	0	2	0	3	0	0	194	708
04:10:00 PM	2	31	0	0	0	6	22	1	0	0	0	0	1	0	0	1	1	3	0	0	200	712
04:15:00 PM	0	27	0	0	0	1	17	0	0	0	1	0	0	0	0	0	1	2	0	0	173	710
04:20:00 PM	4	31	0	0	0	2	26	1	0	0	1	2	0	0	0	3	0	5	0	0	192	734
04:25:00 PM	1	33	3	0	0	3	22	0	0	0	0	0	2	0	0	0	1	5	0	0	194	739
04:30:00 PM	1	22	0	0	0	0	20	0	0	0	1	1	1	0	0	2	0	2	0	0	195	743
04:35:00 PM	0	34	0	0	0	1	16	0	0	0	0	2	2	0	0	3	0	4	0	0	182	748
04:40:00 PM	3	33	1	0	0	1	20	0	0	0	2	1	1	0	0	0	0	3	0	0	177	740
04:45:00 PM	0	33	2	0	0	4	27	1	0	0	3	0	0	0	0	0	0	5	0	0	202	765
04:50:00 PM	0	31	1	0	0	3	12	0	0	0	5	2	1	0	0	0	0	4	0	0	199	767
04:55:00 PM	0	34	0	0	0	1	23	0	0	0	0	2	1	0	0	0	0	2	0	0	197	768
05:00:00 PM	0	31	2	0	0	4	26	0	0	0	0	2	3	0	0	1	0	2	0	0	193	763
05:05:00 PM	0	32	1	0	0	3	18	0	0	0	0	1	0	0	0	0	0	2	0	0	191	764
05:10:00 PM	1	45	0	0	0	5	23	0	0	0	0	1	0	0	0	0	0	0	0	0	203	771
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	722
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	647
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	577
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	465
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	400
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	325
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	266
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	203

Truck Volumes

Time	NB (99W)					SB (99W)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
02:00:00 PM	2	2	0	0	0	0	3	0	0	0	0	0	1	0	0	0	1	0	0	0		
02:05:00 PM	1	4	1	0	0	0	1	1	0	0	7	0	1	0	0	0	1	0	0	0		
02:10:00 PM	2	3	1	0	0	0	3	2	0	0	0	0	1	0	0	0	0	0	0	0	38	
02:15:00 PM	1	1	0	0	0	1	2	0	0	0	0	0	2	0	0	0	0	1	0	0	37	
02:20:00 PM	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	24	
02:25:00 PM	0	0	0	0	0	0	2	0	0	0	3	1	2	0	0	1	3	0	0	0	24	
02:30:00 PM	2	1	0	0	0	0	1	2	0	0	0	1	0	0	0	1	1	0	0	0	25	
02:35:00 PM	0	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	27	
02:40:00 PM	2	3	0	0	0	0	0	0	0	0	1	3	2	0	0	0	4	0	0	0	30	
02:45:00 PM	0	2	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	28	
02:50:00 PM	1	0	0	0	0	2	0	0	0	0	4	0	2	0	0	0	0	0	0	0	31	
02:55:00 PM	1	1	0	0	0	0	2	0	0	0	0	2	0	0	0	0	1	1	0	0	24	116
03:00:00 PM	1	3	0	0	0	2	3	0	0	0	1	1	0	0	0	0	1	0	0	0	29	119
03:05:00 PM	0	0	1	0	0	1	2	0	0	0	1	2	2	0	0	0	1	0	0	0	30	112
03:10:00 PM	0	6	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	1	0	0	35	113
03:15:00 PM	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	27	109
03:20:00 PM	0	7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	25	113
03:25:00 PM	1	1	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	0	18	107
03:30:00 PM	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	0	20	104
03:35:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	14	100
03:40:00 PM	0	1	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	13	90
03:45:00 PM	0	2	0	0	0	1	1	0	0	0	2	0	0	0	0	0	1	0	0	0	14	90
03:50:00 PM	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	16	85
03:55:00 PM	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	15	81
04:00:00 PM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	12	73
04:05:00 PM	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	11	66
04:10:00 PM	0	1	0	0	0	0	2	0	0	0	1	1	0	0	0	0	1	0	0	0	13	59
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	10	56
04:20:00 PM	0	1	0	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	0	12	53
04:25:00 PM	1	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	11	52
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	46
04:35:00 PM	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	47
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	42
04:45:00 PM	0	2	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	7	39
04:50:00 PM	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7	38
04:55:00 PM	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	10	37
05:00:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7	34
05:05:00 PM	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	7	34
05:10:00 PM	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6	30
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	29
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	24
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Bike Volumes

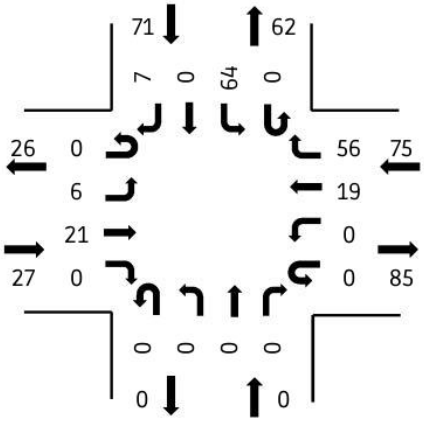
Time	NB (99W)					SB (99W)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian Volumes

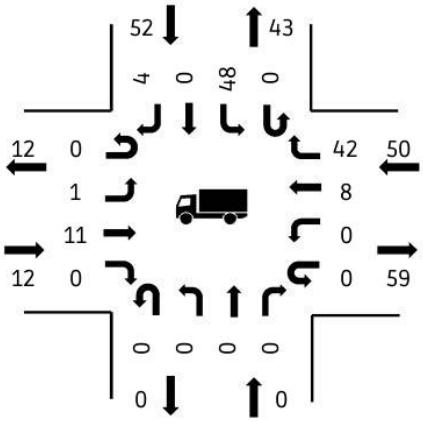
Time	Pedestrians				Totals	
Time	North	South	East	West	15min	1hr
02:00:00 PM	0	0	0	0		
02:05:00 PM	0	0	0	0		
02:10:00 PM	0	0	0	0	0	
02:15:00 PM	0	0	0	0	0	
02:20:00 PM	0	0	0	0	0	
02:25:00 PM	0	0	0	0	0	
02:30:00 PM	0	0	0	0	0	
02:35:00 PM	0	0	0	0	0	
02:40:00 PM	0	0	0	0	0	
02:45:00 PM	0	0	0	0	0	
02:50:00 PM	0	0	0	0	0	
02:55:00 PM	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0
03:45:00 PM	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0
05:40:00 PM	0	0	0	0	0	0
05:45:00 PM	0	0	0	0	0	0
05:50:00 PM	0	0	0	0	0	0
05:55:00 PM	0	0	0	0	0	0

Location: Landfill Driveway & Coffin Butte Rd
Date: 2025-04-10
Peak Hour Start: 10:25 AM
Peak 15 Minute Start: 11:10 AM
Peak Hour Factor: 0.88

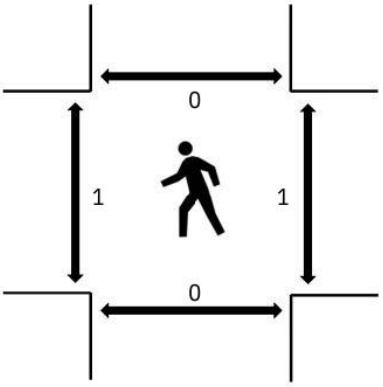
Motorized Vehicles



Heavy Vehicles



Pedestrians



(peak hour)

All Vehicle Volumes

Time	NB (Landfill Driveway)					SB (Landfill Driveway)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
07:00:00 AM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	4	0	0		
07:05:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0		
07:10:00 AM	0	0	0	0	0	3	0	0	0	0	1	2	0	0	0	0	1	4	0	0	24	
07:15:00 AM	0	0	0	0	0	4	0	1	0	0	0	3	0	0	0	0	2	3	0	0	30	
07:20:00 AM	0	0	0	0	0	3	0	0	0	0	1	1	0	0	0	0	1	0	0	0	30	
07:25:00 AM	0	0	0	0	0	4	0	0	0	0	3	0	0	0	0	0	2	4	0	0	32	
07:30:00 AM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	2	0	0	0	25	
07:35:00 AM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	2	4	0	0	28	
07:40:00 AM	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	1	5	0	0	24	
07:45:00 AM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	8	0	0	29	
07:50:00 AM	0	0	0	0	0	3	4	0	0	0	0	2	0	0	0	0	1	2	0	0	32	
07:55:00 AM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	4	0	0	0	31	111
08:00:00 AM	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	3	0	0	29	113
08:05:00 AM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	2	2	0	0	25	115
08:10:00 AM	0	0	0	0	0	2	0	1	0	0	3	2	0	0	0	0	1	8	0	0	34	121
08:15:00 AM	0	0	0	0	0	5	0	2	0	0	1	2	0	0	0	0	1	6	0	0	42	125
08:20:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	3	0	0	41	126
08:25:00 AM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	1	3	0	0	32	121
08:30:00 AM	0	0	0	0	0	3	0	1	0	0	1	1	0	0	0	0	0	6	0	0	27	127
08:35:00 AM	0	0	0	0	0	4	0	1	0	0	1	0	0	0	0	0	2	6	0	0	34	132
08:40:00 AM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	2	2	0	0	35	132
08:45:00 AM	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	0	3	0	0	30	128
08:50:00 AM	0	0	0	0	0	3	0	0	0	0	2	1	0	0	0	0	1	2	0	0	25	125
08:55:00 AM	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0	0	2	6	0	0	29	130
09:00:00 AM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	2	2	0	0	32	131
09:05:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	31	131
09:10:00 AM	0	0	0	0	0	5	0	1	0	0	0	1	0	0	0	0	1	4	0	0	30	126
09:15:00 AM	0	0	0	0	0	4	0	1	0	0	0	1	0	0	0	0	3	1	0	0	30	119
09:20:00 AM	0	0	0	0	0	5	0	0	0	0	1	1	0	0	0	0	1	2	0	0	32	122
09:25:00 AM	0	0	0	0	0	5	0	0	0	0	0	5	0	0	0	0	1	6	0	0	37	131
09:30:00 AM	0	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	4	0	0	35	127
09:35:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	7	0	0	36	124
09:40:00 AM	0	0	0	0	0	4	0	2	0	0	1	1	0	0	0	0	1	1	0	0	29	125
09:45:00 AM	0	0	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0	5	0	0	33	130
09:50:00 AM	0	0	0	0	0	6	0	0	0	0	0	3	0	0	0	0	0	4	0	0	35	134
09:55:00 AM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	1	1	0	0	33	129
10:00:00 AM	0	0	0	0	0	3	0	1	0	0	0	1	0	0	0	0	1	8	0	0	35	133
10:05:00 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	6	0	0	31	134
10:10:00 AM	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	1	8	0	0	36	135
10:15:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	6	0	0	33	136
10:20:00 AM	0	0	0	0	0	3	0	0	0	0	2	2	0	0	0	0	1	5	0	0	37	139
10:25:00 AM	0	0	0	0	0	8	0	0	0	0	0	1	0	0	0	0	1	5	0	0	39	137
10:30:00 AM	0	0	0	0	0	4	0	3	0	0	0	3	0	0	0	0	1	6	0	0	45	146
10:35:00 AM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	3	6	0	0	47	150
10:40:00 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	2	4	0	0	43	151
10:45:00 AM	0	0	0	0	0	5	0	1	0	0	1	0	0	0	0	0	4	2	0	0	39	152
10:50:00 AM	0	0	0	0	0	5	0	1	0	0	1	0	0	0	0	0	0	4	0	0	35	150
10:55:00 AM	0	0	0	0	0	7	0	0	0	0	1	3	0	0	0	0	1	6	0	0	42	160
11:00:00 AM	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0	5	0	0	40	157
11:05:00 AM	0	0	0	0	0	5	0	1	0	0	0	2	0	0	0	0	0	5	0	0	42	161
11:10:00 AM	0	0	0	0	0	5	0	0	0	0	2	2	0	0	0	0	2	5	0	0	40	164
11:15:00 AM	0	0	0	0	0	6	0	1	0	0	1	4	0	0	0	0	3	3	0	0	47	171
11:20:00 AM	0	0	0	0	0	6	0	0	0	0	0	2	0	0	0	0	2	5	0	0	49	173
11:25:00 AM	0	0	0	0	0	5	0	0	0	0	2	2	0	0	0	0	1	3	0	0	46	171
11:30:00 AM	0	0	0	0	0	3	0	0	0	0	1	1	0	0	0	0	0	4	0	0	37	163
11:35:00 AM	0	0	0	0	0	5	0	0	0	0	1	2	0	0	0	0	1	1	0	0	32	158
11:40:00 AM	0	0	0	0	0	4	0	0	0	0	1	2	0	0	0	0	1	6	0	0	33	161
11:45:00 AM	0	0	0	0	0	4	0	1	0	0	0	1	0	0	0	0	1	3	0	0	34	158
11:50:00 AM	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	4	7	0	0	39	162
11:55:00 AM	0	0	0	0	0	6	0	1	0	0	0	1	0	0	0	0	0	3	0	0	36	155
12:00:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	2	4	0	0	36	154
12:05:00 PM	0	0	0	0	0	3	0	0	0	0	1	2	0	0	0	0	0	2	0	0	29	149

12:10:00 PM	0	0	0	0	0	5	0	0	0	0	1	3	0	0	0	0	3	3	0	0	33	148
12:15:00 PM	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0	0	4	2	0	0	37	144
12:20:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	4	0	0	39	139
12:25:00 PM	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	3	6	0	0	37	139
12:30:00 PM	0	0	0	0	0	3	0	0	0	0	1	4	0	0	0	0	2	4	0	0	37	144
12:35:00 PM	0	0	0	0	0	4	0	2	0	0	0	3	0	0	0	0	2	4	1	0	43	150
12:40:00 PM	0	0	0	0	0	3	0	2	0	0	2	1	0	0	0	0	0	8	0	0	46	152
12:45:00 PM	0	0	0	0	0	7	0	1	0	0	0	1	0	0	0	0	1	4	0	0	46	156
12:50:00 PM	0	0	0	0	0	6	0	1	0	0	0	2	0	0	0	0	0	3	0	0	42	153
12:55:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	2	2	0	0	34	150
01:00:00 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	3	3	0	0	31	151
01:05:00 PM	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	5	0	0	30	154
01:10:00 PM	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	1	2	0	0	31	148
01:15:00 PM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	2	5	0	0	32	146
01:20:00 PM	0	0	0	0	0	3	0	0	0	0	2	3	0	0	0	0	0	6	0	0	35	150
01:25:00 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	1	5	0	0	38	149
01:30:00 PM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	2	5	0	0	38	147
01:35:00 PM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	1	4	0	0	33	140
01:40:00 PM	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	5	4	0	0	36	139
01:45:00 PM	0	0	0	0	0	8	0	0	0	0	1	3	0	0	0	0	1	6	0	0	43	144
01:50:00 PM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	2	0	0	39	137
01:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	7	0	0	34	139
02:00:00 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	1	6	0	0	25	138
02:05:00 PM	0	0	0	0	0	8	0	0	0	0	0	4	0	0	0	0	0	6	0	0	38	145
02:10:00 PM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	4	0	0	36	144
02:15:00 PM	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	1	0	0	33	139
02:20:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	5	0	0	22	132
02:25:00 PM	0	0	0	0	0	4	0	0	1	0	0	2	0	0	0	0	0	3	0	0	24	130
02:30:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	1	6	0	0	28	129
02:35:00 PM	0	0	0	0	0	4	0	0	0	0	3	4	0	0	0	0	3	5	0	0	40	139
02:40:00 PM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	2	4	0	0	42	136
02:45:00 PM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	5	0	0	41	127
02:50:00 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	30	130
02:55:00 PM	0	0	0	0	0	5	0	1	0	0	0	1	0	0	0	0	2	5	0	0	32	134
03:00:00 PM	0	0	0	0	0	3	0	1	0	0	0	2	0	0	0	0	0	4	0	0	32	134
03:05:00 PM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	2	0	0	32	124
03:10:00 PM	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	28	126
03:15:00 PM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	2	1	0	0	26	127
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	1	0	0	23	125
03:25:00 PM	0	0	0	0	0	4	0	1	0	0	0	4	0	0	0	0	2	0	0	0	24	126
03:30:00 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	2	1	0	0	24	123
03:35:00 PM	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	23	108
03:40:00 PM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	2	1	0	0	19	103
03:45:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	16	98
03:50:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	17	95
03:55:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	1	0	0	15	86
04:00:00 PM	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	1	0	0	16	82
04:05:00 PM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	2	2	0	0	18	81
04:10:00 PM	0	0	0	0	0	3	0	2	0	0	1	1	0	0	0	0	0	5	0	0	25	83
04:15:00 PM	0	0	0	0	0	2	0	1	0	0	1	0	0	0	0	0	1	0	0	0	24	80
04:20:00 PM	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	1	4	0	0	26	84
04:25:00 PM	0	0	0	0	0	3	0	1	0	0	0	1	0	0	0	0	0	4	0	0	23	82
04:30:00 PM	0	0	0	0	0	3	0	1	0	0	1	0	0	0	0	0	0	1	0	0	24	80
04:35:00 PM	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	1	0	0	20	81
04:40:00 PM	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	1	2	0	0	18	81
04:45:00 PM	0	0	0	0	0	2	0	0	0	0	1	3	0	0	0	0	1	0	0	0	19	83
04:50:00 PM	0	0	0	0	0	5	0	2	0	0	0	4	0	0	0	0	0	0	0	0	25	89
04:55:00 PM	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	22	88
05:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	20	87
05:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	11	82
05:10:00 PM	0	0	0	0	0	1	0	3	0	0	0	1	0	0	0	0	1	0	0	0	13	76
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	13	76
05:20:00 PM	0	0	0	0	0	0	0	1	0	0	1	7	0	0	0	0	2	0	0	0	22	78
05:25:00 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	2	0	0	0	21	74
05:30:00 PM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	20	72
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	10	68

05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	62
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	56
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	46
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	43
06:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	38
06:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	36
06:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
06:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
06:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
06:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
06:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
06:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
06:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
06:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Car Volumes

Time	NB (Landfill Driveway)					SB (Landfill Driveway)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
07:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		
07:05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:10:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	2	0	0	6	
07:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	8	
07:20:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	11	
07:25:00 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	9	
07:30:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7	
07:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
07:40:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	
07:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	4	
07:50:00 AM	0	0	0	0	0	0	4	0	0	0	0	1	0	0	0	0	1	1	0	0	11	
07:55:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	12	29
08:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	10	29
08:05:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	5	31
08:10:00 AM	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	1	3	0	0	11	34
08:15:00 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	1	0	0	0	15	36
08:20:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	15	35
08:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	33
08:30:00 AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	7	36
08:35:00 AM	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	1	0	0	10	41
08:40:00 AM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	2	1	0	0	15	46
08:45:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	14	46
08:50:00 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	12	42
08:55:00 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	9	43
09:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	7	43
09:05:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	7	44
09:10:00 AM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	8	40
09:15:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	8	36
09:20:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	8	37
09:25:00 AM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	3	0	0	10	42
09:30:00 AM	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	0	0	13	42
09:35:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	12	39
09:40:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	9	36
09:45:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	8	36
09:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	9	36
09:55:00 AM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	0	0	0	10	37
10:00:00 AM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	1	0	0	12	41
10:05:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	11	40
10:10:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	11	40
10:15:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	3	0	0	11	44
10:20:00 AM	0	0	0	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	15	47
10:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	13	43
10:30:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	12	43
10:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	0	11	46
10:40:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	13	47
10:45:00 AM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	1	1	0	0	14	49
10:50:00 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	11	48
10:55:00 AM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	1	1	0	0	13	50
11:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	12	49
11:05:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	0	0	14	51
11:10:00 AM	0	0	0	0	0	2	0	0	0	0	2	2	0	0	0	0	2	1	0	0	17	56
11:15:00 AM	0	0	0	0	0	3	0	0	0	0	1	3	0	0	0	0	2	0	0	0	22	60
11:20:00 AM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	1	0	0	23	59
11:25:00 AM	0	0	0	0	0	3	0	0	0	0	1	2	0	0	0	0	1	1	0	0	22	65
11:30:00 AM	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	17	65
11:35:00 AM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	14	62
11:40:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	2	0	0	11	63
11:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	59
11:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4	0	0	12	63
11:55:00 AM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	1	0	0	12	62
12:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	15	62
12:05:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	11	60

12:10:00 PM	0	0	0	0	0	2	0	0	0	0	1	2	0	0	0	0	3	0	0	0	14	59
12:15:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	1	1	0	0	16	56
12:20:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	2	0	0	22	59
12:25:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	2	0	0	19	56
12:30:00 PM	0	0	0	0	0	1	0	0	0	0	1	3	0	0	0	0	1	1	0	0	20	59
12:35:00 PM	0	0	0	0	0	1	0	2	0	0	0	3	0	0	0	0	1	1	1	0	21	66
12:40:00 PM	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	0	3	0	0	24	69
12:45:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	20	71
12:50:00 PM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	15	69
12:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	65
01:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	10	66
01:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	66
01:10:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	11	62
01:15:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	11	61
01:20:00 PM	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	1	0	0	14	58
01:25:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	13	56
01:30:00 PM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	1	3	0	0	15	56
01:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	12	49
01:40:00 PM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	2	2	0	0	16	48
01:45:00 PM	0	0	0	0	0	3	0	0	0	0	1	2	0	0	0	0	1	2	0	0	18	54
01:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	17	51
01:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	12	52
02:00:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	3	0	0	8	52
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	10	53
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9	50
02:15:00 PM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	9	50
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	8	47
02:25:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	9	46
02:30:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	9	44
02:35:00 PM	0	0	0	0	0	2	0	0	0	0	2	4	0	0	0	0	3	3	0	0	21	56
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	20	50
02:45:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	20	46
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	7	46
02:55:00 PM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	2	1	0	0	12	50
03:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	47
03:05:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	12	48
03:10:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	51
03:15:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	12	50
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	0	12	52
03:25:00 PM	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	13	55
03:30:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	14	55
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	13	44
03:40:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	1	0	0	12	47
03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	8	43
03:50:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	8	45
03:55:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	41
04:00:00 PM	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	1	0	0	10	44
04:05:00 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	11	44
04:10:00 PM	0	0	0	0	0	1	0	2	0	0	1	1	0	0	0	0	0	4	0	0	18	49
04:15:00 PM	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	17	49
04:20:00 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	1	2	0	0	19	51
04:25:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	16	52
04:30:00 PM	0	0	0	0	0	2	0	1	0	0	1	0	0	0	0	0	0	1	0	0	17	52
04:35:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	14	52
04:40:00 PM	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	1	1	0	0	14	54
04:45:00 PM	0	0	0	0	0	1	0	0	0	0	1	3	0	0	0	0	1	0	0	0	15	59
04:50:00 PM	0	0	0	0	0	3	0	2	0	0	0	4	0	0	0	0	0	0	0	0	21	65
04:55:00 PM	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0	0	19	67
05:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	17	66
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	9	63
05:10:00 PM	0	0	0	0	0	1	0	3	0	0	0	1	0	0	0	0	1	0	0	0	11	60
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	10	59
05:20:00 PM	0	0	0	0	0	0	0	1	0	0	1	7	0	0	0	0	1	0	0	0	19	63
05:25:00 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	2	0	0	0	18	62
05:30:00 PM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	19	61
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	58

05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	53
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	48
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	40
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	37
06:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33
06:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	32
06:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
06:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
06:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
06:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
06:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
06:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
06:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
06:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Truck Volumes

Time	NB (Landfill Driveway)					SB (Landfill Driveway)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
07:00:00 AM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	3	0	0		
07:05:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0		
07:10:00 AM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	2	0	0	18	
07:15:00 AM	0	0	0	0	0	4	0	1	0	0	0	2	0	0	0	0	0	3	0	0	22	
07:20:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	
07:25:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	4	0	0	23	
07:30:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	18	
07:35:00 AM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	2	4	0	0	24	
07:40:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	5	0	0	22	
07:45:00 AM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	6	0	0	25	
07:50:00 AM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	1	0	0	21	
07:55:00 AM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	2	0	0	0	19	82
08:00:00 AM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	3	0	0	19	84
08:05:00 AM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	2	0	0	20	84
08:10:00 AM	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	0	5	0	0	23	87
08:15:00 AM	0	0	0	0	0	4	0	1	0	0	0	1	0	0	0	0	0	6	0	0	27	89
08:20:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	26	91
08:25:00 AM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	1	2	0	0	24	88
08:30:00 AM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	4	0	0	20	91
08:35:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	5	0	0	24	91
08:40:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	20	86
08:45:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	16	82
08:50:00 AM	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	0	2	0	0	13	83
08:55:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	5	0	0	20	87
09:00:00 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	2	2	0	0	25	88
09:05:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	24	87
09:10:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	4	0	0	22	86
09:15:00 AM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	3	1	0	0	22	83
09:20:00 AM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	1	0	0	0	24	85
09:25:00 AM	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0	0	3	0	0	27	89
09:30:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	22	85
09:35:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	7	0	0	24	85
09:40:00 AM	0	0	0	0	0	4	0	1	0	0	1	0	0	0	0	0	0	1	0	0	20	89
09:45:00 AM	0	0	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	3	0	0	25	94
09:50:00 AM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	4	0	0	26	98
09:55:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	23	92
10:00:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	7	0	0	23	92
10:05:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	5	0	0	20	94
10:10:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	6	0	0	25	95
10:15:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	22	92
10:20:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	5	0	0	22	92
10:25:00 AM	0	0	0	0	0	8	0	0	0	0	0	1	0	0	0	0	1	3	0	0	26	94
10:30:00 AM	0	0	0	0	0	4	0	2	0	0	0	2	0	0	0	0	0	5	0	0	33	103
10:35:00 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	4	0	0	36	104
10:40:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	4	0	0	30	104
10:45:00 AM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	3	1	0	0	25	103
10:50:00 AM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	4	0	0	24	102
10:55:00 AM	0	0	0	0	0	4	0	0	0	0	0	3	0	0	0	0	0	5	0	0	29	110
11:00:00 AM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	2	0	0	28	108
11:05:00 AM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	3	0	0	28	110
11:10:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0	23	108
11:15:00 AM	0	0	0	0	0	3	0	1	0	0	0	1	0	0	0	0	1	3	0	0	25	111
11:20:00 AM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	1	4	0	0	26	114
11:25:00 AM	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	2	0	0	24	106
11:30:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	20	98
11:35:00 AM	0	0	0	0	0	4	0	0	0	0	1	1	0	0	0	0	1	1	0	0	18	96
11:40:00 AM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	4	0	0	22	98
11:45:00 AM	0	0	0	0	0	4	0	1	0	0	0	1	0	0	0	0	1	2	0	0	26	99
11:50:00 AM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	3	3	0	0	27	99
11:55:00 AM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	2	0	0	24	93
12:00:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	2	0	0	21	92
12:05:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	2	0	0	18	89

12:10:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	3	0	0	19	89
12:15:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	3	1	0	0	21	88
12:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	17	80
12:25:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2	4	0	0	18	83
12:30:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	3	0	0	17	85
12:35:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	3	0	0	22	84
12:40:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	5	0	0	22	83
12:45:00 PM	0	0	0	0	0	7	0	0	0	0	0	1	0	0	0	0	0	3	0	0	26	85
12:50:00 PM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	3	0	0	27	84
12:55:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	2	2	0	0	26	85
01:00:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	21	85
01:05:00 PM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	4	0	0	22	88
01:10:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	20	86
01:15:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	4	0	0	21	85
01:20:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	5	0	0	21	92
01:25:00 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	1	3	0	0	25	93
01:30:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0	23	91
01:35:00 PM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	3	0	0	21	91
01:40:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	2	0	0	20	91
01:45:00 PM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	0	4	0	0	25	90
01:50:00 PM	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0	22	86
01:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	0	0	22	87
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	3	0	0	17	86
02:05:00 PM	0	0	0	0	0	8	0	0	0	0	0	3	0	0	0	0	0	4	0	0	28	92
02:10:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0	27	94
02:15:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	24	89
02:20:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	14	85
02:25:00 PM	0	0	0	0	0	3	0	0	1	0	0	1	0	0	0	0	0	3	0	0	15	84
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4	0	0	19	85
02:35:00 PM	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	2	0	0	19	83
02:40:00 PM	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	2	3	0	0	22	86
02:45:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	0	21	81
02:50:00 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	23	84
02:55:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	20	84
03:00:00 PM	0	0	0	0	0	1	0	1	0	0	0	2	0	0	0	0	0	4	0	0	23	87
03:05:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	20	76
03:10:00 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	75
03:15:00 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	1	0	0	0	14	77
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	11	73
03:25:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	0	0	0	11	71
03:30:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	68
03:35:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	64
03:40:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	7	56
03:45:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	55
03:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	9	50
03:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	9	45
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	38
04:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	7	37
04:10:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	7	34
04:15:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	31
04:20:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	7	33
04:25:00 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	7	30
04:30:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	28
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	6	29
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	27
04:45:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	24
04:50:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	24
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	21
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	21
05:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	3	17
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	15
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	12
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	10

05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
06:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
06:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
06:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
06:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
06:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bike Volumes

Time	NB (Landfill Driveway)					SB (Landfill Driveway)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
07:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:20:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:40:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:55:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:20:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:20:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:40:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:55:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:20:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:40:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:55:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:05:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:20:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:25:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:35:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:40:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:50:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:55:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

12:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

05:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian Volumes

Time	Pedestrians				Totals	
Time	North	South	East	West	15min	1hr
07:00:00 AM	0	0	0	0		
07:05:00 AM	0	0	0	0		
07:10:00 AM	0	0	0	0	0	
07:15:00 AM	0	0	0	0	0	
07:20:00 AM	0	0	0	0	0	
07:25:00 AM	0	0	0	0	0	
07:30:00 AM	0	0	0	0	0	
07:35:00 AM	0	0	0	0	0	
07:40:00 AM	0	0	0	0	0	
07:45:00 AM	0	0	0	0	0	
07:50:00 AM	0	0	0	0	0	
07:55:00 AM	0	0	0	0	0	0
08:00:00 AM	0	0	0	0	0	0
08:05:00 AM	0	0	0	0	0	0
08:10:00 AM	0	0	0	0	0	0
08:15:00 AM	0	0	0	0	0	0
08:20:00 AM	0	0	0	0	0	0
08:25:00 AM	0	0	0	0	0	0
08:30:00 AM	0	0	0	0	0	0
08:35:00 AM	0	0	0	0	0	0
08:40:00 AM	0	0	0	0	0	0
08:45:00 AM	0	0	0	0	0	0
08:50:00 AM	0	0	0	0	0	0
08:55:00 AM	0	0	0	0	0	0
09:00:00 AM	0	0	0	0	0	0
09:05:00 AM	0	0	0	0	0	0
09:10:00 AM	0	0	0	0	0	0
09:15:00 AM	0	0	0	0	0	0
09:20:00 AM	0	0	0	0	0	0
09:25:00 AM	0	0	0	0	0	0
09:30:00 AM	0	0	0	0	0	0
09:35:00 AM	0	0	0	0	0	0
09:40:00 AM	0	0	0	0	0	0
09:45:00 AM	0	0	0	0	0	0
09:50:00 AM	0	0	0	0	0	0
09:55:00 AM	0	0	0	0	0	0
10:00:00 AM	0	0	0	0	0	0
10:05:00 AM	0	0	0	0	0	0
10:10:00 AM	0	0	0	0	0	0
10:15:00 AM	0	0	0	0	0	0
10:20:00 AM	0	0	0	0	0	0
10:25:00 AM	0	0	0	0	0	0
10:30:00 AM	0	0	0	0	0	0
10:35:00 AM	0	0	0	0	0	0
10:40:00 AM	0	0	0	0	0	0
10:45:00 AM	0	0	0	0	0	0
10:50:00 AM	0	0	0	0	0	0
10:55:00 AM	0	0	0	0	0	0
11:00:00 AM	0	0	0	0	0	0
11:05:00 AM	0	0	0	1	1	1
11:10:00 AM	0	0	1	0	2	2
11:15:00 AM	0	0	0	0	2	2
11:20:00 AM	0	0	0	0	1	2
11:25:00 AM	0	0	0	0	0	2
11:30:00 AM	0	0	0	0	0	2
11:35:00 AM	0	0	0	0	0	2
11:40:00 AM	0	0	0	0	0	2
11:45:00 AM	0	0	0	0	0	2
11:50:00 AM	0	0	0	0	0	2
11:55:00 AM	0	0	0	0	0	2
12:00:00 PM	0	0	0	0	0	2
12:05:00 PM	0	0	0	0	0	1

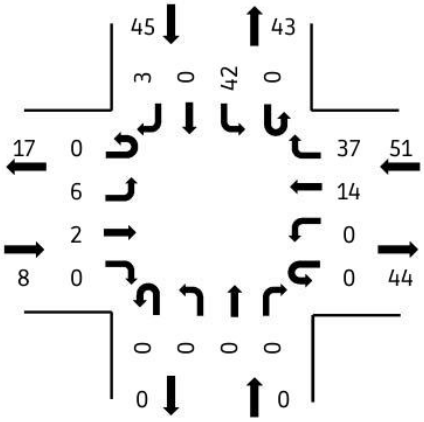
12:10:00 PM	0	0	0	0	0	0
12:15:00 PM	0	0	0	0	0	0
12:20:00 PM	0	0	0	0	0	0
12:25:00 PM	0	0	0	0	0	0
12:30:00 PM	0	0	0	0	0	0
12:35:00 PM	0	0	0	0	0	0
12:40:00 PM	0	0	0	0	0	0
12:45:00 PM	0	0	0	0	0	0
12:50:00 PM	0	0	0	0	0	0
12:55:00 PM	0	0	0	0	0	0
01:00:00 PM	0	0	0	0	0	0
01:05:00 PM	0	0	0	0	0	0
01:10:00 PM	0	0	0	0	0	0
01:15:00 PM	0	0	0	0	0	0
01:20:00 PM	0	0	0	0	0	0
01:25:00 PM	0	0	0	0	0	0
01:30:00 PM	0	0	0	0	0	0
01:35:00 PM	0	0	0	0	0	0
01:40:00 PM	0	0	0	0	0	0
01:45:00 PM	0	0	0	0	0	0
01:50:00 PM	0	0	0	0	0	0
01:55:00 PM	0	0	0	0	0	0
02:00:00 PM	0	0	0	0	0	0
02:05:00 PM	0	0	0	0	0	0
02:10:00 PM	0	0	0	0	0	0
02:15:00 PM	0	0	0	0	0	0
02:20:00 PM	0	0	0	0	0	0
02:25:00 PM	0	0	0	0	0	0
02:30:00 PM	0	0	0	0	0	0
02:35:00 PM	0	0	0	0	0	0
02:40:00 PM	0	0	0	0	0	0
02:45:00 PM	0	0	0	0	0	0
02:50:00 PM	0	0	0	0	0	0
02:55:00 PM	0	0	0	0	0	0
03:00:00 PM	0	0	0	0	0	0
03:05:00 PM	0	0	0	0	0	0
03:10:00 PM	0	0	0	0	0	0
03:15:00 PM	0	0	0	0	0	0
03:20:00 PM	0	0	0	0	0	0
03:25:00 PM	0	0	0	0	0	0
03:30:00 PM	0	0	0	0	0	0
03:35:00 PM	0	0	0	0	0	0
03:40:00 PM	0	0	0	0	0	0
03:45:00 PM	0	0	0	0	0	0
03:50:00 PM	0	0	0	0	0	0
03:55:00 PM	0	0	0	0	0	0
04:00:00 PM	0	0	0	0	0	0
04:05:00 PM	0	0	0	0	0	0
04:10:00 PM	0	0	0	0	0	0
04:15:00 PM	0	0	0	0	0	0
04:20:00 PM	0	0	0	0	0	0
04:25:00 PM	0	0	0	0	0	0
04:30:00 PM	0	0	0	0	0	0
04:35:00 PM	0	0	0	0	0	0
04:40:00 PM	0	0	0	0	0	0
04:45:00 PM	0	0	0	0	0	0
04:50:00 PM	0	0	0	0	0	0
04:55:00 PM	0	0	0	0	0	0
05:00:00 PM	0	0	0	0	0	0
05:05:00 PM	0	0	0	0	0	0
05:10:00 PM	0	0	0	0	0	0
05:15:00 PM	0	0	0	0	0	0
05:20:00 PM	0	0	0	0	0	0
05:25:00 PM	0	0	0	0	0	0
05:30:00 PM	0	0	0	0	0	0
05:35:00 PM	0	0	0	0	0	0

05:40:00 PM	0	0	0	0	0	0
05:45:00 PM	0	0	0	0	0	0
05:50:00 PM	0	0	0	0	0	0
05:55:00 PM	0	0	0	0	0	0
06:00:00 PM	0	0	0	0	0	0
06:05:00 PM	0	0	0	0	0	0
06:10:00 PM	0	0	0	0	0	0
06:15:00 PM	0	0	0	0	0	0
06:20:00 PM	0	0	0	0	0	0
06:25:00 PM	0	0	0	0	0	0
06:30:00 PM	0	0	0	0	0	0
06:35:00 PM	0	0	0	0	0	0
06:40:00 PM	0	0	0	0	0	0
06:45:00 PM	0	0	0	0	0	0
06:50:00 PM	0	0	0	0	0	0
06:55:00 PM	0	0	0	0	0	0
07:00:00 PM	0	0	0	0	0	0
07:05:00 PM	0	0	0	0	0	0
07:10:00 PM	0	0	0	0	0	0
07:15:00 PM	0	0	0	0	0	0
07:20:00 PM	0	0	0	0	0	0
07:25:00 PM	0	0	0	0	0	0
07:30:00 PM	0	0	0	0	0	0
07:35:00 PM	0	0	0	0	0	0
07:40:00 PM	0	0	0	0	0	0
07:45:00 PM	0	0	0	0	0	0
07:50:00 PM	0	0	0	0	0	0
07:55:00 PM	0	0	0	0	0	0
08:00:00 PM	0	0	0	0	0	0
08:05:00 PM	0	0	0	0	0	0
08:10:00 PM	0	0	0	0	0	0
08:15:00 PM	0	0	0	0	0	0
08:20:00 PM	0	0	0	0	0	0
08:25:00 PM	0	0	0	0	0	0
08:30:00 PM	0	0	0	0	0	0
08:35:00 PM	0	0	0	0	0	0
08:40:00 PM	0	0	0	0	0	0
08:45:00 PM	0	0	0	0	0	0
08:50:00 PM	0	0	0	0	0	0
08:55:00 PM	0	0	0	0	0	0

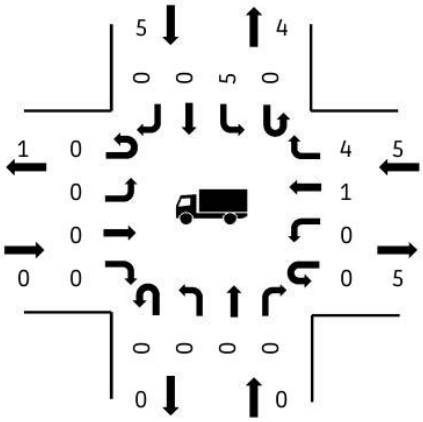
RallyTraffic

Location: Landfill Entrance & Coffin Butte Rd
Date: 2025-04-12
Peak Hour Start: 01:00 PM
Peak 15 Minute Start: 01:00 PM
Peak Hour Factor: 0.87

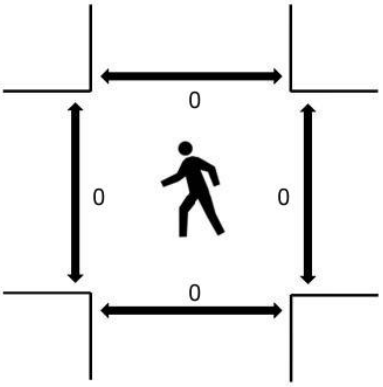
Motorized Vehicles



Heavy Vehicles



Pedestrians



(peak hour)

All Vehicle Volumes

Time	NB (Landfill Entrance)					SB (Landfill Entrance)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
12:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	2	0	1	0	0	1	4	0	0		
12:05:00 PM	0	0	0	0	0	1	0	0	0	0	1	5	0	0	0	0	0	3	0	0		
12:10:00 PM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	4	0	0	29	
12:15:00 PM	0	0	0	0	0	2	0	2	0	0	1	0	0	0	0	0	0	3	0	0	27	
12:20:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	5	0	0	26	
12:25:00 PM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	2	0	0	23	
12:30:00 PM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	2	2	0	0	24	
12:35:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	7	0	0	24	
12:40:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	3	0	0	24	
12:45:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	21	
12:50:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	18	
12:55:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	3	0	0	19	95
01:00:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	6	0	0	25	97
01:05:00 PM	0	0	0	0	0	3	0	1	0	0	2	0	0	0	0	0	1	2	0	0	28	96
01:10:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	5	0	0	30	96
01:15:00 PM	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0	0	1	3	0	0	28	98
01:20:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	1	0	0	25	95
01:25:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	6	0	0	26	99
01:30:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	3	0	0	23	97
01:35:00 PM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	2	1	0	0	25	96
01:40:00 PM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	2	0	0	21	96
01:45:00 PM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	3	5	0	0	26	102
01:50:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	1	0	0	25	103
01:55:00 PM	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	0	0	2	0	0	27	104
02:00:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	23	100
02:05:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	5	0	0	25	100
02:10:00 PM	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	5	0	0	26	100
02:15:00 PM	0	0	0	0	0	2	0	3	0	0	1	1	0	0	0	0	1	6	0	0	32	104
02:20:00 PM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	1	0	0	29	104
02:25:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	1	2	0	0	27	101
02:30:00 PM	0	0	0	0	0	3	0	0	0	0	1	1	0	0	0	0	0	5	0	0	23	104
02:35:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0	24	103
02:40:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	23	103
02:45:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	19	97
02:50:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	20	98
02:55:00 PM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	1	2	0	0	22	98

Car Volumes

Time	NB (Landfill Entrance)					SB (Landfill Entrance)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
12:00:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	1	0	0	1	4	0	0		
12:05:00 PM	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0	3	0	0		
12:10:00 PM	0	0	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	4	0	0	27	
12:15:00 PM	0	0	0	0	0	2	0	2	0	0	1	0	0	0	0	0	0	3	0	0	26	
12:20:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	5	0	0	25	
12:25:00 PM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	2	0	0	22	
12:30:00 PM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	2	0	0	0	21	
12:35:00 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	7	0	0	22	
12:40:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0	21	
12:45:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	20	
12:50:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	16	
12:55:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	3	0	0	17	87
01:00:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	5	0	0	22	89
01:05:00 PM	0	0	0	0	0	2	0	1	0	0	2	0	0	0	0	0	1	2	0	0	25	88
01:10:00 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	1	4	0	0	27	87
01:15:00 PM	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	1	3	0	0	25	88
01:20:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1	1	0	0	23	86
01:25:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	4	0	0	23	88
01:30:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	3	0	0	21	88
01:35:00 PM	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	2	1	0	0	22	86
01:40:00 PM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	2	0	0	20	87
01:45:00 PM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	3	5	0	0	25	93
01:50:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	1	0	0	23	93
01:55:00 PM	0	0	0	0	0	3	0	0	0	0	2	0	0	0	0	0	0	2	0	0	24	94
02:00:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	20	91
02:05:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	22	90
02:10:00 PM	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	5	0	0	23	90
02:15:00 PM	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	6	0	0	26	92
02:20:00 PM	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	1	0	0	25	92
02:25:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	1	1	0	0	23	90
02:30:00 PM	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	3	0	0	19	90
02:35:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	19	89
02:40:00 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	19	89
02:45:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	18	83
02:50:00 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	20	86
02:55:00 PM	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	1	2	0	0	21	86

Truck Volumes

Time	NB (Landfill Entrance)					SB (Landfill Entrance)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
12:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
12:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
12:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
12:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
12:20:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
12:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
12:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	
12:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
12:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	
12:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
12:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	
12:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8
01:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	8
01:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8
01:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	9
01:15:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10
01:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9
01:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	11
01:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9
01:35:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10
01:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
01:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9
01:50:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	10
01:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	9
02:05:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	10
02:10:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	6	12
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	12
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	11
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	4	14
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	14
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	14
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	14
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
02:55:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12

Bike Volumes

Time	NB (Landfill Entrance)					SB (Landfill Entrance)					EB (Coffin Butte Rd)					WB (Coffin Butte Rd)					Totals	
Time	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	Left	Thru	Right	U-turn	RTOR	15min	1hr
12:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
12:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
12:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
12:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
12:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
01:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:20:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:25:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:35:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:40:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:50:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:55:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian Volumes

Time	Pedestrians				Totals	
Time	North	South	East	West	15min	1hr
12:00:00 PM	0	0	0	0		
12:05:00 PM	0	0	0	0		
12:10:00 PM	0	0	0	0	0	
12:15:00 PM	0	0	0	0	0	
12:20:00 PM	0	0	0	0	0	
12:25:00 PM	0	0	0	0	0	
12:30:00 PM	0	0	0	0	0	
12:35:00 PM	0	0	0	0	0	
12:40:00 PM	0	0	0	0	0	
12:45:00 PM	0	0	0	0	0	
12:50:00 PM	0	0	0	0	0	
12:55:00 PM	0	0	0	0	0	0
01:00:00 PM	0	0	0	0	0	0
01:05:00 PM	0	0	0	0	0	0
01:10:00 PM	0	0	0	0	0	0
01:15:00 PM	0	0	0	0	0	0
01:20:00 PM	0	0	0	0	0	0
01:25:00 PM	0	0	0	0	0	0
01:30:00 PM	0	0	0	0	0	0
01:35:00 PM	0	0	0	0	0	0
01:40:00 PM	0	0	0	0	0	0
01:45:00 PM	0	0	0	0	0	0
01:50:00 PM	0	0	0	0	0	0
01:55:00 PM	0	0	0	0	0	0
02:00:00 PM	0	0	0	0	0	0
02:05:00 PM	0	0	0	0	0	0
02:10:00 PM	0	0	0	0	0	0
02:15:00 PM	0	0	0	0	0	0
02:20:00 PM	0	0	0	0	0	0
02:25:00 PM	0	0	0	0	0	0
02:30:00 PM	0	0	0	0	0	0
02:35:00 PM	0	0	0	0	0	0
02:40:00 PM	0	0	0	0	0	0
02:45:00 PM	0	0	0	0	0	0
02:50:00 PM	0	0	0	0	0	0
02:55:00 PM	0	0	0	0	0	0

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	21	19	56	64	7
Future Vol, veh/h	6	21	19	56	64	7
Conflicting Peds, #/hr	1	0	0	1	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	17	52	42	75	75	57
Mvmt Flow	7	24	22	64	73	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	87	0	-	0	94	56
Stage 1	-	-	-	-	55	-
Stage 2	-	-	-	-	39	-
Critical Hdwy	4.27	-	-	-	7.15	6.77
Critical Hdwy Stg 1	-	-	-	-	6.15	-
Critical Hdwy Stg 2	-	-	-	-	6.15	-
Follow-up Hdwy	2.353	-	-	-	4.175	3.813
Pot Cap-1 Maneuver	1420	-	-	-	755	875
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	825	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	750	873
Mov Cap-2 Maneuver	-	-	-	-	750	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	824	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1419	-	-	-	761
HCM Lane V/C Ratio	0.005	-	-	-	0.106
HCM Control Delay (s)	7.5	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	6.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	27	0	52	22	4	48
Future Vol, veh/h	27	0	52	22	4	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	150	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	44	0	100	36	100	100
Mvmt Flow	33	0	63	27	5	58

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	33	0	186	33
Stage 1	-	-	-	-	33	-
Stage 2	-	-	-	-	153	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1124	-	624	818
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1124	-	589	818
Mov Cap-2 Maneuver	-	-	-	-	589	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	645	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	794	-	-	1124	-
HCM Lane V/C Ratio	0.079	-	-	0.056	-
HCM Control Delay (s)	9.9	-	-	8.4	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	69	19	56	16	55
Future Vol, veh/h	6	69	19	56	16	55
Conflicting Peds, #/hr	1	0	0	1	1	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	17	86	42	75	10	91
Mvmt Flow	7	83	23	67	19	66

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	91	0	-	0	156	59
Stage 1	-	-	-	-	58	-
Stage 2	-	-	-	-	98	-
Critical Hdwy	4.27	-	-	-	6.5	7.11
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.353	-	-	-	3.59	4.119
Pot Cap-1 Maneuver	1415	-	-	-	817	804
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	906	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1414	-	-	-	811	802
Mov Cap-2 Maneuver	-	-	-	-	811	-
Stage 1	-	-	-	-	939	-
Stage 2	-	-	-	-	905	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1414	-	-	-	804
HCM Lane V/C Ratio	0.005	-	-	-	0.106
HCM Control Delay (s)	7.6	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

TUPPAN CONSULTANTS LLC
Geology Hydrogeology Environmental Consulting

UPDATED TECHNICAL MEMORANDUM

TO: Benton County Community Development Department DATE: February 25, 2025

FROM: Eric Tuppan, R.G., Consultant for Valley Landfills, Inc. (Coffin Butte Landfill)

RE: Environmental and Operational Considerations

This memorandum provides a synopsis of environmental and operational considerations regarding the proposed landfill development south of Coffin Butte Road by Valley Landfills, Inc. (Coffin Butte Landfill). It was modified slightly in response to the comments received by Maul Foster Alongi, dated November 27, 2024, as follows: revised Figures 1 and 4 to name Tampico Ridge; clarified language in the section titled "Waste Quality Monitoring Program"; and revised the reported volume of excavated material consistent with engineering calculations in the section titled "Available Quantity of Soil Cover." The information presented in this Technical Memorandum is based on past investigations that characterized site hydrogeology and geotechnical parameters for the area north of Coffin Butte Road where a landfill has operated since the mid-1970s, as well as recent investigations south of the road. The area south of Coffin Butte Road is currently used for ancillary structures and buildings that support landfill operations. Initially, hydrogeologic and geotechnical characterization occurred in the area south of the road as it related to the construction and operations of two leachate holding ponds and other infrastructure. Characterization in this area includes ongoing water quality sampling of groundwater monitoring wells and a geotechnical evaluation of the proposed development area that was conducted in 2021 and 2022.

As part of the process for developing landfills overseen by Oregon's Department of Environmental Quality (DEQ), permittees are required to characterize the site conditions and then, based on that data, provide design documents for the landfill that must be approved by the DEQ before construction occurs. At Coffin Butte Landfill, consultants have studied the surface soils and subsurface geology of the site, geotechnical parameters of soil, as well as the groundwater hydrogeology and geochemistry over the past forty years. These investigations have provided a substantial historical record for the area north of Coffin Butte Road, where much of the site character for surface soils and for shallow and deep water-bearing zones is known. For the development area south of the road, investigation reports are in preparation for submittal to the DEQ as part of the permitting process.

DEQ's regulatory role in Oregon is to oversee all aspects of landfill development with regard to liner and landfill design, operations, and surface water and groundwater monitoring. This regulatory oversight has authority based on state and federal laws written

to provide for the safe development, operations, closure, and post-closure care of solid waste landfills. As part of solid waste permit requirements, Valley Landfills is required to submit workplans and designs that must be approved by the DEQ before landfill construction can begin. Follow-up reports document quality assurance and quality control measured during construction. In addition, the DEQ requires that Valley Landfills maintain a fund for financial assurance that provides for landfill closure, post-closure care and, if required, corrective action.

As noted above, Valley Landfills is in the process of supplementing this technical information for the area south of Coffin Butte Road. We submitted a workplan in July 2021 to the DEQ that described tasks to characterize the hydrogeology and geotechnical properties needed to understand the constructability of the landfill and to protect groundwater resources. Objectives for this study included:

- Update information to satisfy DEQ's Phase I site characterization elements, which focus on regional and area-wide data needs.

- Evaluate the site geology and hydrogeology, including stratigraphic units and the water-bearing zones as part of DEQ's Phase II site characterization. More specifically, this aspect will examine subsurface conditions that include the depth and extent of the water bearing hydrogeologic units, the hydraulic connection between units, the lithologic and hydraulic properties of these units, groundwater flow patterns, and other factors. This evaluation will occur in two phases: the first will include submittal of a site characterization report that reviews existing information and data for the site, the second part will present results of field studies as noted below in the last bullet.

- Acquire geotechnical information about the site to satisfy both a DEQ Phase I and II geotechnical assessment, including design-level data on the distribution of overburden soils (i.e., alluvium and regolith), depth of bedrock, and competency of units in the south development area. This aspect of the study, of which field work was performed in fall 2021 through 2022, included:
  - Characterized the variability, depth, aerial extent and engineering properties of onsite soils and other overburden deposits.
  - Inventoried soils and other overburden deposits suitable for use in construction, and identified a proposed use for these materials.
  - Identified geotechnical considerations (such as settlement and slope stability) which must be addressed in the engineering design.

- In a future phase, Valley Landfills will augment the groundwater monitoring network in the south development area (for the interim, two temporary piezometers were installed along the northern slope of Tampico Ridge as part of the geotechnical study). The purpose of this work is to validate our understanding of the conceptual hydrogeologic model for the site and to begin collecting groundwater depth and

water quality data. This will include (1) installing wells upgradient, between the landfill and properties to the south and southeast, (2) installing wells cross- and down-gradient along the perimeter of the landfill footprint to function as compliance wells, (3) decommissioning any wells that are within the planned footprint of the landfill, and (4) conducting hydraulic testing to estimate the hydraulic properties of the bedrock unit.

Given that additional data is forthcoming, our present understanding of the development area is summarized briefly below, knowing that more extensive information specific to DEQ guidance will be available in the near future.

GEOLOGIC FRAMEWORK

Physical Setting and Slopes

The property being developed as a municipal solid waste landfill is approximately 42 acres on the northern slope of what is referred to locally as Tampico Ridge. The northern flank of Tampico Ridge and the southern flank of Coffin Butte, located to the north, create a topographic saddle in which the ground surface dips gently away from the saddle to the east and west. Slopes on the upper part of the basin near the summit of the northern part of Tampico Ridge range from 16 to 20 percent, with hill top elevations over 500 feet above sea level on the southwest part of the hill to over 600 feet above sea level a bit farther south. Farther down the hillside toward Coffin Butte Road, slopes range from 2 to 13 percent.

Current Surface Water Drainage

The northernmost slope of Tampico Ridge forms a basin just east of the saddle with Coffin Butte that drains northerly into an unnamed intermittent drainage. Drainage from areas around the former leachate treatment facility, the existing covered and double-lined leachate holding ponds, and the landfill gas to electricity facility is directed through a culvert under Coffin Butte Road, joins stormwater drainage from the current landfill, and flows into a settlement pond and bioswale. The settlement pond and bioswale are engineered to remove site-related compounds from the stormwater before it discharges to creeks that flow off site. At the downstream edge of the bioswale is a sub-surface flow wetland (SSFW). The SSFW includes an impermeable berm installed across the bioswale that forces water to flow downwards through a media bed at the upstream side of the impermeable berm. The media bed contains a mixture of coarse sand and biochar, which removes site-related compounds. A system of perforated pipes installed at the bottom of the media bed then collects the water and transports it to the downstream side of the impermeable berm, where the water then flows horizontally through a subsurface gravel layer. The gravel extends the remaining length of the SSFW to the existing outlet where the water daylights and is discharged at a sampling point.

Outside of the operations areas, precipitation that falls on the northeastern slopes of Tampico Ridge drains north to a ditch along the south side of Coffin Butte Road, and from there east to Highway 99, where it then flows through a culvert beneath Coffin Butte Road.

Water flows north in the drainage ditch along the west side of Highway 99 to a culvert that conveys water from a wetland and this ditch to a creek on the east side of Highway 99. From there, surface water travels approximately 3 miles to the east-northeast in an unnamed tributary before discharging to Soap Creek, which flows into the Luckiamute River 2.5 miles before the confluence with the Willamette River.

Geology

Tampico Ridge and Coffin Butte are prominent topographic features that comprise volcanic masses flanked by unconsolidated terrace and alluvial deposits. The volcanics are part of the Eocene Siletz River Formation and consist of relatively thick (up to 70 feet) sequences of basalt flows and a much smaller volume of thinly interbedded sedimentary units (individual beds up to 8 feet thick). Basalt flows are characterized by pillow lavas, flow breccias, and minor columnar jointing. The sedimentary portion consists of thinly bedded tuffaceous sandstone, siltstone, and claystone. The upper 5 to 15 feet of the bedrock unit is typically weathered and, in places, decomposed to soil where it is shown on geologic maps as volcanic pediment. With depth, the bedrock generally becomes less weathered to fresh and hard, although fracture and brecciated zones can become altered to clay minerals.

The lower flanks along the northern slope of Tampico Ridge are underlain by water laid sediments (Willamette Silt and alluvial sediments) that range in thickness from less than 10 feet to approximately 20 feet. These deposits consist primarily of clays, silty clays with gravels, or silty sands. Thicker deposits, at least 100 feet thick based on landfill boring log MW-9D (just north of the intersection of Coffin Butte Road and Hwy 99), extend to the east of Highway 99W.

HYDROGEOLOGY

Groundwater Occurrence

In bedrock terrains such as Tampico Ridge and Coffin Butte, shallow groundwater occurs primarily within fractures of weathered and unweathered bedrock, and in the alluvial deposits of the surrounding lowland areas. The local groundwater system is recharged by infiltrating precipitation and surface water from intermittent streams. Fractures provide the primary transport mechanism of groundwater in the bedrock; therefore, the occurrence and amount of groundwater depend on the nature, distribution, and interconnection of the fractures. Lack of interconnection among fractures limits the production available to groundwater wells completed in the basalt bedrock. Shallow bedrock in this area is commonly weathered to a gravel and sand mixture that behaves more uniformly (i.e., isotropic flow). As the bedrock becomes harder with depth and dominated by fractures, the groundwater moves predominantly through the fractures (i.e. anisotropic flow) from the uplands to areas of lower elevation. At that point, groundwater discharges through seeps or into streams, or into deeper alluvial deposits that overlie the bedrock.

Recharge and Flow of Groundwater

In hilly areas, shallow groundwater recharges through infiltration of rainwater. The amount of infiltration depends on the size and geometry of the recharge, or drainage, area that collects the rainwater. In bedrock terrains, groundwater flows through weathered residual soil and fractures. Groundwater flows in the downslope direction from areas of higher elevation to lower elevation with the groundwater surface (i.e., potentiometric surface) generally reflecting the surface topography, although it is typically more subdued. As such, as depicted in Figure 1, the groundwater is generally assumed to flow away from the top of Tampico Ridge to the north, towards the proposed landfill development area, to the east toward Highway 99W (and, in places, discharge through springs at the base of the hill) and to the west and south. Figure 2 illustrates the groundwater flow pattern along the northern slope of Tampico Ridge based on the existing monitoring network for the landfill that includes two piezometers installed near the upslope, southern boundary of the proposed landfill footprint.

Based on the existing topography and recharge areas, it is unlikely that a landfill liner along the northern part of the ridge would reduce infiltration and the quantity of groundwater supplying domestic wells or springs at properties of concern east and south of the northernmost part of the ridge. This is schematically depicted in Figure 1, which illustrates the landfill relative to the groundwater divide along Tampico Ridge and the presumed areal flow direction of groundwater.

Conceptual Hydrogeologic Model

The conceptual hydrogeologic model for the area follows the basic premise described above. Groundwater flow at the site is controlled by the topographic setting where the groundwater surface generally mimics the topography, with groundwater originating in the uplands of Tampico Ridge and Coffin Butte and flowing downgradient along the potentiometric surface. The higher elevation hills and recharge areas create local groundwater divides that separate the basin containing landfill operations from areas north of Coffin Butte and south of Tampico Ridge. Between the two hills, a lower elevation groundwater divide exists near the topographic saddle, where the northern component of groundwater flow from Tampico Ridge meets the southern component of groundwater flow from Coffin Butte. Groundwater then flows towards the east and west generally following the long axes of the valleys. Based on almost 30 years of measurement, the seasonal groundwater flow pattern measured along the northern flanks of Tampico Ridge and at the Coffin Butte Landfill has not changed significantly.

As noted earlier, historical measurements in wells south of Coffin Butte Road, specifically MW-8S, MW-15, and now decommissioned MW-16, depicted groundwater along the northern slope of Tampico Ridge flowing towards the north-northeast as shown in Figure 2. These wells were supplemented with two temporary piezometers installed in 2022 near the upslope, southern boundary of the proposed landfill footprint. Groundwater elevations in these more recent piezometers support the premise that groundwater flow on the northern slope of Tampico Ridge is northerly. On the northwest side of Tampico Ridge, groundwater

flow documented by wells P-8, Merril, Phillips, Berkland, and Duplex, is toward the northwest away from Tampico Ridge. These wells, in addition to the newly proposed monitoring wells to be installed as part of site development (see Figure 4 and discussion in the section on water quality monitoring program), will be used to verify this conceptual hydrogeologic model.

Groundwater Supply

Water wells in this area produce primarily from fractured basalt bedrock. Predicting where and at what depth the basalt will be fractured enough to produce water for a supply well is problematic. This is because the lateral and vertical geometry of fractures in the bedrock basalt flows is naturally not uniform. In addition, the basalt is commonly altered to low permeability clays along fractures and in brecciated zones, thus reducing the ability of groundwater to flow within fractures. Domestic wells in this part of Benton County typically produce water from the basalt bedrock (frequently called "Blue- or Black Basalt" on the drillers' logs). As indicated on logs available from the Oregon Water Resources Department, when initially tested by drillers as part of pumping tests from one to four hours long, the water level in the wells draws down significantly, more than half the depth of the well on many of the logs. In terms of production, this means that the recharge of the aquifer to the well cannot keep up with what is being pumped out. This can happen for a number of reasons. For this area, the basalt aquifer has a limited capacity to provide water to wells because of low porosity (storage capacity) of the aquifer and the fractures that provide the water are not extensively connected to each other over long distances. Put another way, the distance away from a well that the well draws water is limited because of the discontinuous nature of the fractures.

Protection of Groundwater Resources

Before 1991 when the U.S. Environmental Protection Agency (EPA) implemented solid waste rules that required owners of new landfills construct composite liners and collection systems for municipal solid waste landfills, many older landfills leaked and as a consequence contaminated groundwater. Since then, the DEQ, which implements the EPA's landfill liner rules, requires that landfills on the west side of the Cascades build double composite liners with secondary collection and leak detection systems as described below. This change in landfill regulation and construction altered the old paradigm that associated dumps with groundwater contamination to one of state-of-the-art engineered landfills with containment and detection systems that protect the environment and underlying groundwater.

Along the same lines, groundwater resources in the area are protected from potential landfill impacts by two conditions: a groundwater divide between the proposed landfill footprint (described in the previous section) and the landfill liner system. With regard to groundwater supply, the landfill will not consume any additional groundwater from the local aquifer to support operations.

Groundwater Divide. As noted above and shown in Figure 1, after rainwater infiltrates uplands along Tampico Ridge, it flows in the subsurface downgradient, following the direction of the slope of the potentiometric surface. This means that groundwater below the landfill footprint on the north slope of Tampico Ridge flows north away from the peak elevation of the hill as depicted in Figure 2. Groundwater will flow downgradient along other aspects of Tampico Ridge in a similar manner, generally following the topography from the high points (from 500 to 600 feet above sea level), to the lower elevations on the east and south. It is this groundwater divide, which subtly mimics the ground surface, that prevents groundwater from one side of the hill to flow to the other.

Landfill Liner System. To protect groundwater resources, federal and state governments require state-of-the-art landfill liner systems for all new landfills. The current design planned for the composite liner system extends below the entire landfill from the upper part of landfill footprint at approximate elevation 380 feet above sea level, to the lower areas of the footprint near the current elevation of Coffin Butte Road at 250 to 270 feet above sea level. The footprint of the liner is shown in Figures 2 and 4 as a dashed green line within the development area. The design of the liner system prevents leachate from infiltrating to groundwater through the base of the landfill. In the western part of the state of Oregon and specifically at Coffin Butte Landfill, this consists of a double-liner composite system that contains five key components as shown in Figure 3. From bottom to top, these are:

- An underdrain layer of sand or gravel (or other possible geosynthetic component) that keeps the groundwater from impinging on the liner.

- A tertiary geomembrane, referred to as a flexible membrane liner (FML), of high density polyethylene (HDPE) that separates the groundwater from lower layers of the liner system.

- A second layer of sand or gravel (or other possible geosynthetic component) that provides for detection and secondary containment of possible leaks. This layer is monitored for volume and water quality as part of the detection monitoring program.

- Two more FML layers (primary and secondary geomembranes separated by a geosynthetic clay liner) to provide containment of leachate and fluids produced within the landfill.

- Leachate collection and removal system designed to collect and remove leachate generated in the landfill and convey the liquid to a pond for treatment; this prevents the accumulation of leachate along the base of the landfill and removes any downward hydraulic pressure that could drive leachate from this layer into the underlying secondary layer and to groundwater.

The liner system design and installation will be approved by the DEQ and construction will be closely monitored, tested and certified by a professional engineer, consistent with a DEQ-approved quality assurance and quality control plan.

Water Quality Monitoring Program. Water quality monitoring is required at the Coffin Butte Landfill by Solid Waste Permit 306, issued by the DEQ. Environmental monitoring has been conducted at Coffin Butte Landfill since 1975 when the DEQ started collecting water quality data from the leachate lagoon and from surface water around the site. Groundwater monitoring began in 1977 and since then, the monitoring network has evolved in response to different monitoring and site characterization needs required by the solid waste permit. The current water quality monitoring network has five components:

- Groundwater monitoring wells, which include compliance and detection wells, and water supply wells
- Observation wells and piezometers used for measuring water levels
- The secondary leachate collection system (also referred to as the leak detection system or LDS)
- Leachate sumps
- Surface water monitoring points

The rationale for the network design and the media monitored can be found in the environmental monitoring plan. As part of landfill development, the groundwater monitoring network will be expanded to include the development area south of Coffin Butte Road. Proposed locations of new monitoring wells associated with this development are shown in Figure 4.

As noted earlier, this expanded monitoring network will include:

- Three upgradient wells along the southern perimeter of the landfill footprint (MW-B, MW-C, and MW-D). Depth-to-water can be measured in these wells to define the potentiometric surface south of the landfill, and the wells will also be tested for water quality parameters. Moreover, these will function as detection monitoring wells between the landfill and properties to the south and southeast.

- One well on the west side (MW-E) and one on east side (MW-A) of the landfill will serve as cross-gradient/compliance wells.

- Existing monitoring wells downgradient of the new cell (e.g., MW-8S/8D and MW-14S/14D) will be designated as compliance boundary wells.

- The leachate ponds will be covered and double-lined with a leak detection layer. Any fluids that might seep through the primary liner into this secondary leak detection layer will be collected and tested for landfill contaminants in a manner similar to the process for monitoring the secondary layer below the landfill. A piezometer (PZ-1) to the southeast of the ponds will monitor the groundwater elevation to define groundwater flow direction and if needed, can be sampled for groundwater quality. The locations and nomenclature for the new sampling points

associated with the leachate ponds, and for the wells listed above, will be defined in a workplan to be developed and submitted for approval by the DEQ.

In addition to environmental monitoring specified by the solid waste permit, stormwater samples are collected four times per water year and the results submitted to the DEQ annually under a National Pollutant Discharge Elimination System (NPDES), Industrial Stormwater Discharge Permit No. 1200-Z.

Landfill Operations Water Use. Landfill operations and construction activities use water supplied by Adair Village, not groundwater from onsite wells. The only groundwater used from onsite wells is for the existing office and the scale house. The volume of groundwater consumed at these two locations will not change. Overall, no additional groundwater will be used for the landfill development above current volumes.

GEOTECHNICAL ISSUES AND SEISMIC STABILITY

Geologic hazards and earthquake safety for the Coffin Butte Landfill have been discussed in site development plans and as part of reviewing federal and state location criteria for siting municipal solid waste landfills. These reports found that there were no known Holocene faults within 200 feet of the landfill boundary, and that landfill cells have been, and will continue to be, designed for potential seismic events as defined in federal and state solid waste rules.

The development area will be founded on a firm, competent geologic formation comprised of fresh basalt, weathered basalt, and some thin veneers of alluvium in the flatter downslope areas. In areas of prior landfill construction north of Coffin Butte Road, the only geotechnical constraints at the site were slope stability issues driven by the relative geometries of the bottom liner system, and the height and slope of the final landfill. Moreover, there were no unusual unstable areas or foundation conditions known to exist that would adversely affect landfill development. Detailed geotechnical evaluations are routinely conducted as part of each new cell development and will be part of the South Development Area Design Report, which will be submitted by the landfill design engineer Civil & Environmental Consultants, Inc. (CEC), before the landfill is constructed.

As part of the site characterization efforts, earlier planning and site characterization documents as well as recently conducted field and laboratory testing will be used as a basis to support our understanding for the geologic hazards analysis. Tasks for this element as they relate to the development area include:

- Discuss geologic hazards that could potentially be relevant to the site consistent with DEQ Landfill Guidance Section 2.7, and that includes location restrictions under OAR 340-94-0030 (and 40 CFR, Part 258, Subpart B), to address considerations such as Holocene fault zones, seismic impact areas, and unstable areas.

- Evaluate the earthquake safety of the site, including relative to its seismotectonic setting and seismic history of the area, the potential for the area to be affected by surface rupture, probable response of site to likely earthquakes, including estimated ground motion, maximum ground acceleration, velocity and displacement, the potential for the area to be affected by earthquake-induced landslides or soil liquefaction, and the potential for the area to be affected by regional tectonic deformation (subsidence or uplift). This evaluation will be presented as part of the geotechnical investigation for the site.

The proposed geotechnical scope of work was developed to provide design-level data for relevant engineering analyses. The data will be used to assess the suitability of on-site material for facility construction and the integrity of the soil and underlying material for stability in constructing the landfill. Types of data collected during field tasks included mapping the types and distribution of soils at the site, as well as noting the engineering properties of soil structure in test pits, geotechnical borings, and cone penetration tests.

SOIL DEPTH AND CLASSIFICATION

Reconnaissance mapping by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) identified the soil series as Witzel-Ritner, very cobbly loam near the top of Tampico Ridge with Jory silty clay loam, Waldo silty clay loam, and Bashaw clay in the drainage basin to the north. Soil characteristics of these soil types as published by the NRCS are:

- Witzel-Ritner – well drained with moderately high to high capacity to transmit water, loamy or clayey colluvium derived from basalt along slopes of 12 to 60 percent.

- Jory – well drained with moderately high capacity to transmit water, loamy colluvium derived from basalt over clayey residuum weathered from basalt along slopes of 2 to 20 percent.

- Bashaw – poorly drained with very low to moderately low capacity to transmit water, clayey alluvium derived from basalt on slopes of 3 to 12 percent.

- Waldo – poorly drained with moderately low to moderately high capacity to transmit water, silty clay loam derived from clayey alluvium on slopes of 0 to 3 percent.

From past field studies, the depth of soil ranged from no soil over hard rocky outcrops in the steeper northern slopes to a depth of 16 feet on intermediate slopes of Tampico Ridge. In the borehole for monitoring well MW-16, located on the north slope of Tampico Ridge near the east leachate pond, clayey silt was present from the surface to a depth of 3 feet, basalt bedrock weathered to silt and clayey gravel from 3 to 16 feet, and hard basaltic bedrock was logged at a depth of 16 feet. Test pits completed in August 2021 found a range of soil types and depths consistent with these past findings. This included soils at the surface

to depths that ranged from 2.5 to over 10 feet deep of typically fine-grained clay and silt. The fine grained soils are typically underlain by a sandy gravel interval from 2 to 5 feet thick, which is weathered basalt bedrock. The gravelly interval overlies hard basalt bedrock.

EROSION CONTROL FACTORS

To control potential erosion and reduce the debris and sediment in the stormwater discharge during landfill construction and operations, stormwater management practices will be employed as described in the Erosion and Sediment Control Plan (ESCP) that will be developed for construction and approved by the DEQ.

Implementation of stormwater management practices limit the amount of erosion associated with stormwater runoff. These practices may include structural or nonstructural control measures such as debris and sediment control, stormwater diversion, and preventative maintenance.

Debris and Sediment Control

The extent of construction activities at the landfill will make debris and sediment control critical. The following practices may be used as appropriate to control erosion.

- Temporary seeding and sodding of disturbed areas such as landfill side slopes, stockpile areas, and interim cover areas. Permanently seed areas that have been brought to final grade such as final cover areas, embankments, ditches, and drainage swales.

- Surface roughening of disturbed soil slopes after they are graded and before they are seeded to help establish the vegetative cover, reduce runoff velocity, and allow sediment trapping.

- Mulching and matting to protect soil surfaces from raindrop impact and reduce the velocity of overland flow.

- Plastic sheet cover to provide immediate erosion protection to small temporary soil stockpiles, erosion-troubled soil areas, and slopes and disturbed areas when vegetative cover cannot be established because of soil characteristics, slope steepness, or time of year.

- Buffer zones of natural grassy vegetation will be cultivated and left unmowed along areas of sheet flow runoff.

- Filter fences and straw bale barriers intercept and detain small amounts of sediment from disturbed areas during constructions activity. These will be appropriately installed both below areas of sheet or rill erosion, such as along the toe of graded areas, soil stockpiles, and embankments.

- Sedimentation traps and basins allow for sediment contained in stormwater runoff to settle out and will be installed as needed throughout the development of the landfill.

- Dust control such as road watering, temporary and permanent vegetation, and plastic covering will be used to reduce the amount of soil lost from exposed surfaces.

- Outlet protection including riprap aprons, riprap plunge pools, or energy dissipating devices will be installed at stormwater discharge points to prevent scour and to minimize downstream erosion.

- Riprap may be used as permanent ground cover at outlets, ditches, and toes of slopes to protect soil surfaces from concentrated runoff, slow the runoff velocity, and stabilize slopes with seepage problems.

Stormwater Diversion

Stormwater is diverted away from the landfilled waste areas. The design will call for interceptor dikes and swales to intercept stormwater runoff from drainage areas above unprotected slopes and direct it to a stabilized outlet. Interceptor dikes or swales are placed above sharp grade breaks and soil stockpile areas. In areas within the active landfill operations, temporary stormwater structures divert runoff from equipment maintenance areas, spill areas, exposed waste, and from leachate seep areas so that any surface water that contacts the exposed waste drains internal to the landfill boundary where it can be collected by the leachate collection system. This type of grading and the structures prevent the escape of stormwater runoff that has contacted exposed waste.

Preventative Maintenance

Routine preventive maintenance is crucial to reducing the amount of erosion produced by stormwater runoff. Each month during the rainy season, routine inspections for debris and sediment in the stormwater control structures will be performed. Inspection will be followed by, as needed, cleaning and repairing stormwater control features, structures and facilities including: seeding and planting areas, mulching and matting areas, plastic sheet cover, buffer zones, haul road, filter fences and straw bale barriers, sediment basins, dust control, surface roughening, interceptor dikes and swales, inlet/outlet protection, ditches, and culverts.

COVER MATERIALS

Type of Cover

There are three types of landfill cover based on the phase of landfill development. The first is a daily operations layer (typically a minimum of 6-inches thick) of soil materials spread over the daily lifts of refuse to control odor, disease vectors, fires, blowing litter, and scavenging. Tarps, or other DEQ-approved alternatives can also be used for daily cover. The second is an interim cover, typically 12 inches of soil covered by tarps made of griffolyn

that is placed over those parts of the operating cell that have achieved final grade. This cover is placed to reduce infiltrating rainfall until the entire cell has been filled, at which time a final cover is installed. The third type of cover is the final cover for the landfill cell which is constructed after the entire cell has reached final grade. The final cover is generally constructed of both geosynthetic and soil materials, consistent with federal and state solid waste regulations.

Available Quantity of Soil Cover

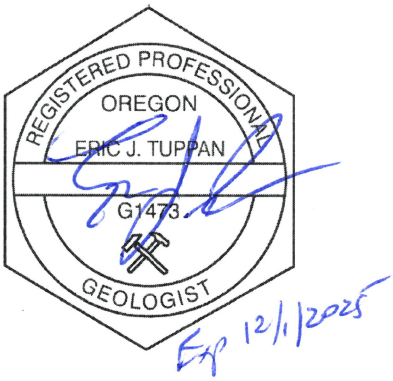
Estimates from the current design show approximately 3,500,000 cubic yards of soil available from the existing parcel for cover material. This soil will likely be removed and stockpiled at an appropriate location near the landfill during the excavation and construction phase until it is needed. Depending on the landfill design and soil characteristics, this soil may be used for daily cover or as the soil component of an interim or final cover.

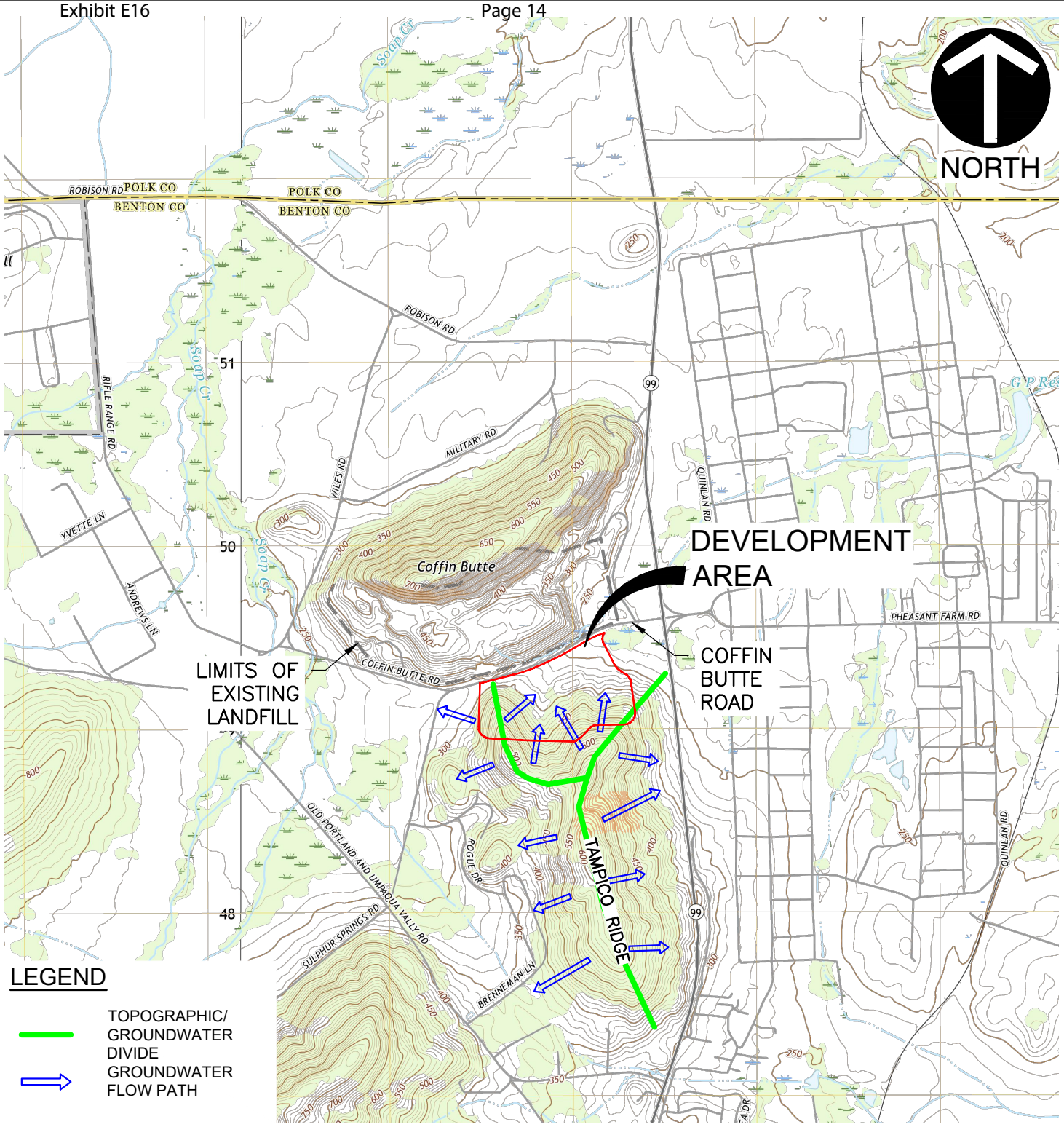
Additional soil cover material may be required depending on the design of the landfill cells. This soil would be borrowed from other parts of the facility property or from other nearby sources.

Transportation of On-Site Soil Materials

Soil and rock materials excavated from on-site will be hauled to designated locations using off-road dump trucks. Soil that is encountered during excavation will most likely be hauled and placed into on-site stockpiles to be used later during cell or final cover construction. Rock that is encountered during excavation will also be stockpiled or hauled to the Knife River Facility for crushing so that it can be used as road base materials or used in the construction of the landfill or final cover systems.

Attachments: Figure 1 – Conceptual Groundwater Divide and Flow Direction
Figure 2 – Groundwater Contours – April 2023
Figure 3 – Landfill Liner Cross Section
Figure 4 – Groundwater Monitoring Network





LEGEND

- TOPOGRAPHIC/ GROUNDWATER DIVIDE
- GROUNDWATER FLOW PATH

REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, LEWISBURG QUADRANGLE, OREGON DATED: 2011.

SCALE IN FEET

0 2,500 5,000

Civil & Environmental Consultants, Inc.

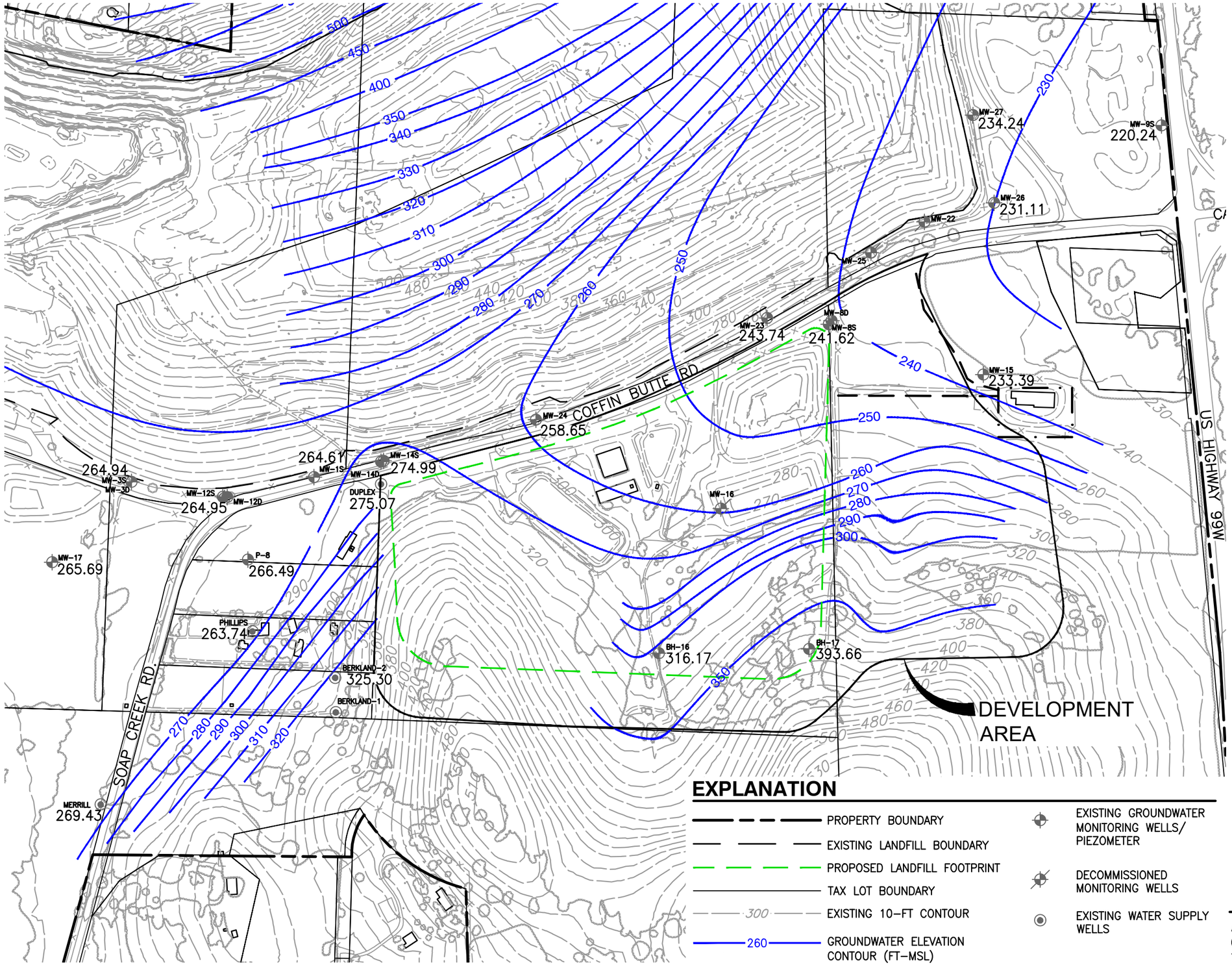
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
29175 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
USGS LEWISBURG TOPOGRAPHY

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:
DATE:	JANUARY 2025	DWG SCALE:	1"=2,500'	PROJECT NO:	322-142	1

P:\320-000\322-142\-CADD\Dwg\Exhibits\322142-1.1-Site Location Map.dwg{1} LS:(1/30/2025 - dbegell) - LP: 1/31/2025 1:52 PM



EXPLANATION

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- PROPOSED LANDFILL FOOTPRINT
- TAX LOT BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- 260 GROUNDWATER ELEVATION CONTOUR (FT-MSL)
- EXISTING GROUNDWATER MONITORING WELLS/ PIEZOMETER
- DECOMMISSIONED MONITORING WELLS
- EXISTING WATER SUPPLY WELLS

NORTH

SCALE IN FEET

0 400 800

REFERENCE

AERIAL TOPOGRAPHY FROM AERIAL SURVEY BY COOPER AERIAL SURVEYS COMPANY; DATE OF TOPOGRAPHY: OCTOBER 07, 2021.

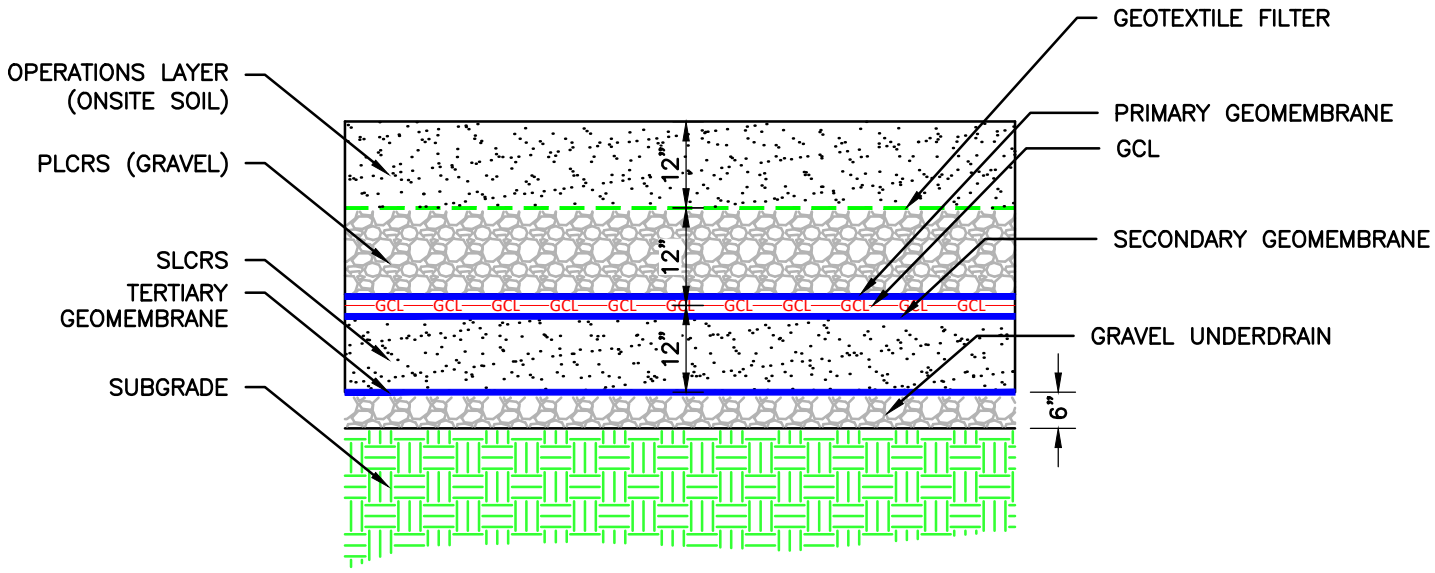
VALLEY LANDFILLS
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

GROUNDWATER CONTOURS - APRIL 2023

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

DRAWN BY:	JS	CHECKED BY:	JAS
DATE:	JANUARY 2025	DWG SCALE:	AS SHOWN
		APPROVED BY:	JAS
		PROJECT NO:	322-142
		FIGURE NO.:	2

P:\320-000\322-142\-CADD\Dwg\Exhibits\322142-3.8-Groundwater Contours-April 2023.dwg[2] LS:(1/29/2025 - dbegeil) - LP: 1/30/2025 8:54 AM



ABBREVIATIONS

PLCRS	PRIMARY LEACHATE COLLECTION AND REMOVAL SYSTEM
SLCRS	SECONDARY LEACHATE COLLECTION AND REMOVAL SYSTEM
GCL	GEOSYNTHETIC CLAY LINER

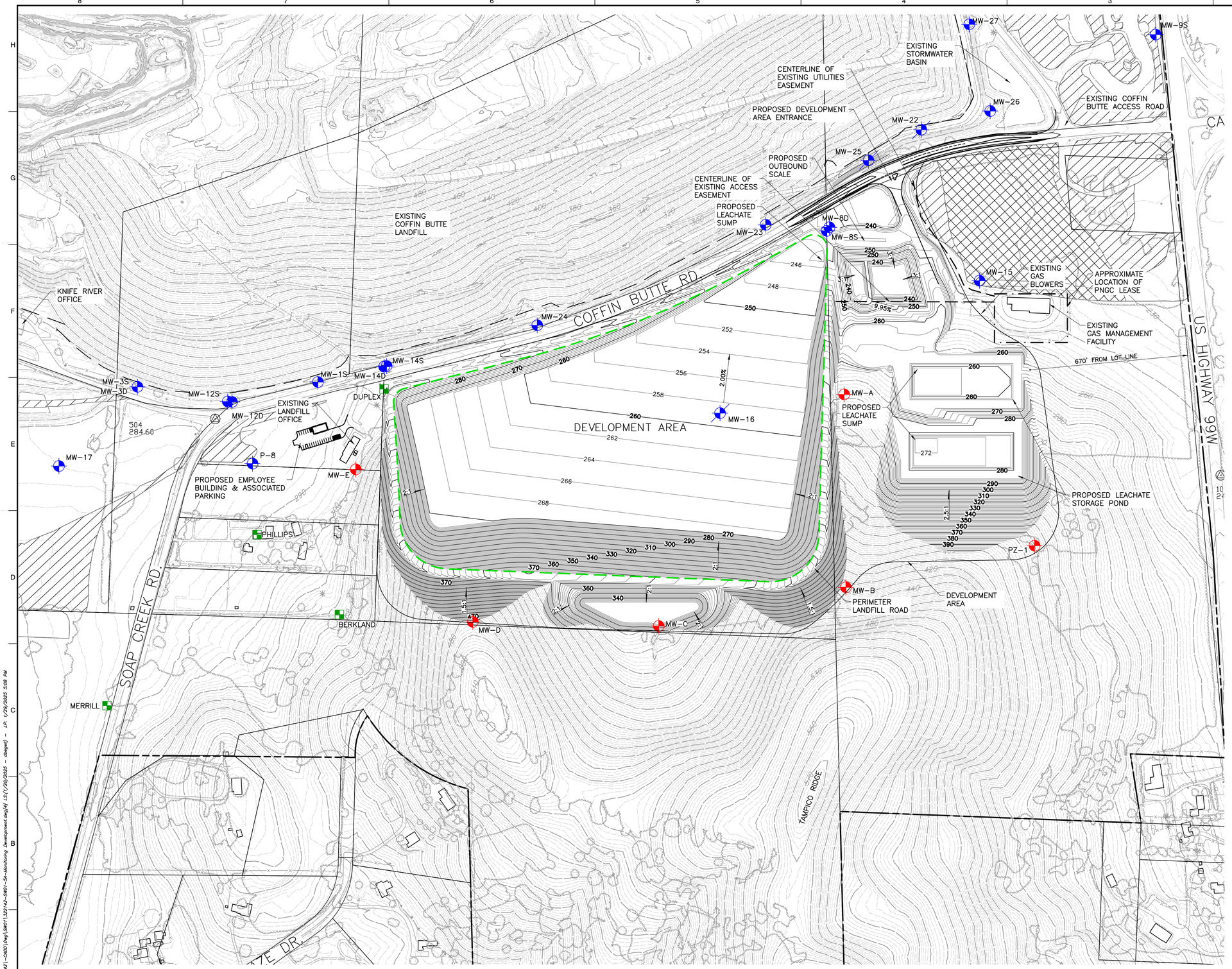
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
29175 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
LINER CROSS SECTION

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:	3
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142		

P:\320-000\322-142\-CADD\Dwg\Exhibits\322-142-3-Liner Cross Section.dwg{3} LS:(1/29/2025 - dbegell) - LP: 1/30/2025 8:46 AM



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- ISOPACH 10-FT CUT CONTOUR
- ISOPACH ZERO CUT/ FILL CONTOUR
- ISOPACH 10-FT FILL CONTOUR
- PROPOSED LANDFILL FOOTPRINT
- EXISTING GROUNDWATER MONITORING WELLS/PIEZOMETER
- DECOMMISSIONED MONITORING WELLS
- EXISTING WATER SUPPLY WELLS
- PROPOSED WELLS/PIEZOMETER

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. DEVELOPMENT AREA PERIMETER DESIGNED ONLY FOR PICKUP TRUCKS OR SMALLER VEHICLES.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

GROUNDWATER MONITORING NETWORK

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: 4

SHEET OF

P:\320-0001\322-142\CADD\Dwg\GM01\322142-GM01-SA-Monitoring Development.dwg[4] LS(1/29/2025 - dbogel) - LP: 1/29/2025 5:08 PM

PRELIMINARY DRAINAGE REPORT
COFFIN BUTTE LANDFILL

CORVALLIS, OREGON

Prepared For:

REPUBLIC SERVICES

28972 Coffin Butte Road
Corvallis, Oregon 97330

Prepared By:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

2356 Gold Meadow Way, Suite 120

Gold River, CA 95670

CEC Project 322-142

JANUARY 2025

UPDATED MARCH 2025

TABLE OF CONTENTS

1.0 INTRODUCTION....1

2.0 EXISTING DRAINAGE CONDITIONS....1

3.0 PROPOSED DRAINAGE CONDITIONS....1

3.1 Stormwater drainage analysis.... 1

3.1.1 General....1

3.1.2 Rainfall Distribution....1

3.1.3 Rainfall Amount....2

3.2 Peak run-off determination.... 2

3.3 Onsite hydraulics and drainage infrastructure.... 2

3.4 Stormwater management.... 3

3.4.1 Onsite....3

3.4.2 Offsite....4

4.0 CONCLUSION....5

5.0 REFERENCES....5

FIGURES

Figure 1 – SCS Rainfall Distribution

Figure 2 – 2-Yr, 24-Hr Rainfall Distribution Map

Figure 3 – 5-Yr, 24-Hr Rainfall Distribution Map

Figure 4 – 10-Yr, 24-Hr Rainfall Distribution Map

Figure 5 – 25-Yr, 24-Hr Rainfall Distribution Map

Figure 6 – 100-Yr, 24-Hr Rainfall Distribution Map

Figure 7 – Drainage Area Map

Figure 8 – Typical Combined Detention and Wet Pond

Figure 9 – Typical Combined Detention and Wet Pond Sections

APPENDICES

Appendix A – Hydrologic Calculations

Appendix B – Hydraulic Calculations

1.0 INTRODUCTION

The purpose of this drainage report is to provide the analysis for the proposed Coffin Butte Landfill expansion project located at 28972 Coffin Butte Road, Corvallis, OR 97330. The proposed project will be an expansion of the landfill to the south side of Coffin Butte Road. This will be referred to in this report as the Proposed Development Area. For the design, the SCS method within Civil 3D's HydraFlow Hydrographs was used to calculate onsite and offsite flows. For onsite stormwater management, a combination detention and wet pond facility was designed using the Corvallis stormwater design standards. The outflow of all onsite stormwater is conveyed by way of a graded swale to a double barrel 12-inch reinforced concrete pipe (RCP) culvert crossing to the north side of Coffin Butte Road and ultimately discharging into an existing detention facility. For offsite stormwater, a retention basin was designed to capture stormwater runoff before entering the proposed development site from the south and a v-ditch was designed to capture stormwater runoff from the south side of Coffin Butte Road along the frontage of the site.

2.0 EXISTING DRAINAGE CONDITIONS

The existing expansion area generally drains from southwest to northeast towards a drainage ditch on the south side of Coffin Butte Road. To the north of Coffin Butte Road is another existing drainage channel conveying flows for the existing landfill area.

3.0 PROPOSED DRAINAGE CONDITIONS

3.1 STORMWATER DRAINAGE ANALYSIS

3.1.1 General

Per the design standards outlined in the Corvallis Stormwater Standard 2015 Edition, the drainage control systems for the Coffin Butte Landfill expansion have been designed to accommodate the anticipated volume of precipitation and resulting run-off generated from the peak 25-year, 24-hour rainfall event. Additionally, per the same stand document, A detention system designed to pass the 100-year, 24-hr storm event was included in the design to ensure the site can sustain a storm event that exceeds the design standard. The stormwater hydrology was calculated using the SCS method within Civil 3D's HydraFlow. It was then used to determine the 25-year, 24-hour stormwater discharge based on intensities for a 5-minute time of concentration. A 5-minute time of concentration was used to provide a conservative estimate for design flows. Pond routing was performed to attenuate the peak flows of 25-year, 24-hour storm event.

3.1.2 Rainfall Distribution

Rainfall distribution is represented as one of the four regional time-distribution types, which define the portion of rainfall that falls at any time within the 24-hour storm event type. Shown in **Figure**

1, all western Oregon, including the Proposed Development Area is located within the Soil Conversation Service (SCS) Type IA rainfall distribution zone. Thus, the Type IA rainfall distribution was used for the drainage analysis.

3.1.3 Rainfall Amount

The rainfall amounts used in the hydrologic analysis of the Proposed Development Area were obtained from National Oceanic and Atmospheric Administration (NOAA) Atlas 2 rainfall frequency maps. The peak 2-year, 5-year, 10-year, and 25-year, 100-year, 24-hour storm events were determined to be 3.1, 3.8, 4.4, 5.1and 6.4 inches, respectively. The corresponding rainfall frequency maps are shown in **Figures 2, 3, 4, 5 and 6**.

3.2 PEAK RUN-OFF DETERMINATION

The SCS Unit Hydrograph method was used within Civil 3D's HydraFlow to compute the onsite peak discharges for the 2-year, 24-hour, and 25-year, 24-hour storm events, assuming a 5-minute time of concentration. A runoff curve number (CN) of 84 was used for the proposed development area, which is representative of a hydrologic soil type D material with grass covering 50-75% of the area. A runoff curve number (CN) of 98 was used for Coffin Butte Road, which is representative of asphaltic pavement.

Refer to **Appendix A** for Hydrologic Calculations.

3.3 ONSITE HYDRAULICS AND DRAINAGE INFRASTRUCTURE

Onsite Drainage for the site will be captured by graded swales and conveyed to proposed catch basins. The proposed catch basins direct flows to a combined detention and wet pond facility. The design 25-year, 24-hour storm event was estimated to generate a total site peak discharge of approximately 52.80 cubic feet/second (cfs). Per the Corvallis Stormwater Standard 2015 Edition, the detained stormwater collected onsite must have a controlled discharge. The use of an 8-inch HDPE storm pipe with a 6-inch orifice restrictor plate at the outlet of the combined detention / wet pond facility was designed to limit the outlet flow to 2.52 cfs to minimize inflow from the proposed expansion area to the existing detention pond located north of Coffin Butte Road. The outlet flow is designed to outfall to a proposed 1-foot-deep swale conveying the combined detention / wet pond facility flow and the flow from the south side of Coffin Butte Road through a double barrel 12-inch reinforced concrete pipe. The flow is then directed north of Coffin Butte Road and is conveyed to an existing detention facility located on the southeast corner of the Coffin Butte Landfill.

Refer to **Appendix B** for Hydraulic Calculations.

3.4 STORMWATER MANAGEMENT

3.4.1 Onsite

Runoff for the proposed development was calculated based on drainage areas defined by existing and proposed topography, Refer to **Figure 7** for the Drainage Area Map. Runoff from drainage area 1, calculated as 7.67 cfs for the 2-yr storm event and 17.28 cfs for the 25-year storm event, flows across existing topography from the southeast to the northwest to a historic outfall at an elevation of 280.00 ft. Runoff from drainage area 5, calculated as 3.40 cfs for the 2-year event and 7.66 cfs for the 25-year event, flows from south to north from Tampico Ridge to a proposed catch basin which directs the flow to the east to the historic flow path. Runoff from drainage areas 2, 4, and 6 combine in a proposed detention / wet pond located in the northeast corner of the proposed development. The combined detention / wet pond was designed according to the Corvallis, Oregon Stormwater Design Standards 2015 Edition. The manual outlines the design criteria and process for both a wet pond and a detention facility. When combined, the detention facility can be stacked above the wet pond to reduce loss of development area. Both criteria are required when designing a combined system. When conflicting requirements are encountered the stricter requirements are utilized for design. Wet ponds using this design criteria are expected to meet a treatment goal of 70 percent TSS removal. For wet pond analysis, the required wet pond volume ($V_b = fV_r$) is used to determine the overall dimensions of the storage facility. To calculate the wet pond volume a minimum volume factor (f) of 3 is applied to the final required volume found for the site as per Corvallis Stormwater Design Standards 2015 Edition. Based on the 100-yr, 24-hr storm event, the rainfall from the mean annual storm (R) is as 6.4 inches per National Oceanic and Atmospheric Administration (NOAA) Atlas 2 rainfall frequency maps, see **Figure 6**. Finally, the runoff from the mean annual storm (V_r) is calculated based on the soil type for the developed site. There are four soil types that are considered for this method of analysis that correspond to soil types associated with SCS hydrological soil group classifications, impervious (hard, non-penetrable surfaces), till grass (post-development grass or landscaped area and onsite forested land on Type C or D soils), till forest (permanent onsite forest and shrub cover located on type C or D soils), and outwash (soil that infiltrates well and produces small amounts of runoff, type A and B soils). For the proposed site type D soil was used with the assumption of the till grass option (A_{tg}), landscaped areas and post-development grass. The overall area for the development is approximately 68.95 acres or 3,003,462 sf. The runoff from the mean annual storm is calculated using the following formula:

$$V_r = \left(0.9Ai + 0.25A_{tg} + 0.10A_{tf} + 0.01A_o\right) \times R$$

Where:

$V_r = Volume\ of\ runoff\ from\ mean\ annual\ storm\ (cf)$
$A_i = Area\ of\ impervious\ surface\ (sf)$
$A_{tg} = Area\ of\ till\ soil\ covered\ with\ grass\ (sf)$
$A_{tf} = Area\ of\ soil\ covered\ with\ forest\ (sf)$
$A_o = Area\ of\ outwash\ soil\ covered\ with\ grass\ or\ forest\ (sf)$
$R = Rainfall\ from\ mean\ annual\ storm\ (ft)$

$$V_r = (0 + 0.25(3{,}003{,}462\ \ sf) + 0 + 0) \times \left(\frac{6.4}{12} ft\right) \approx 40{,}046\ cf$$

Therefore, the wet pond volume is calculated as follows:

$$V_b = fV_r$$

$$V_b = 3 \times 40{,}046\ cf \approx 120{,}138\ cf$$

To determine the dimensions of the wet pond the first wet pool cell must have the capacity to hold 25% to 35% of the wet pond volume. Refer to **Figure 8** for a typical plan view of a combined detention / wet pond design and **Figure 9** for typical cross sections of a combined detention / wet pond. For the proposed wet pond 35% of the required volume was used for design.

$$0.35 \times 120{,}138\ cf \approx 42{,}048\ cf$$

The overall wet pond dimensions were designed to be approximately 275 ft x 165 ft measured at the highest elevation, with a berm separating the primary and secondary cells. The primary cell dimensions are approximately 90 ft x 165 ft with a maximum depth (not including the sediment storage depth) of 8 ft, giving an approximate volume of 66,000 cf. The proposed wet pond design exceeds required capacity.

Refer to **Appendix A** for Stage Storage Report.

3.4.2 Offsite

The proposed development is designed to capture offsite runoff from Tampico Ridge to the south and runoff from the south side of Coffin Butte Road. Runoff for drainage area 3, as seen in **Figure 7**, calculated as 9.84 cfs for the 2-year event and 22.17 cfs for the 25-year event, is captured by a proposed retention basin located south of the top of excavation grades of the proposed development. The provided volume for the south basin, 764,196 cf exceeds the required storage volume of 313,151 cf. All runoff from DA-3 will be captured before entering the proposed development. An emergency overflow pipe with an inlet invert at the top of the proposed basin, 348.00 ft, was designed to convey any excess runoff captured from storm events that exceed design

considerations, with a maximum outflow 0f 0.65 cfs, through DA-4 in a roadside v-ditch. Any excess flow will be directed toward the detention / wet pond. Runoff from DA-O1, the south side of Coffin Butte Road along the frontage of the site, calculated as 1.41 cfs for the 2-year event and 2.36 cfs for the 25-year event, and DA-O2, calculated as 0.65 cfs for the 2-year event and 1.47 cfs for the 25-year event are captured in a roadside ditch and conveyed to a culvert passing beneath the entrance to the proposed development, then combining with the outlet flow from the detention / wet pond.

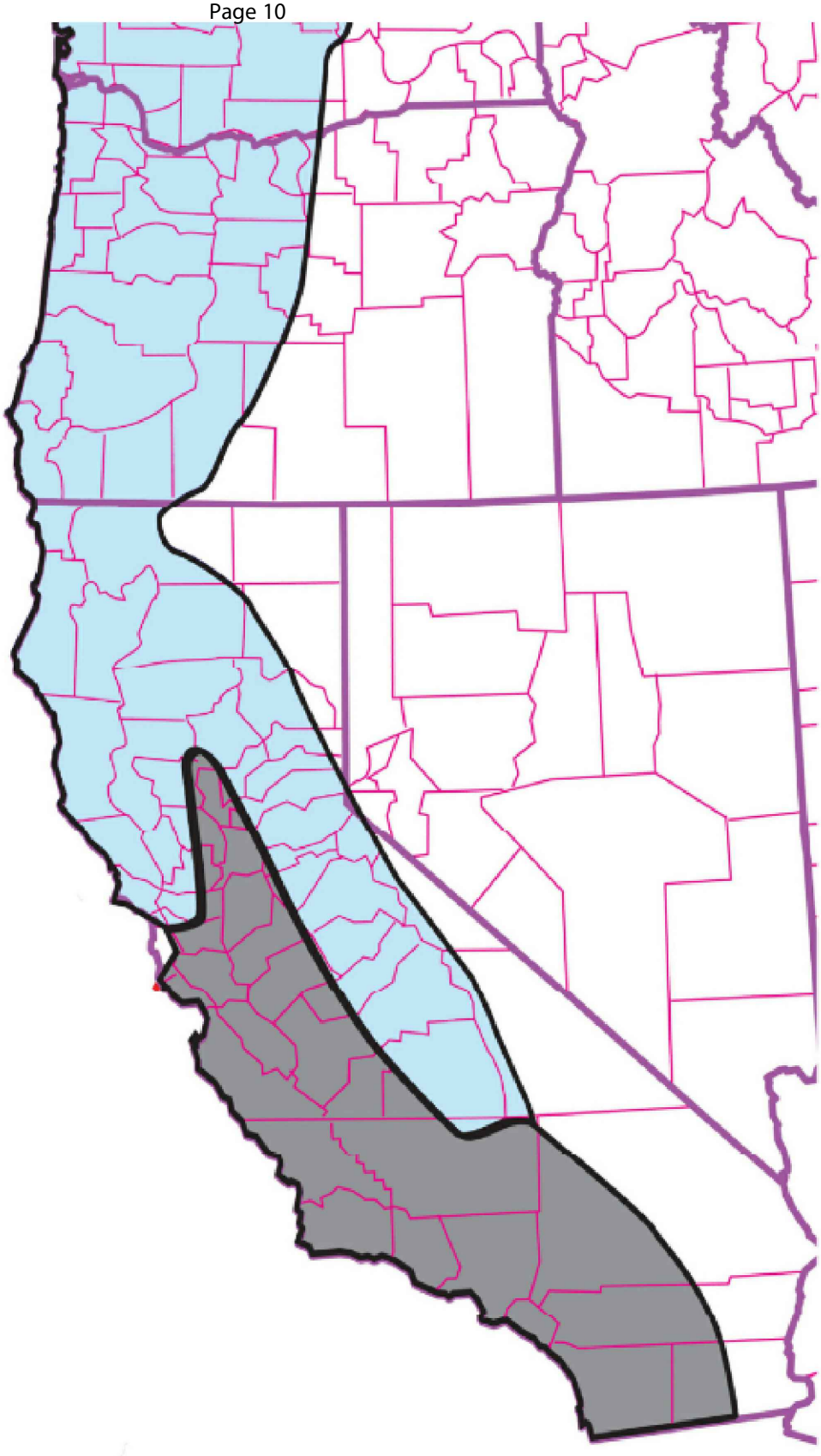
4.0 CONCLUSION

- The Coffin Butte Landfill expansion project will adhere to Corvallis stormwater design standards for Storm Drainage Facilities.
- When the Coffin Butte Landfill expansion area reaches final grades, the detention / wet pond facility will exceed the required stormwater storage capacity.
- The volume of the south basin retention pond exceeds the required volume of offsite flows from the south.
- An attenuated flow of 6.35 cfs will be added to the existing drainage channel north of Coffin Butte Road ultimately discharging into the existing detention pond.

5.0 REFERENCES

- 2015 Stormwater Design Standards, Corvallis, Oregon.
- National Oceanic and Atmospheric Administration (NOAA) Atlas 2.

APPENDIX A
HYDROLOGIC CALCULATIONS



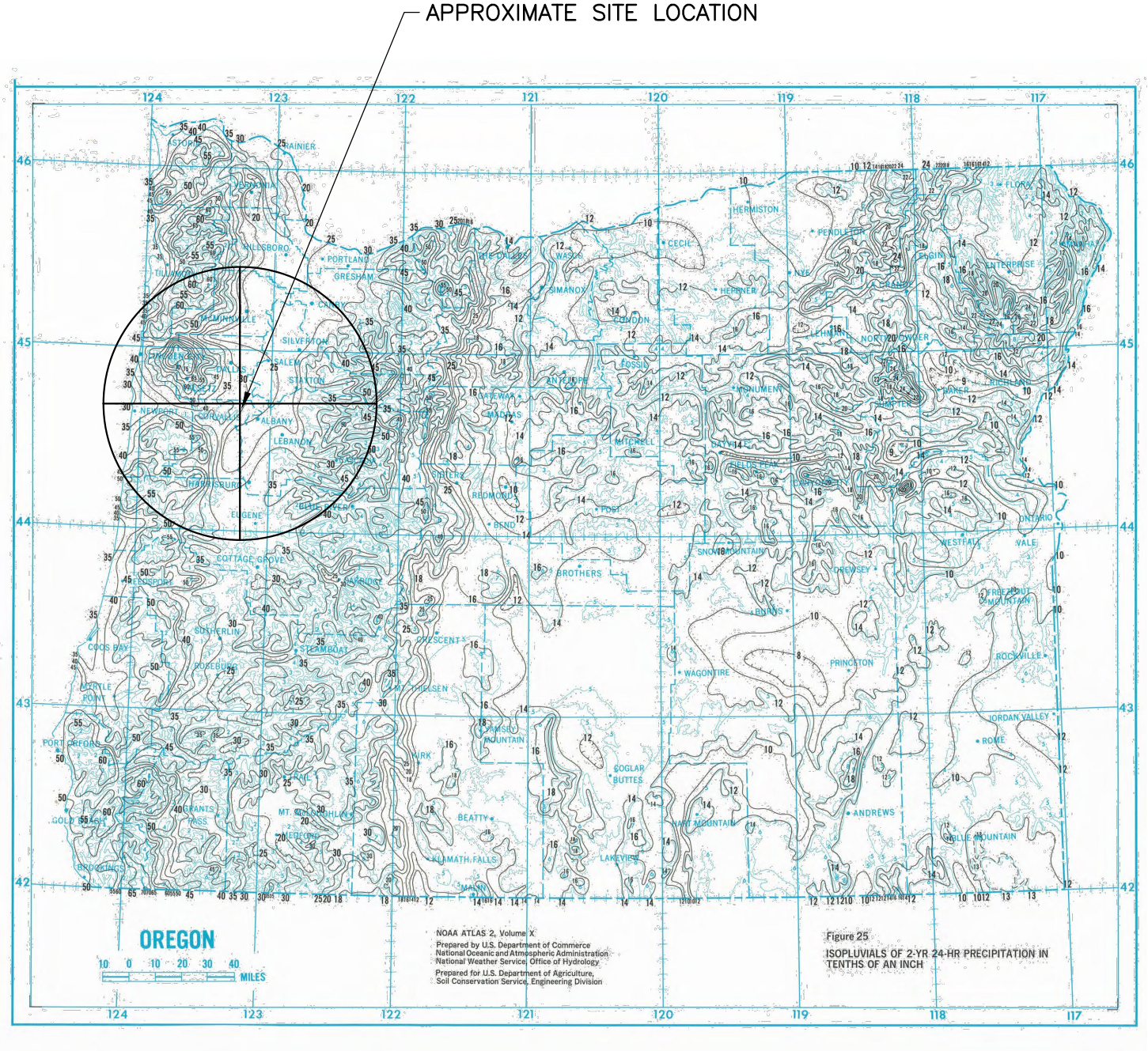
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way · Suite 120 · Gold River, CA 95670
Ph: 916.503.0050 · Fax: 916.503.0051
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
28972 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
SCS RAINFALL DISTRIBUTION

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:	1
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142		

P:\320-000\322-142\-CADD\Dwg\Exhibits\Drainage Report Exhibits\322142-1-SCS Rainfall Distribution.dwg{1} LS:(1/22/2025 - jshah) - LP: 1/29/2025 1:35 PM



2–YEAR 24–HOUR STORM = 3.10 IN

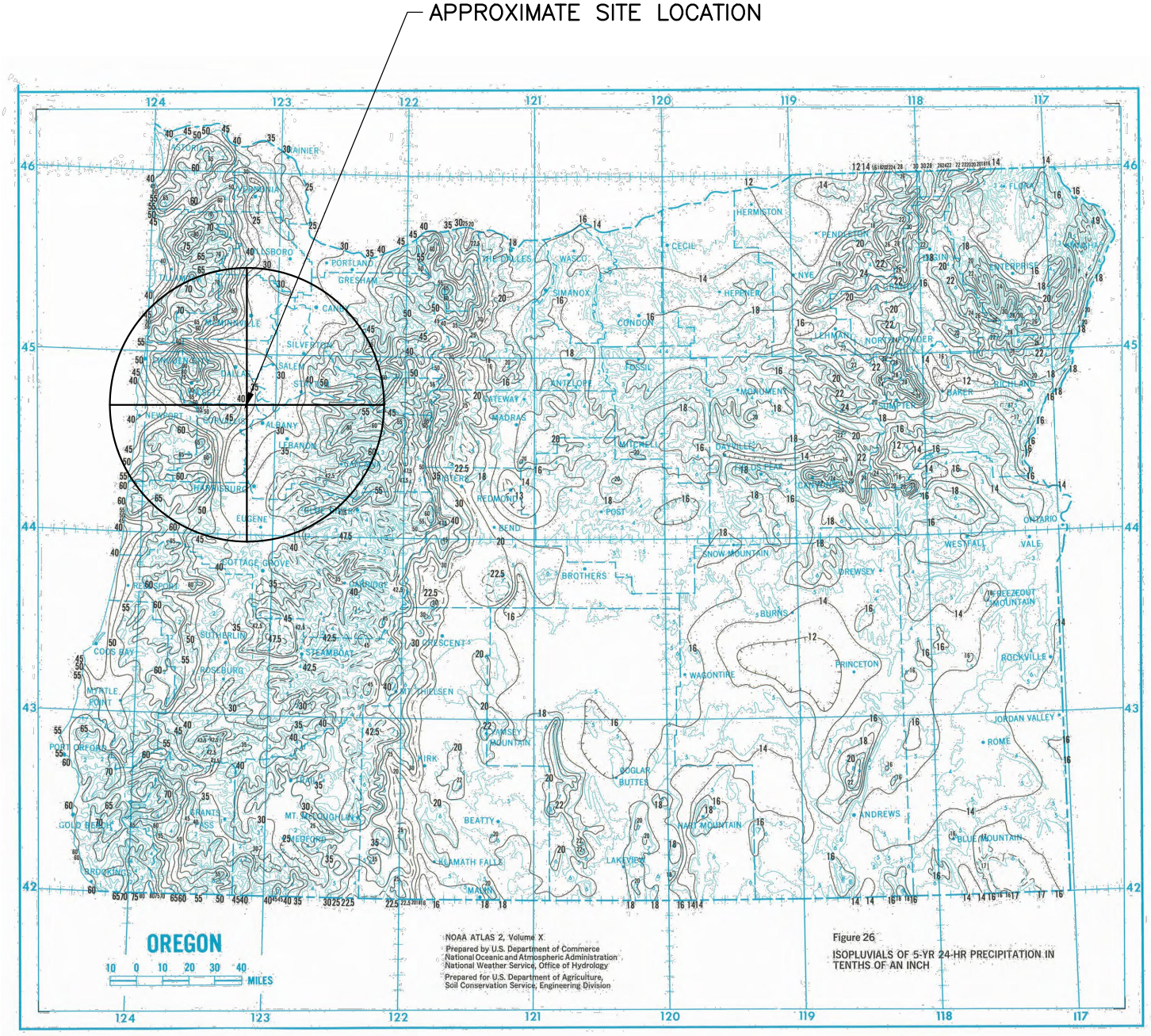
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way · Suite 120 · Gold River, CA 95670
Ph: 916.503.0050 · Fax: 916.503.0051
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
28972 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
2-YR 24-HR RAINFALL DISTRIBUTION MAP

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142	2

P:\320-000\322-142\-CADD\Dwg\Exhibits\Drainage Report Exhibits\322142-2 Yr Storm event.dwg{2} LS:(1/29/2025 - dbegeil) - LP: 1/29/2025 1:31 PM



5–YEAR 24–HOUR STORM = 3.80 IN

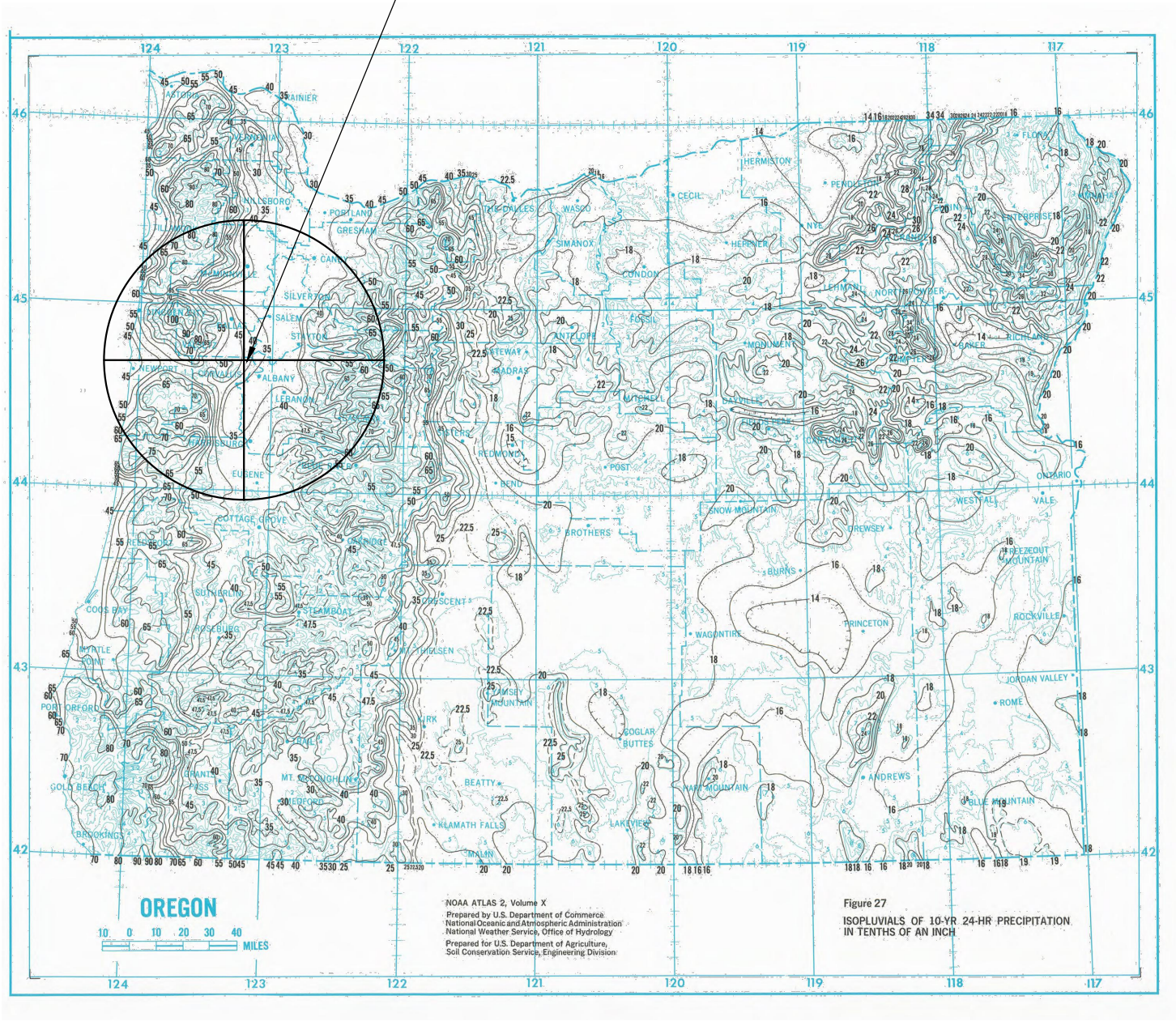
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way · Suite 120 · Gold River, CA 95670
Ph: 916.503.0050 · Fax: 916.503.0051
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
28972 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
5-YR 24-HR RAINFALL DISTRIBUTION MAP

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142	3

P:\320-000\322-142\-CADD\Dwg\Exhibits\Drainage Report Exhibits\322142-5 Yr Storm event.dwg{3} LS:(1/29/2025 - dbegeil) - LP: 1/29/2025 1:30 PM



10–YEAR 24–HOUR STORM = 4.40 IN

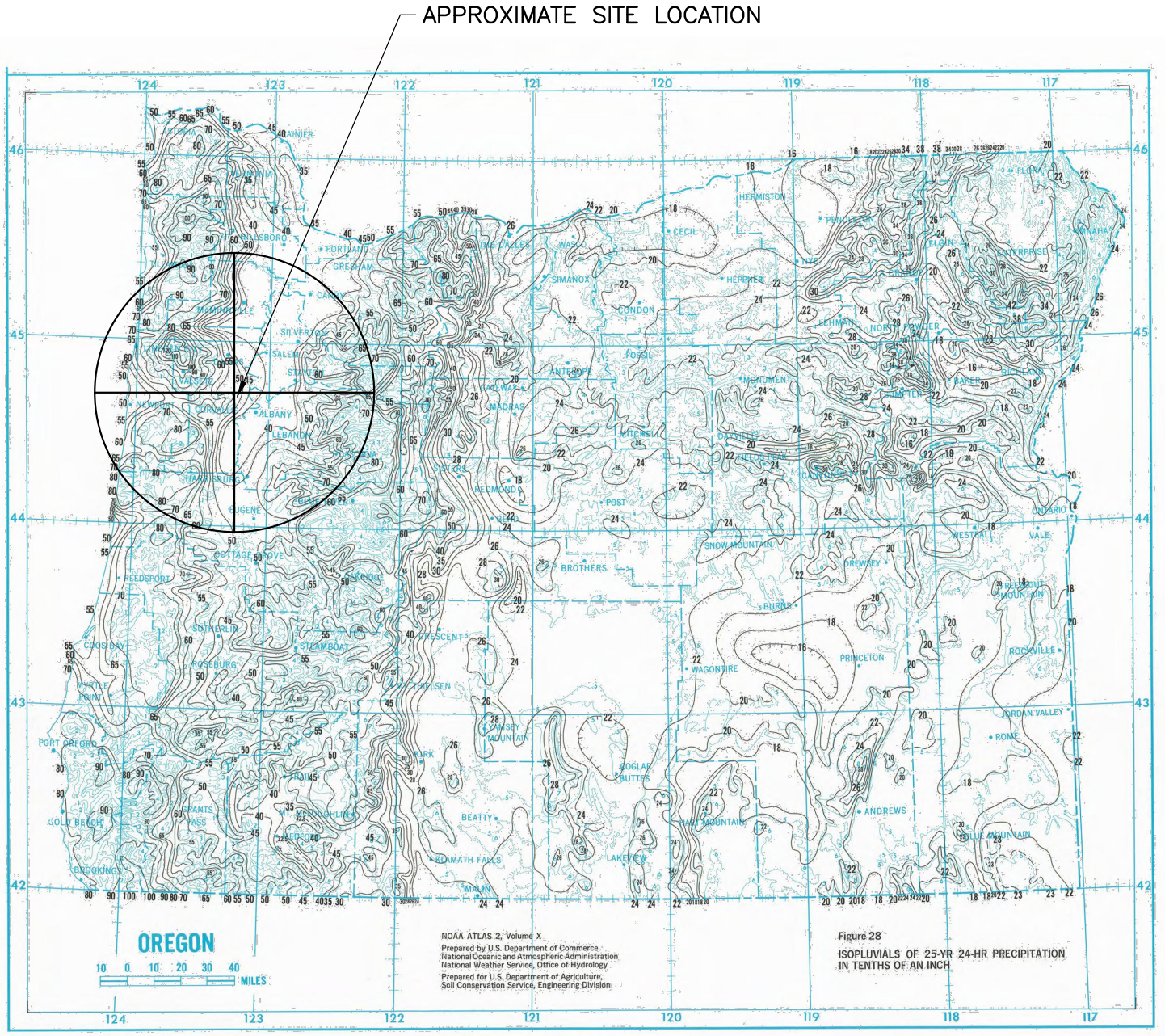
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way · Suite 120 · Gold River, CA 95670
Ph: 916.503.0050 · Fax: 916.503.0051
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
28972 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
10-YR 24-HR RAINFALL DISTRIBUTION MAP

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142	4

P:\320-000\322-142\-CADD\Dwg\Exhibits\Drainage Report Exhibits\322142-10 Yr Storm event.dwg{4} LS:(1/29/2025 - dbegeil) - LP: 1/29/2025 1:32 PM



25–YEAR 24–HOUR STORM = 5.10 IN

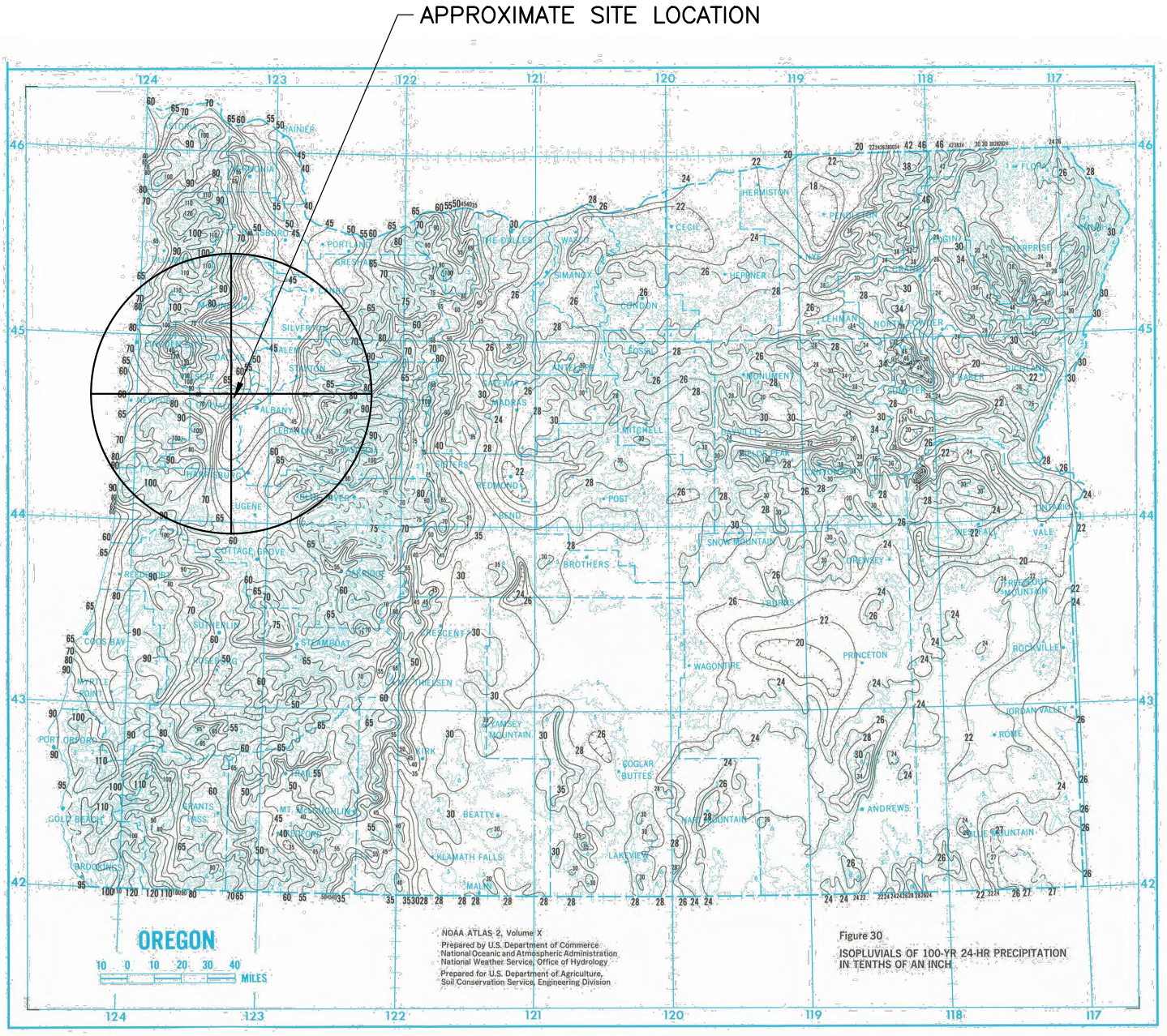
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way · Suite 120 · Gold River, CA 95670
Ph: 916.503.0050 · Fax: 916.503.0051
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
28972 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
25-YR 24-HR RAINFALL DISTRIBUTION MAP

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142	5

P:\320-000\322-142\-CADD\Dwg\Exhibits\Drainage Report Exhibits\322142-25 Yr Storm event.dwg{5} LS:(1/29/2025 - dbegeil) - LP: 1/29/2025 1:19 PM



100–YEAR 24–HOUR STORM = 6.40 IN

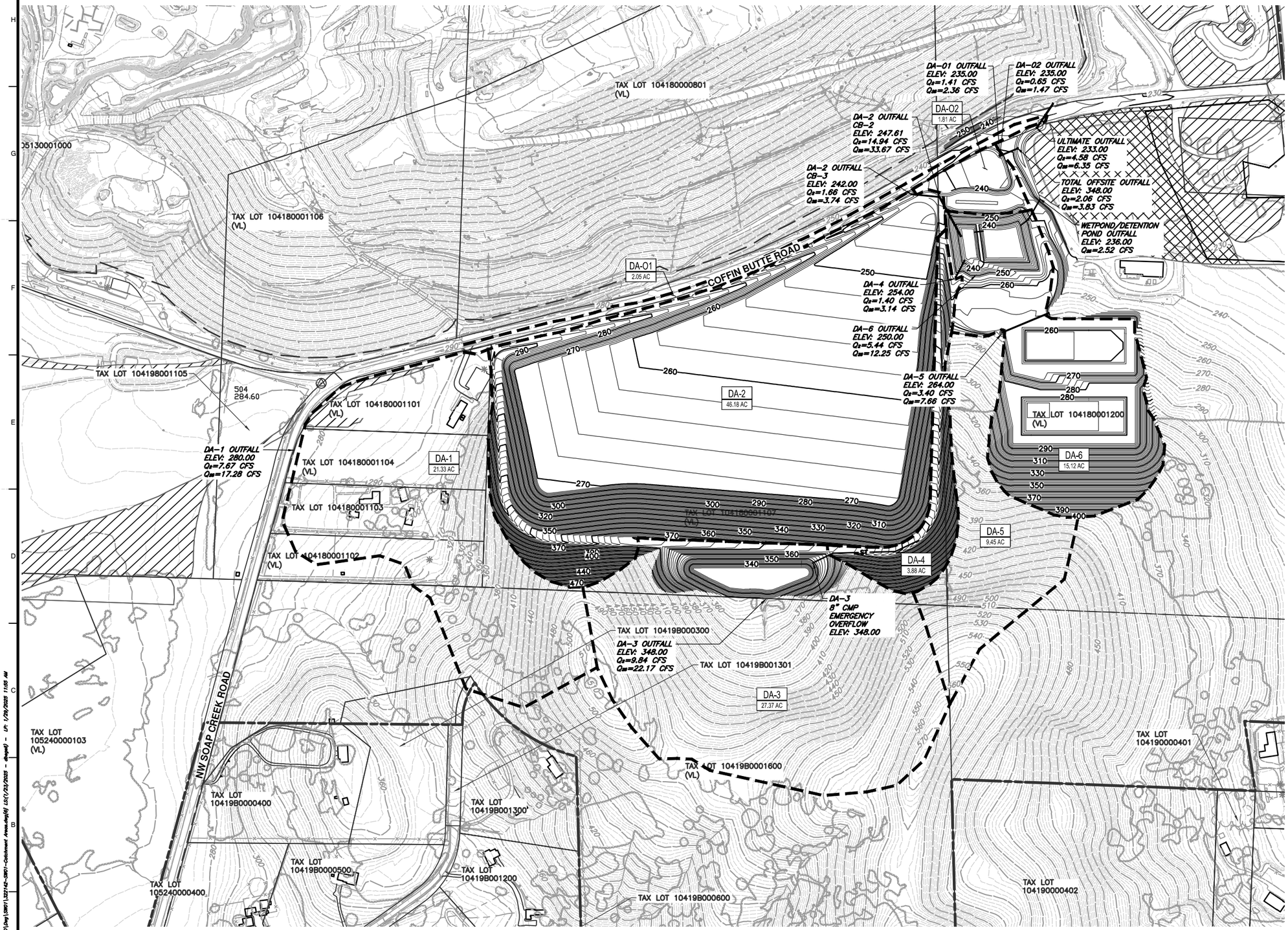
Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way · Suite 120 · Gold River, CA 95670
Ph: 916.503.0050 · Fax: 916.503.0051
www.cecinc.com

REPUBLIC SERVICES
COFFIN BUTTE LANDFILL
28972 COFFIN BUTTE ROAD
CORVALLIS, OR 97330

CONDITIONAL USE PERMIT APPLICATION
25-YR 24-HR RAINFALL DISTRIBUTION MAP

DRAWN BY:	JS	CHECKED BY:	JAS	APPROVED BY:	JAS	FIGURE NO.:
DATE:	JANUARY 2025	DWG SCALE:	N.T.S.	PROJECT NO:	322-142	6

P:\320-000\322-142\-CADD\Dwg\Exhibits\Drainage Report Exhibits\322142-100 Yr Storm event.dwg{6} LS:(1/29/2025 - dbegell) - LP: 1/29/2025 1:50 PM



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 PROPOSED 10-FT CONTOUR
- 254 PROPOSD 2-FT CONTOUR
- DRAINAGE AREA BOUNDARY
- DA-# #.## DRAINAGE AREA BOUNDARY

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REGISTERED PROFESSIONAL ENGINEER 92360PE OREGON JULY 13, 2017 JEFF A. SHEPHERD EXPIRES: 06/30/2026

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

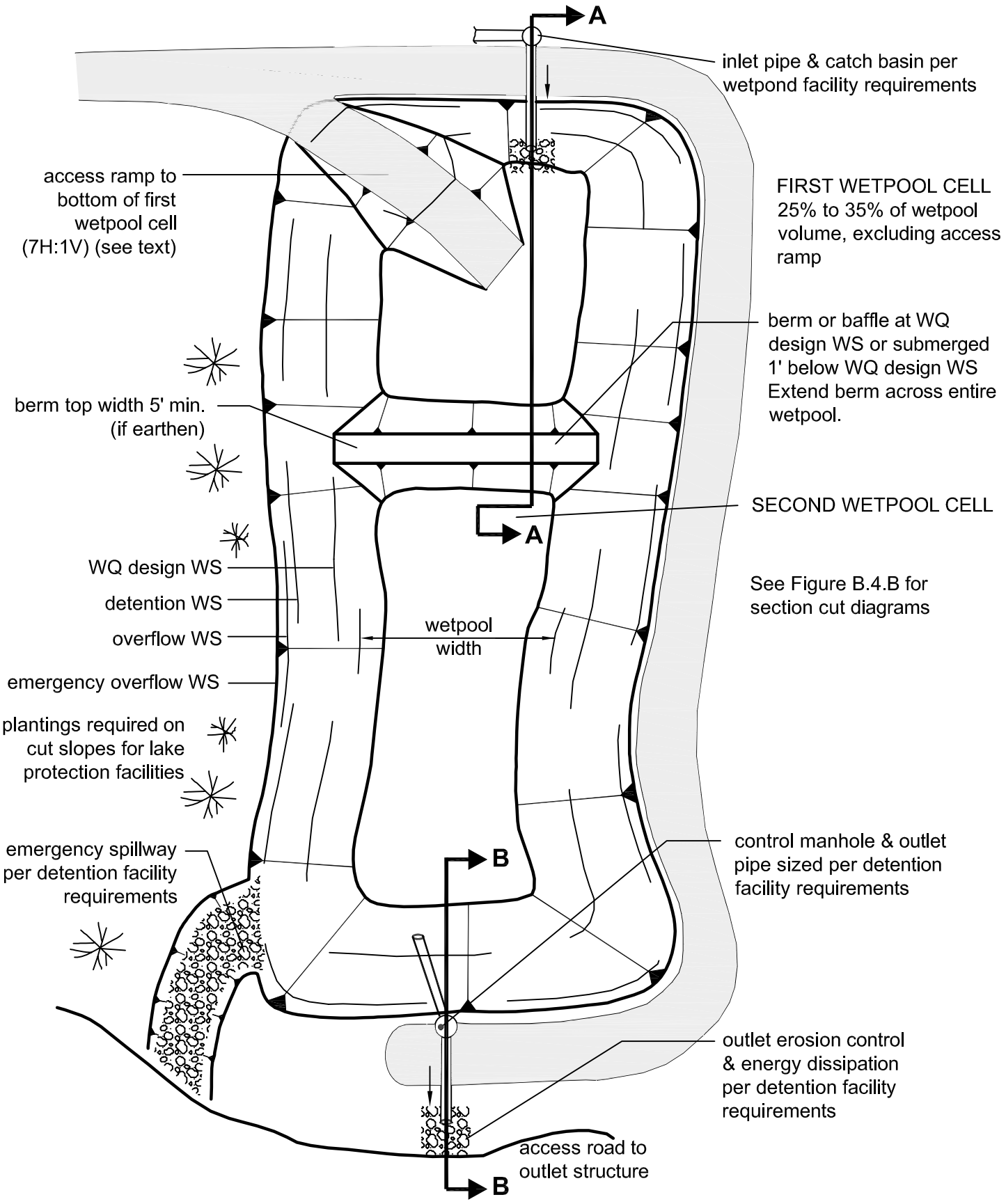
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

DRAINAGE AREA MAP

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

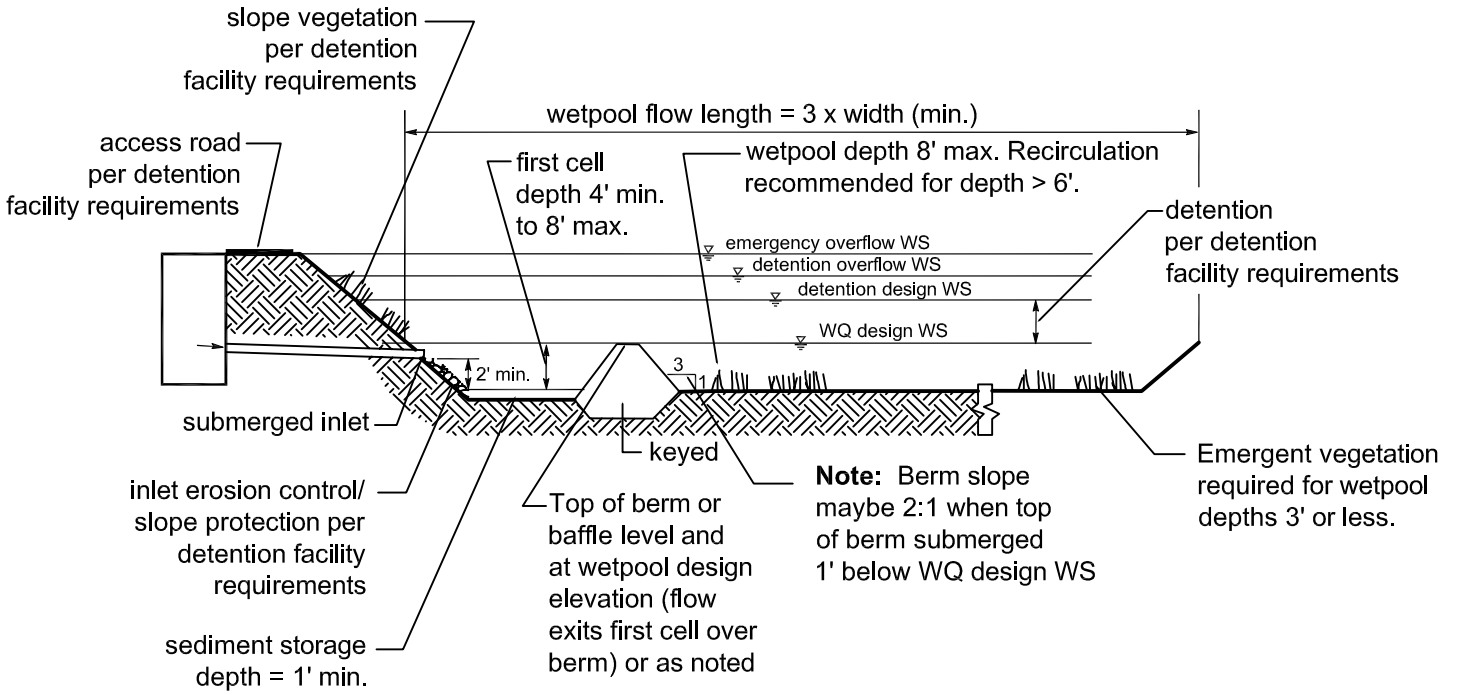
FIGURE NO.: 6
SHEET OF

FIGURE 8. COMBINED DETENTION AND WETPOND

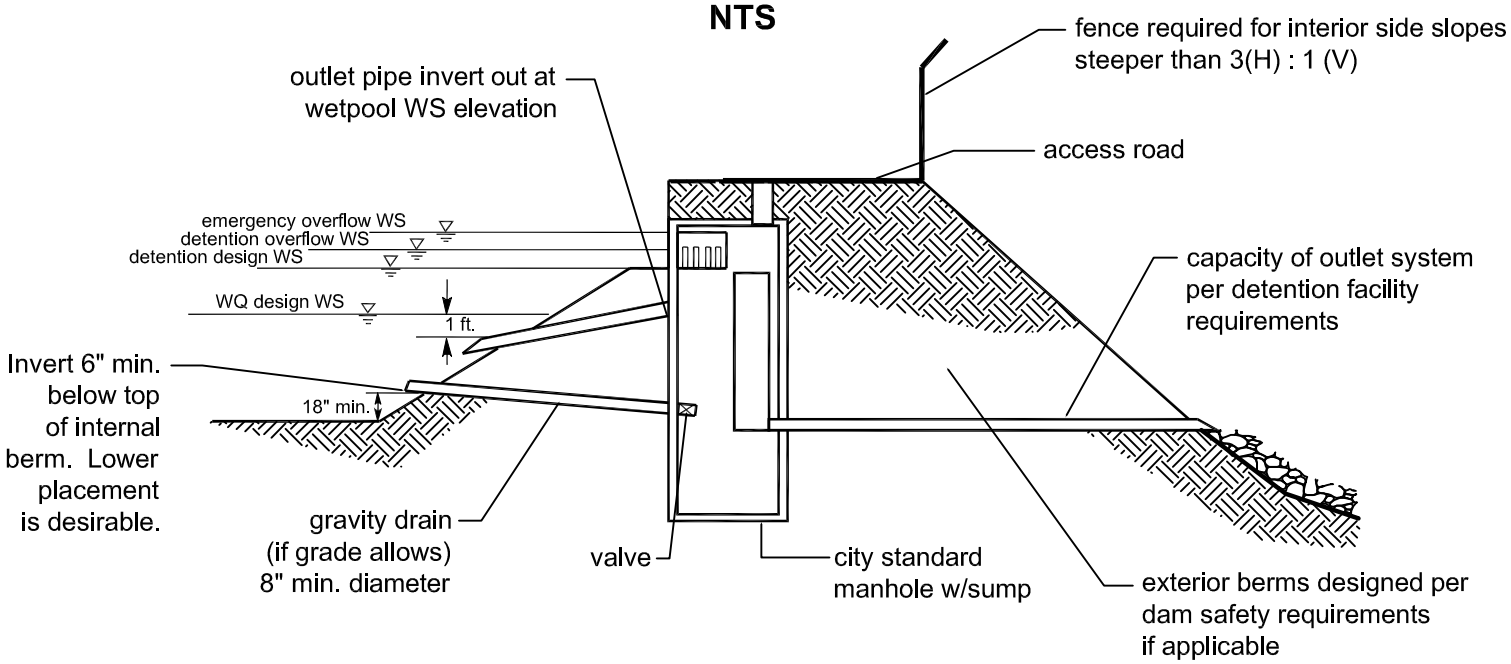


PLAN VIEW
NTS

FIGURE 9. COMBINED DETENTION AND WETPOND SECTIONS



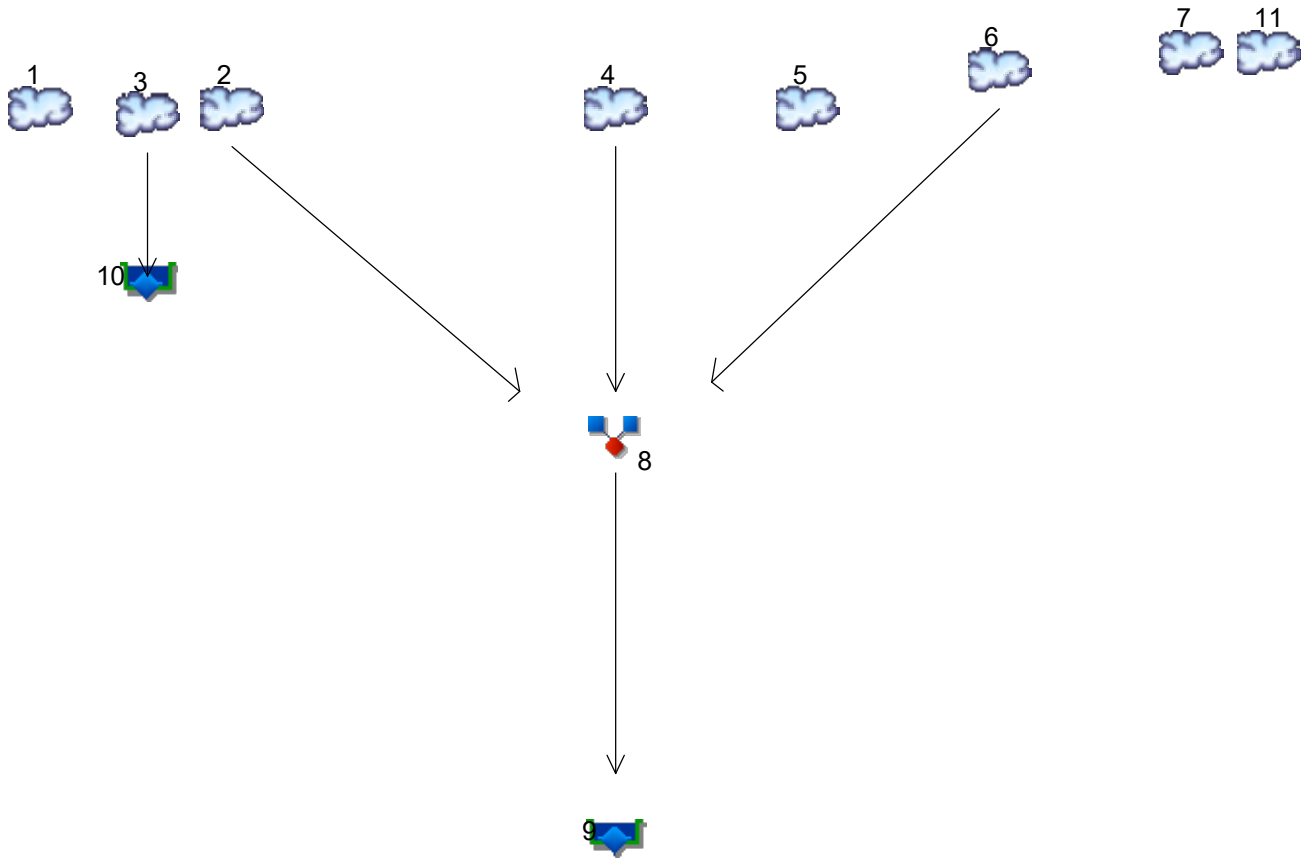
SECTION A-A
NTS



SECTION B-B
NTS

APPENDIX B
HYDRAULIC CALCULATIONS

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	DA-1
2	SCS Runoff	DA-2
3	SCS Runoff	DA-3
4	SCS Runoff	DA-4
5	SCS Runoff	DA-5
6	SCS Runoff	DA-6
7	SCS Runoff	DA-O1
8	Combine	North Pond Routing
9	Reservoir	Wet Pond / Detention P
10	Reservoir	South Basin
11	SCS Runoff	DA-O2

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

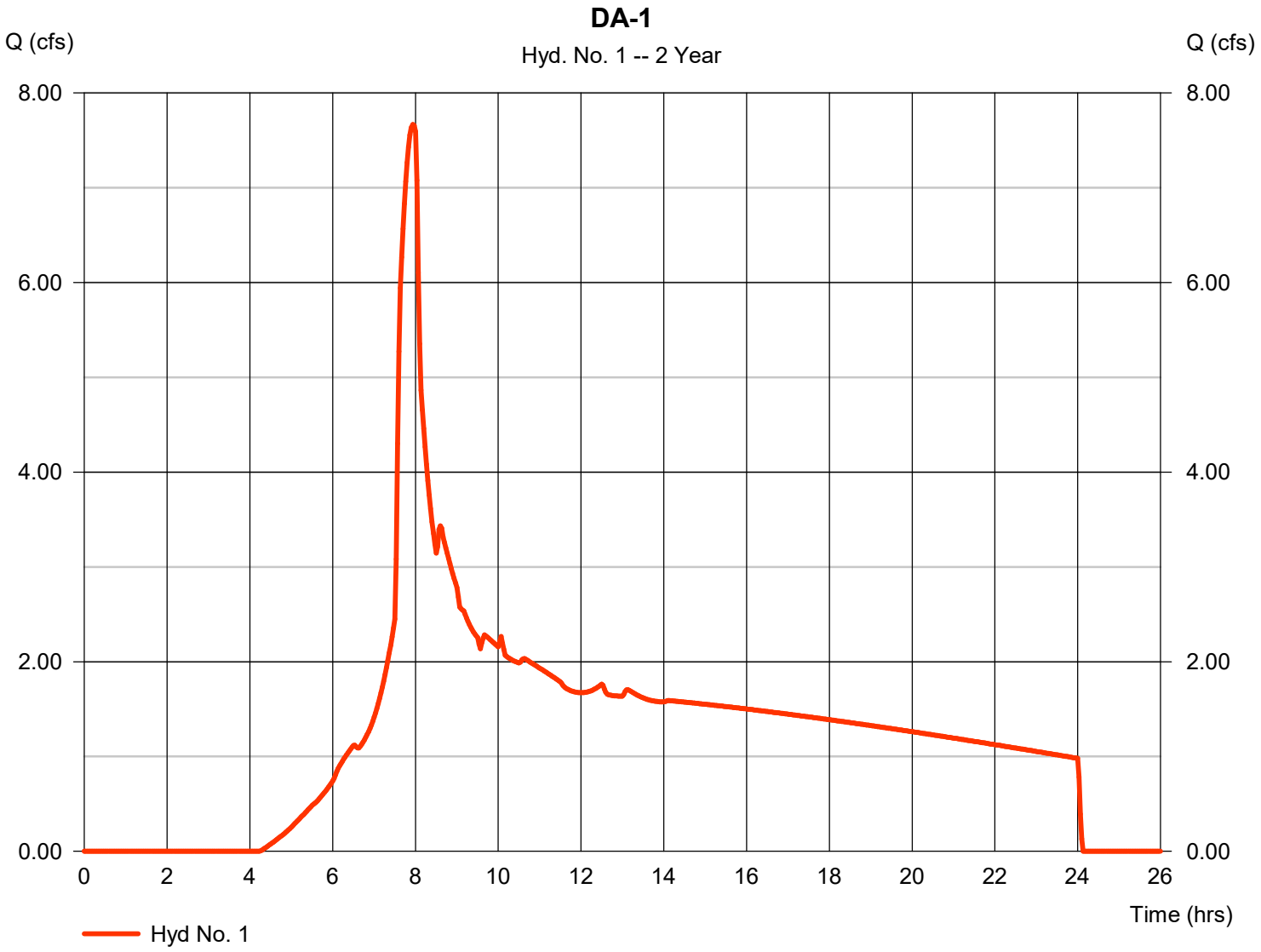
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	7.668	2	476	116,065	------	------	------	DA-1
2	SCS Runoff	16.60	2	476	251,284	------	------	------	DA-2
3	SCS Runoff	9.840	2	476	148,931	------	------	------	DA-3
4	SCS Runoff	1.395	2	476	21,113	------	------	------	DA-4
5	SCS Runoff	3.397	2	476	51,421	------	------	------	DA-5
6	SCS Runoff	5.436	2	476	82,274	------	------	------	DA-6
7	SCS Runoff	1.412	2	470	20,007	------	------	------	DA-O1
8	Combine	23.43	2	476	354,671	2, 4, 6,	------	------	North Pond Routing
9	Reservoir	1.230	2	1444	147,353	8	242.85	322,800	Wet Pond / Detention P
10	Reservoir	0.000	2	n/a	0	3	336.24	148,931	South Basin
11	SCS Runoff	0.651	2	476	9,849	------	------	------	DA-O2

Hydrograph Report

Hyd. No. 1

DA-1

Hydrograph type	= SCS Runoff	Peak discharge	= 7.668 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 116,065 cuft
Drainage area	= 21.330 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

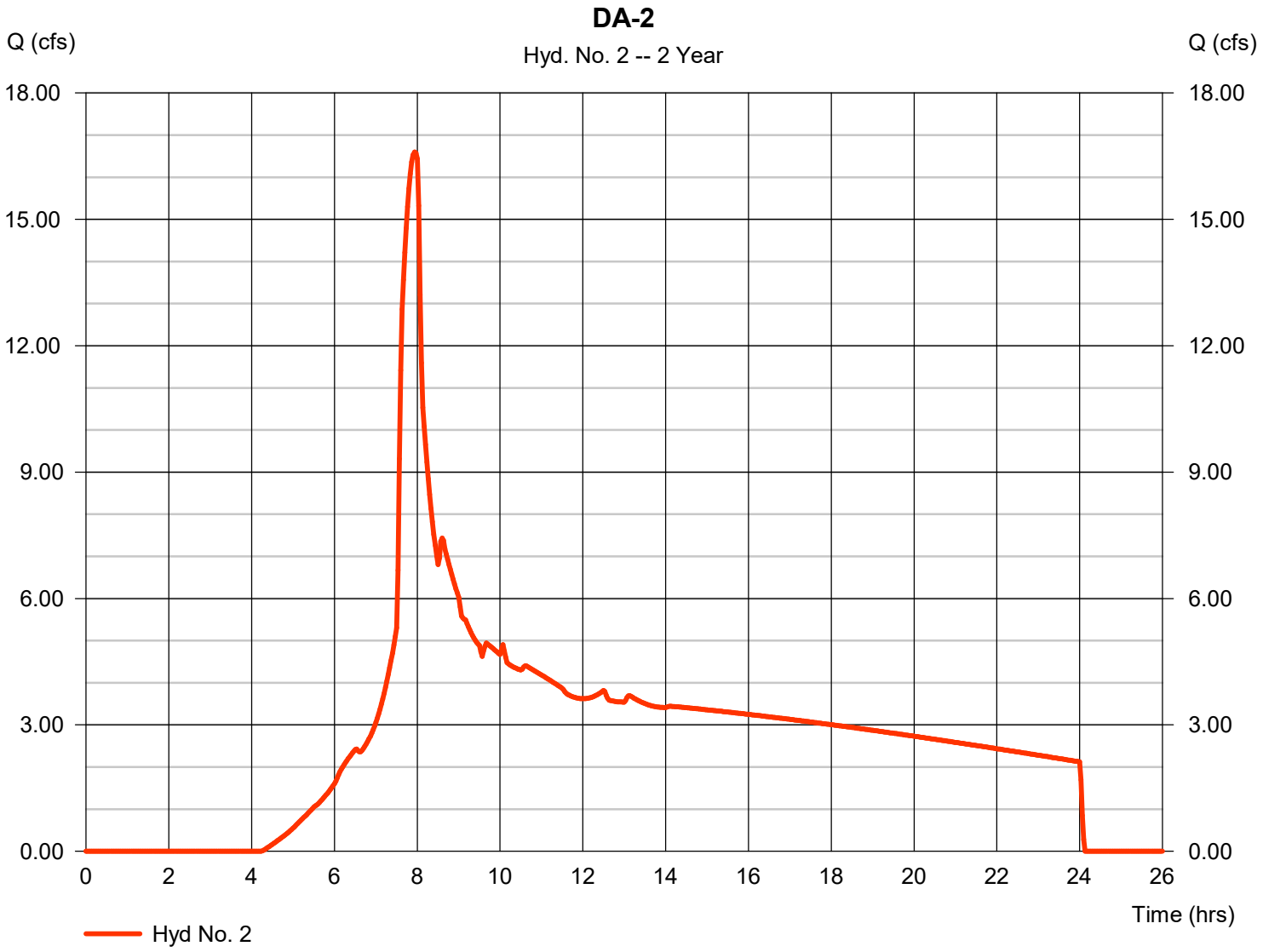


Hydrograph Report

Hyd. No. 2

DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 16.60 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 251,284 cuft
Drainage area	= 46.180 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

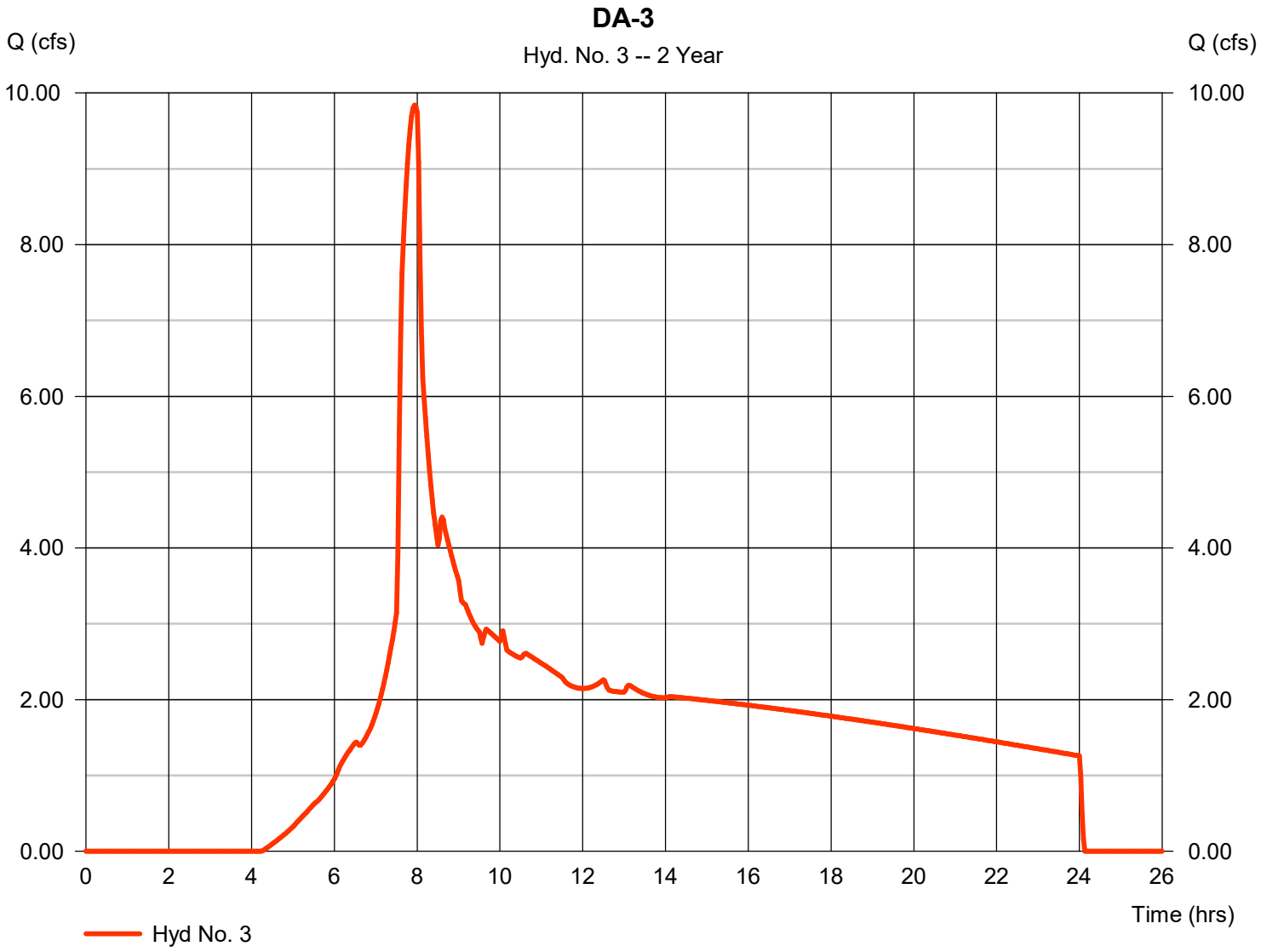


Hydrograph Report

Hyd. No. 3

DA-3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.840 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 148,931 cuft
Drainage area	= 27.370 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

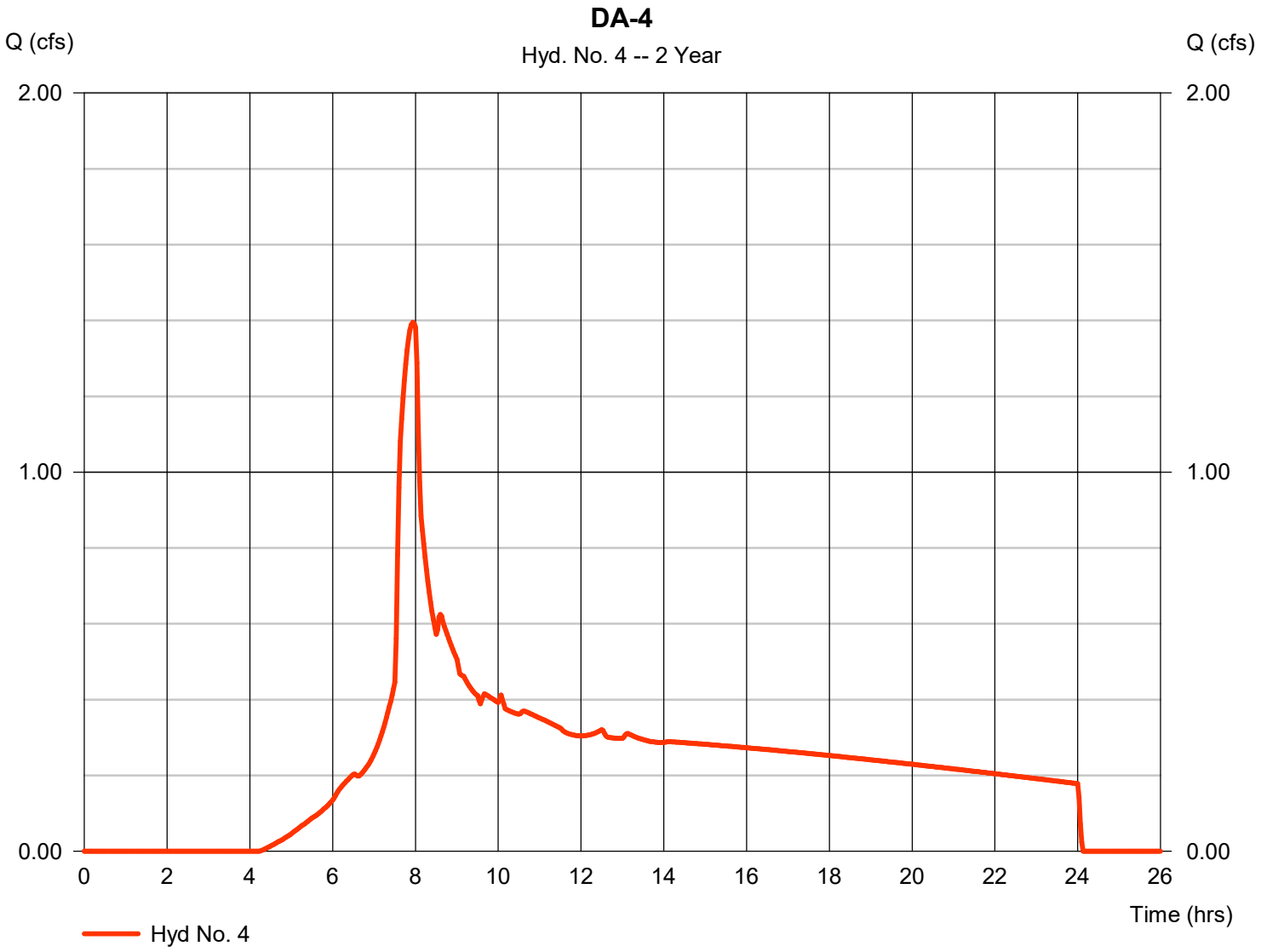


Hydrograph Report

Hyd. No. 4

DA-4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.395 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 21,113 cuft
Drainage area	= 3.880 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

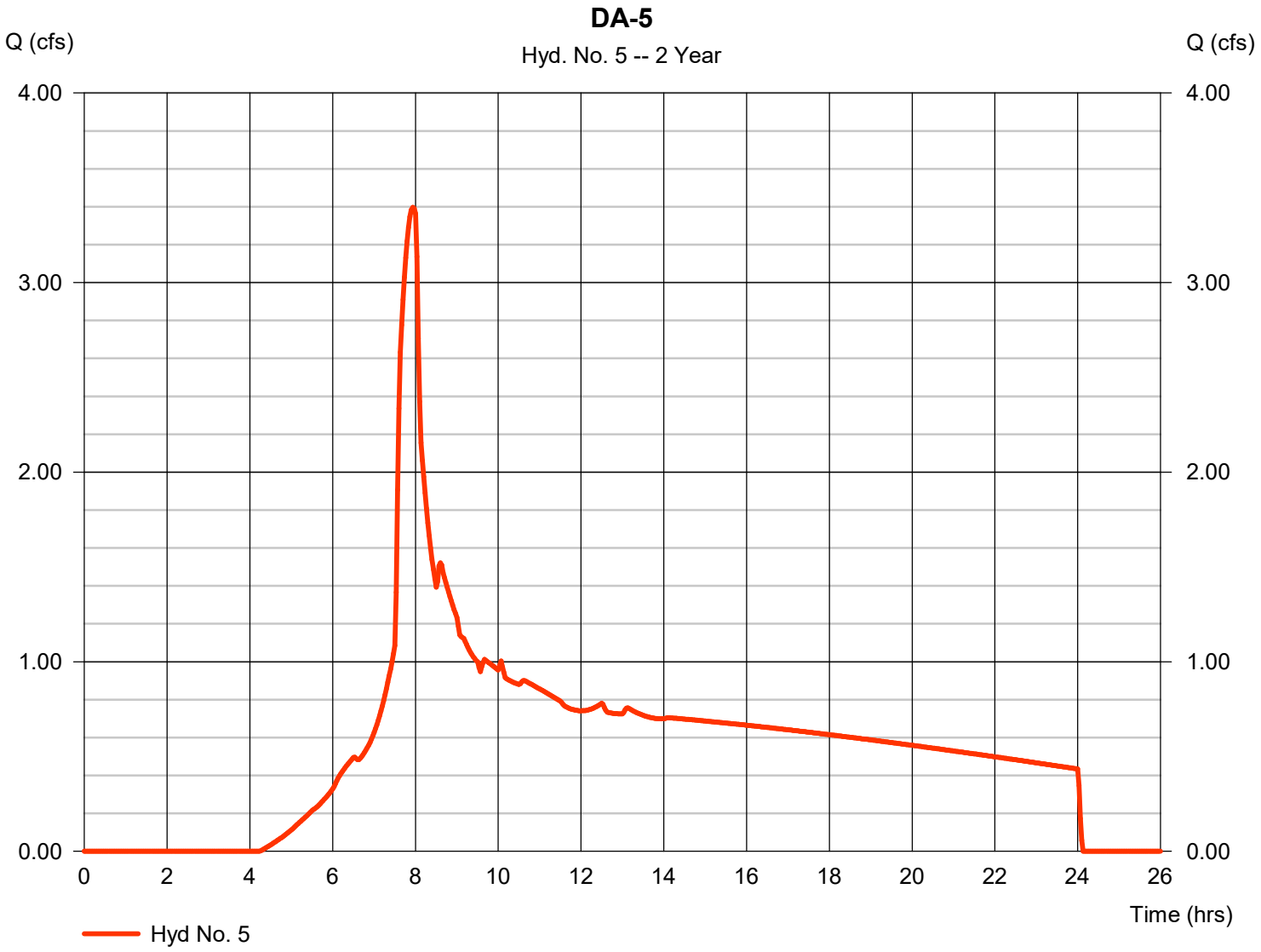


Hydrograph Report

Hyd. No. 5

DA-5

Hydrograph type	= SCS Runoff	Peak discharge	= 3.397 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 51,421 cuft
Drainage area	= 9.450 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

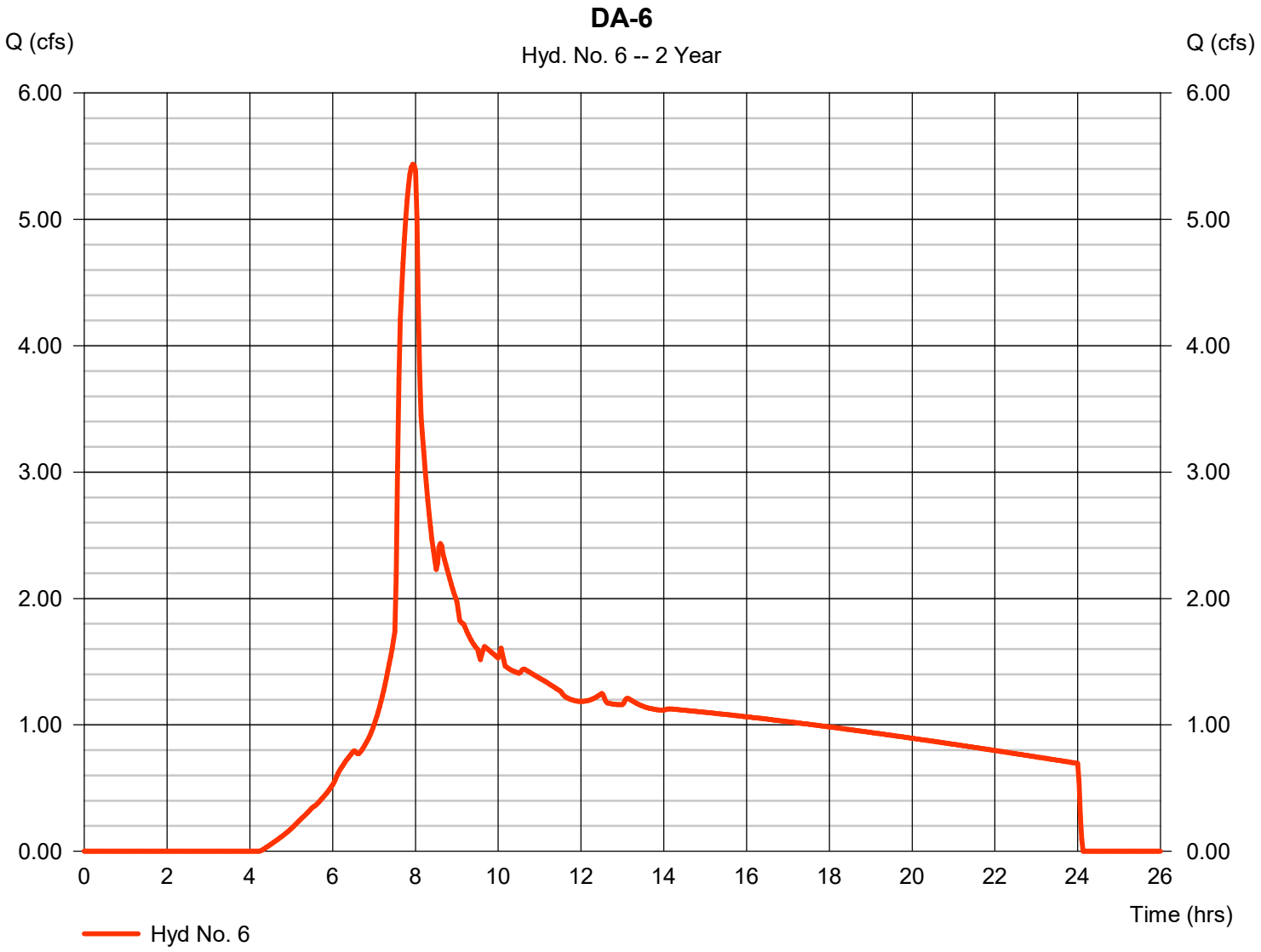


Hydrograph Report

Hyd. No. 6

DA-6

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.436 cfs
Storm frequency	=	2 yrs	Time to peak	=	7.93 hrs
Time interval	=	2 min	Hyd. volume	=	82,274 cuft
Drainage area	=	15.120 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484



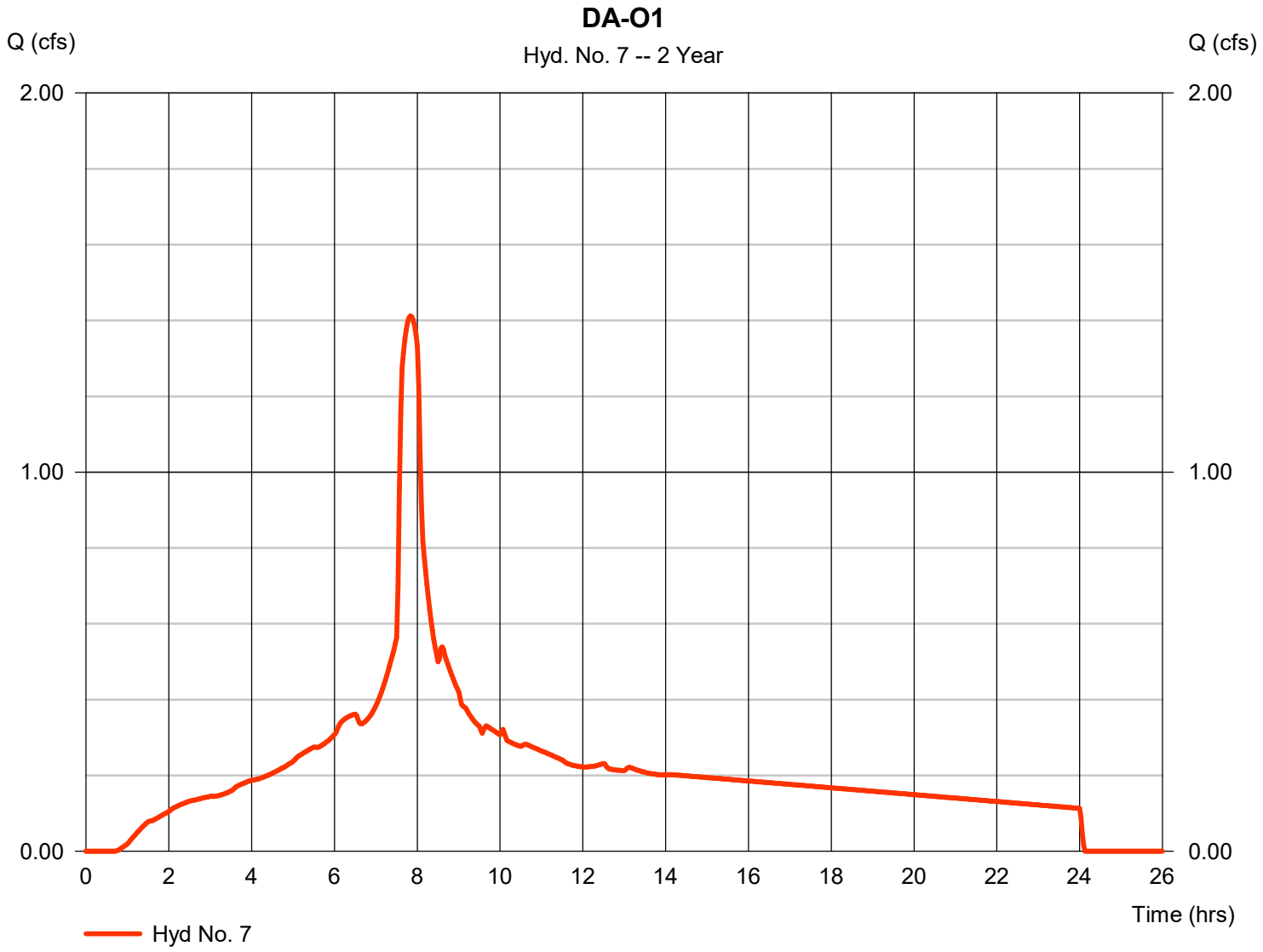
Hydrograph Report

Hyd. No. 7

DA-O1

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.412 cfs
Storm frequency	=	2 yrs	Time to peak	=	7.83 hrs
Time interval	=	2 min	Hyd. volume	=	20,007 cuft
Drainage area	=	2.050 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.820 x 84) + (2.050 x 98)] / 2.050

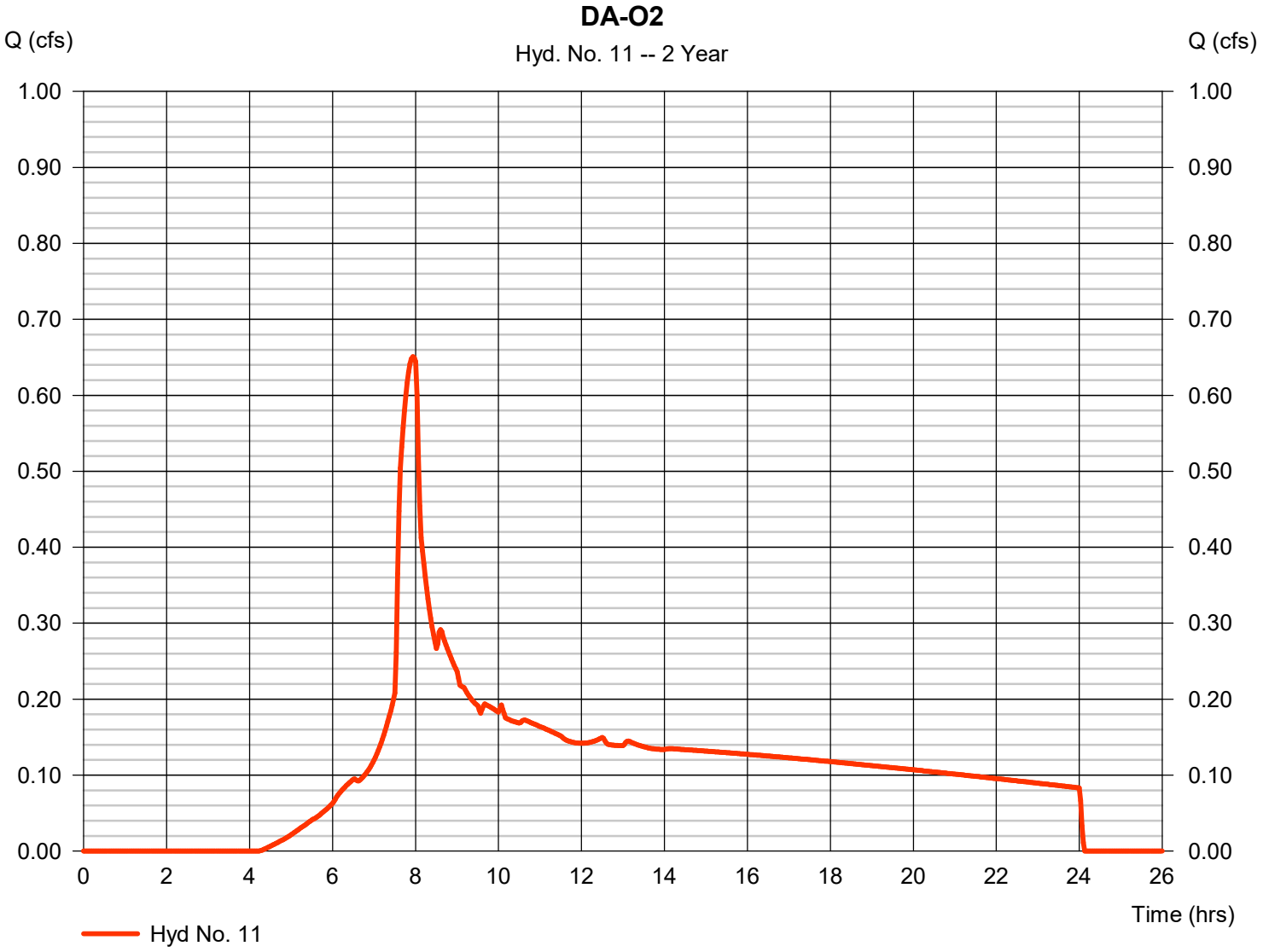


Hydrograph Report

Hyd. No. 11

DA-O2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.651 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 9,849 cuft
Drainage area	= 1.810 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

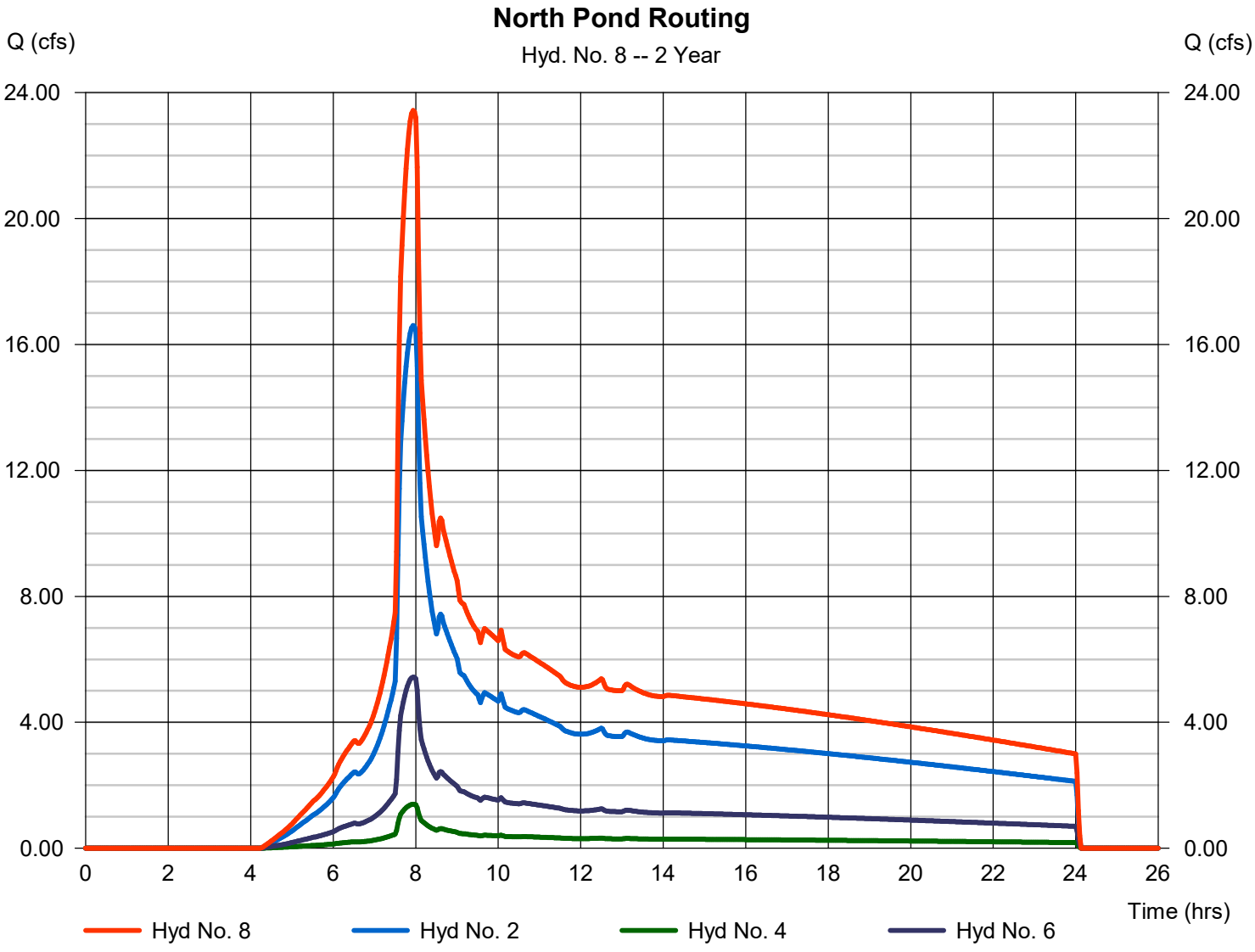


Hydrograph Report

Hyd. No. 8

North Pond Routing

Hydrograph type	= Combine	Peak discharge	= 23.43 cfs
Storm frequency	= 2 yrs	Time to peak	= 7.93 hrs
Time interval	= 2 min	Hyd. volume	= 354,671 cuft
Inflow hyds.	= 2, 4, 6	Contrib. drain. area	= 65.180 ac



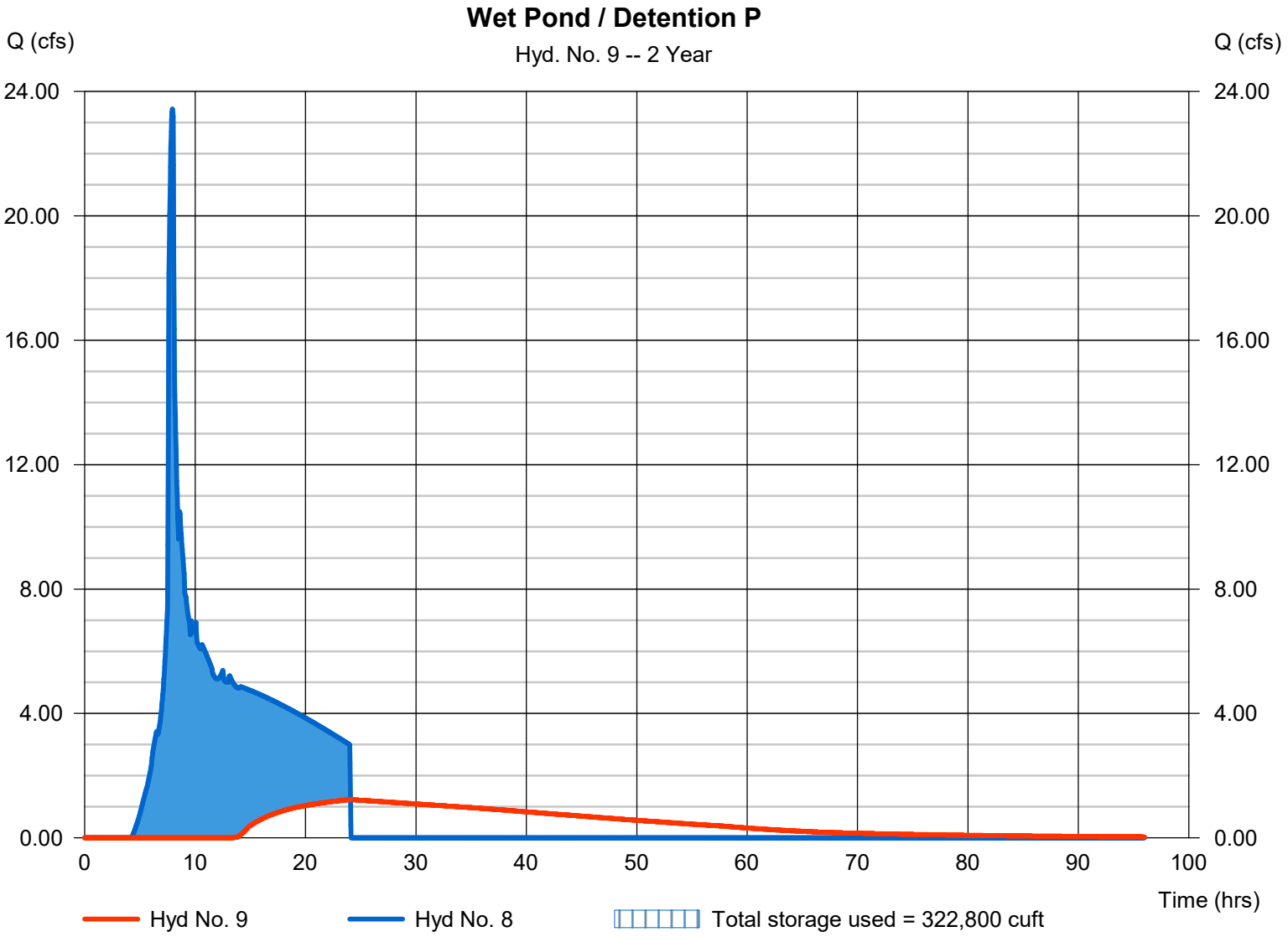
Hydrograph Report

Hyd. No. 9

Wet Pond / Detention P

Hydrograph type	= Reservoir	Peak discharge	= 1.230 cfs
Storm frequency	= 2 yrs	Time to peak	= 24.07 hrs
Time interval	= 2 min	Hyd. volume	= 147,353 cuft
Inflow hyd. No.	= 8 - North Pond Routing	Max. Elevation	= 242.85 ft
Reservoir name	= Wet Pond / Detention Pond	Max. Storage	= 322,800 cuft

Storage Indication method used.



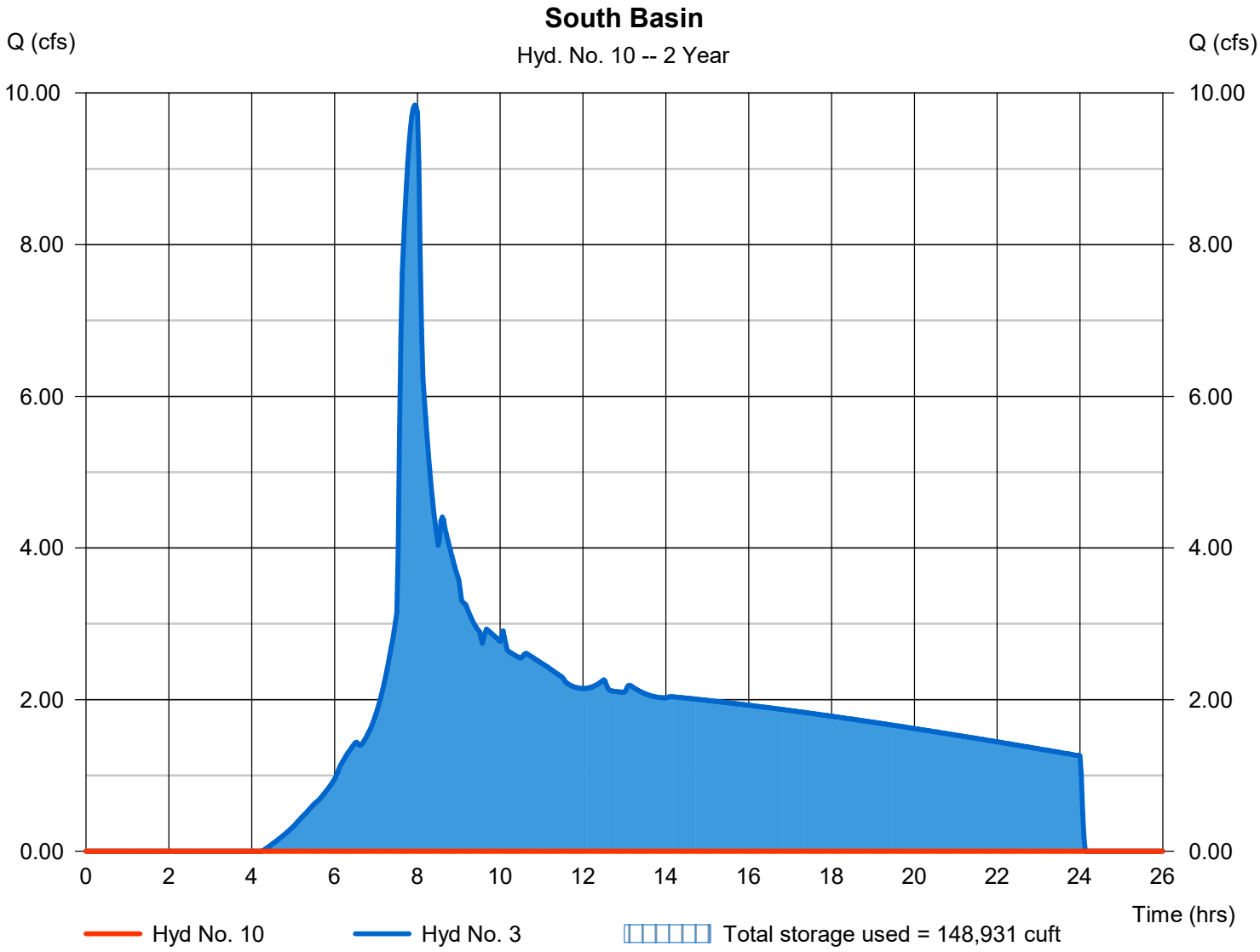
Hydrograph Report

Hyd. No. 10

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	2 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	3 - DA-3	Max. Elevation	=	336.24 ft
Reservoir name	=	South Basin	Max. Storage	=	148,931 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

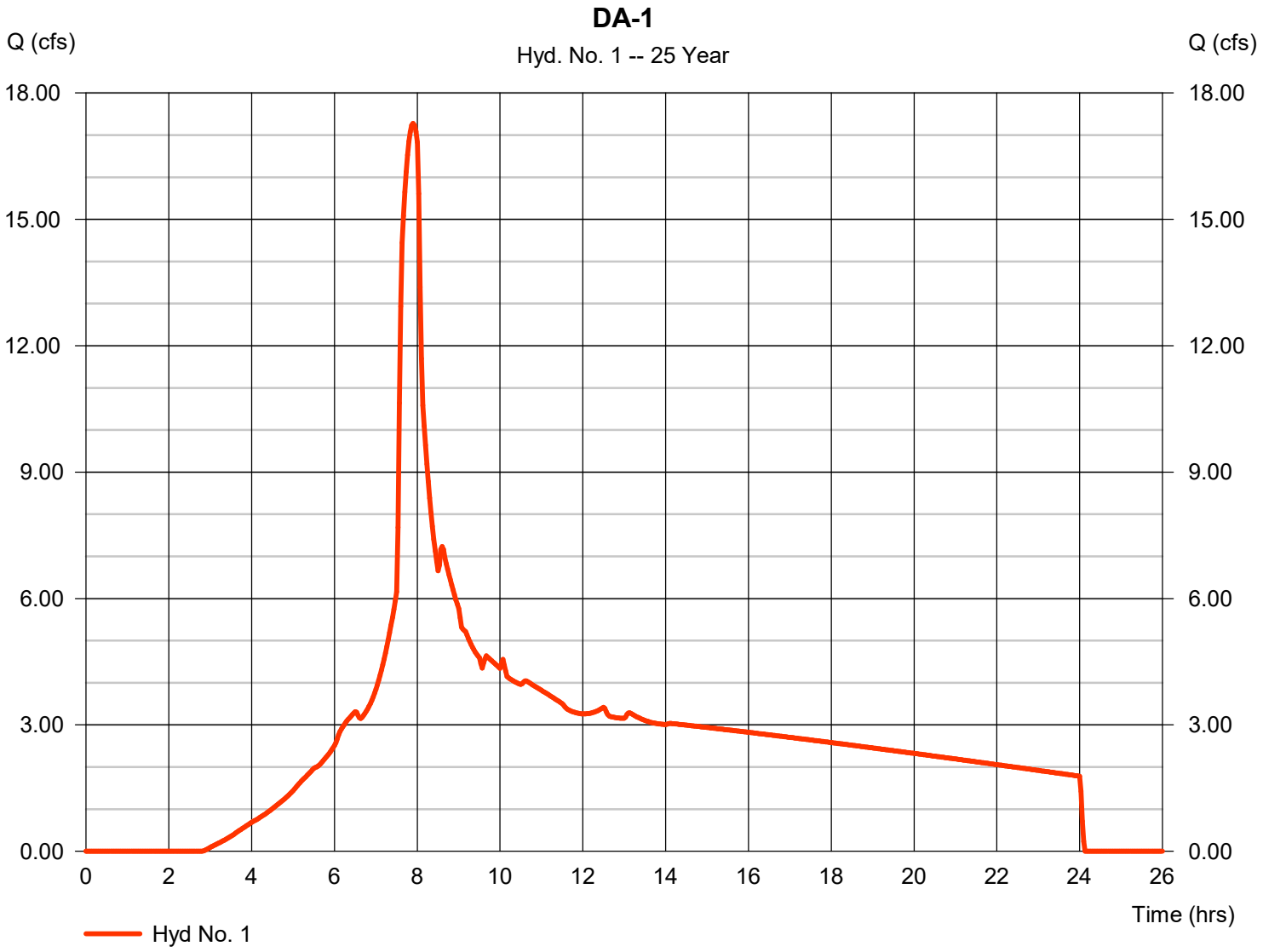
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	17.28	2	474	244,045	------	------	------	DA-1
2	SCS Runoff	37.41	2	474	528,364	------	------	------	DA-2
3	SCS Runoff	22.17	2	474	313,151	------	------	------	DA-3
4	SCS Runoff	3.143	2	474	44,393	------	------	------	DA-4
5	SCS Runoff	7.655	2	474	108,121	------	------	------	DA-5
6	SCS Runoff	12.25	2	474	172,994	------	------	------	DA-6
7	SCS Runoff	2.356	2	470	33,926	------	------	------	DA-O1
8	Combine	52.80	2	474	745,749	2, 4, 6,	------	------	North Pond Routing
9	Reservoir	2.275	2	1444	498,694	8	248.25	643,196	Wet Pond / Detention P
10	Reservoir	0.000	2	n/a	0	3	340.03	313,150	South Basin
11	SCS Runoff	1.466	2	474	20,709	------	------	------	DA-O2

Hydrograph Report

Hyd. No. 1

DA-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.28 cfs
Storm frequency	=	25 yrs	Time to peak	=	7.90 hrs
Time interval	=	2 min	Hyd. volume	=	244,045 cuft
Drainage area	=	21.330 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484

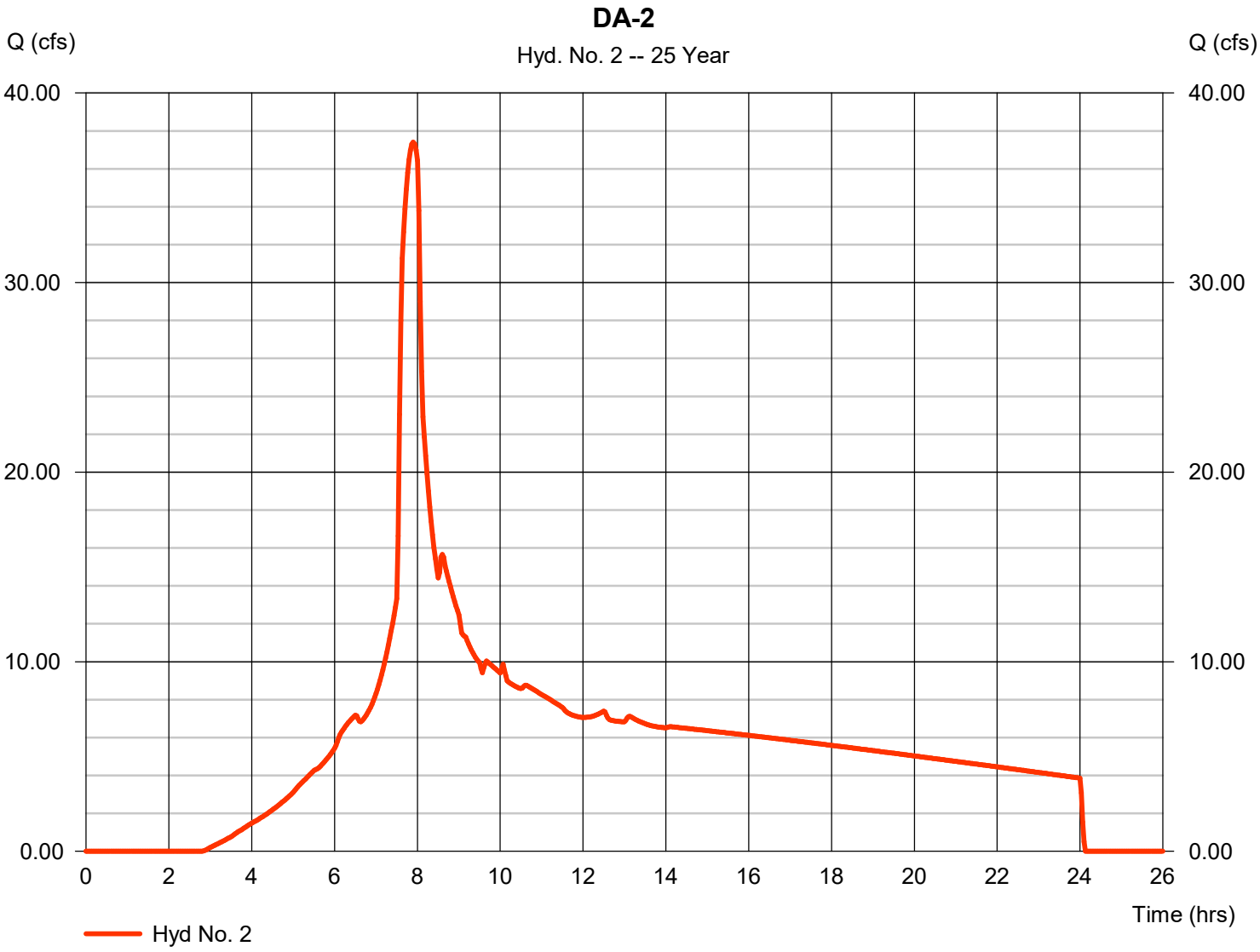


Hydrograph Report

Hyd. No. 2

DA-2

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.41 cfs
Storm frequency	=	25 yrs	Time to peak	=	7.90 hrs
Time interval	=	2 min	Hyd. volume	=	528,364 cuft
Drainage area	=	46.180 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484

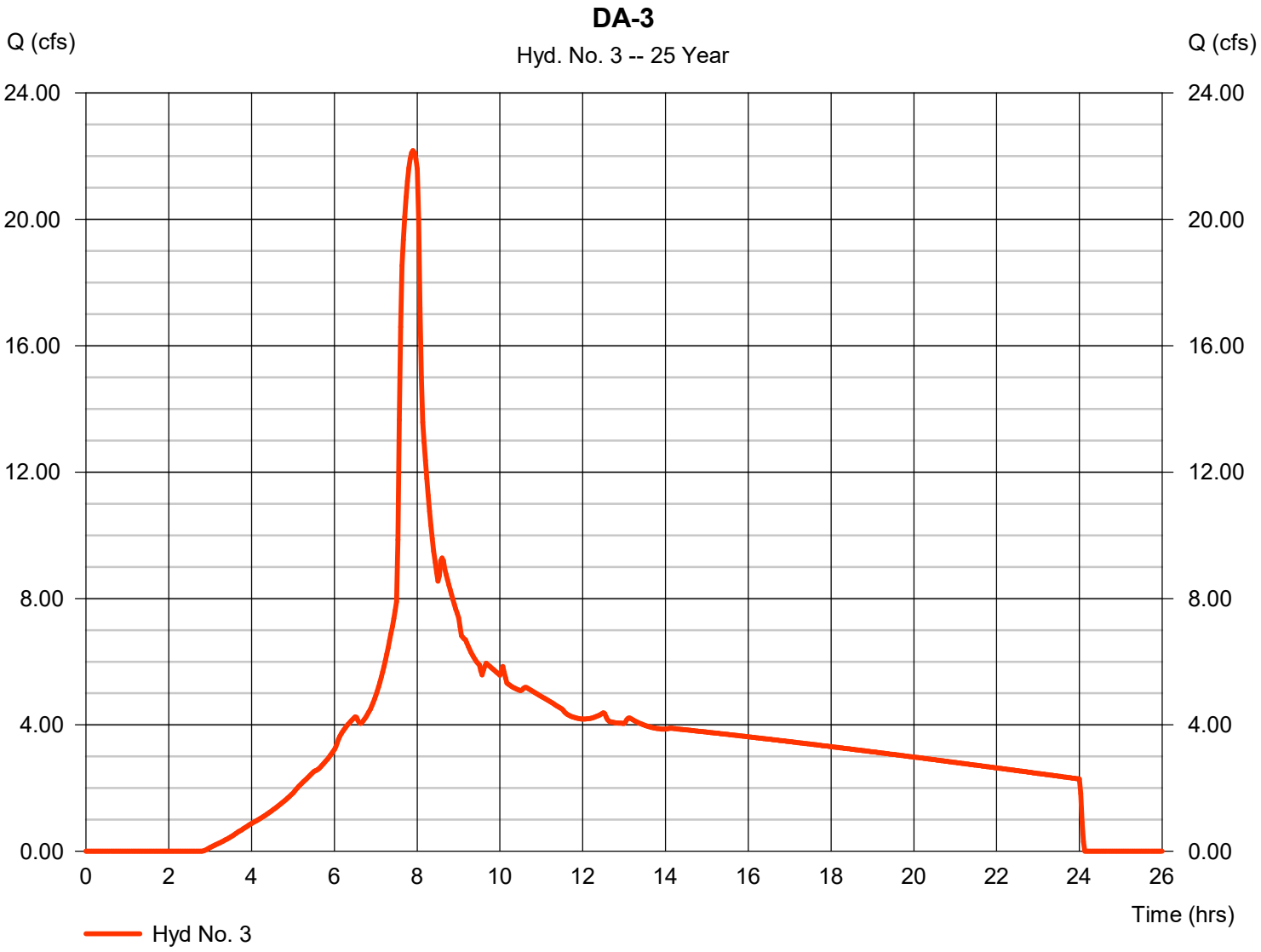


Hydrograph Report

Hyd. No. 3

DA-3

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.17 cfs
Storm frequency	=	25 yrs	Time to peak	=	7.90 hrs
Time interval	=	2 min	Hyd. volume	=	313,151 cuft
Drainage area	=	27.370 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484

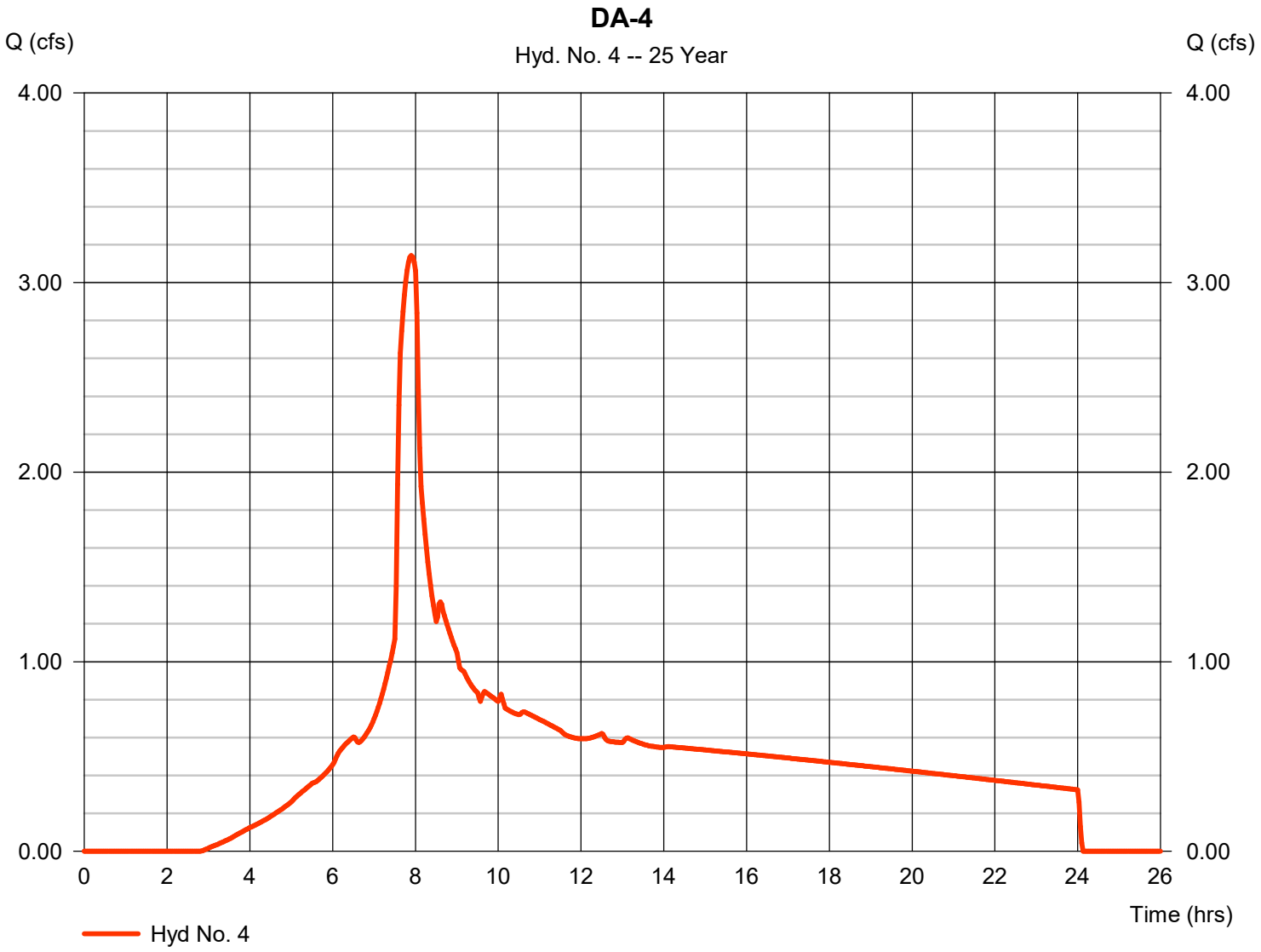


Hydrograph Report

Hyd. No. 4

DA-4

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.143 cfs
Storm frequency	=	25 yrs	Time to peak	=	7.90 hrs
Time interval	=	2 min	Hyd. volume	=	44,393 cuft
Drainage area	=	3.880 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484

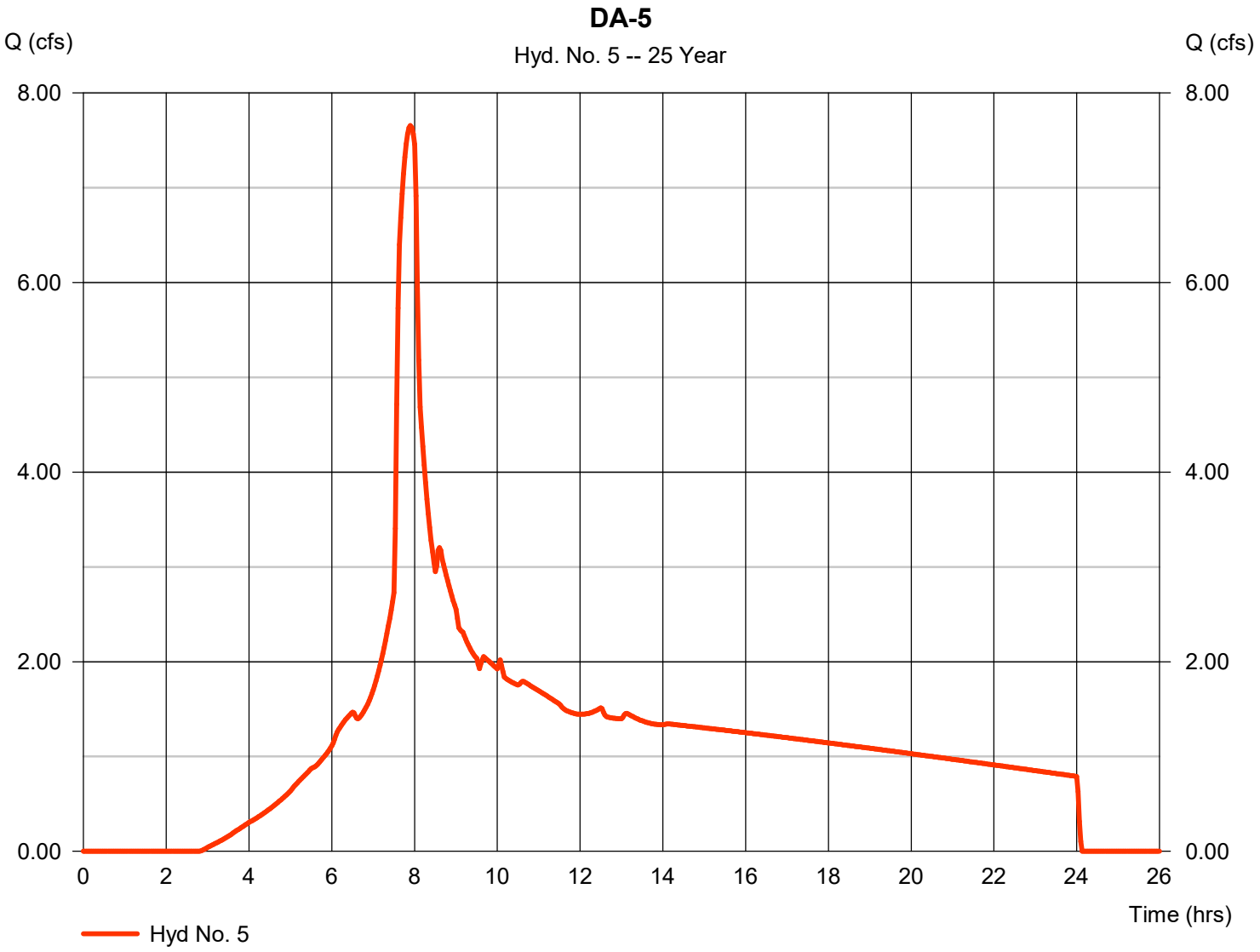


Hydrograph Report

Hyd. No. 5

DA-5

Hydrograph type	= SCS Runoff	Peak discharge	= 7.655 cfs
Storm frequency	= 25 yrs	Time to peak	= 7.90 hrs
Time interval	= 2 min	Hyd. volume	= 108,121 cuft
Drainage area	= 9.450 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

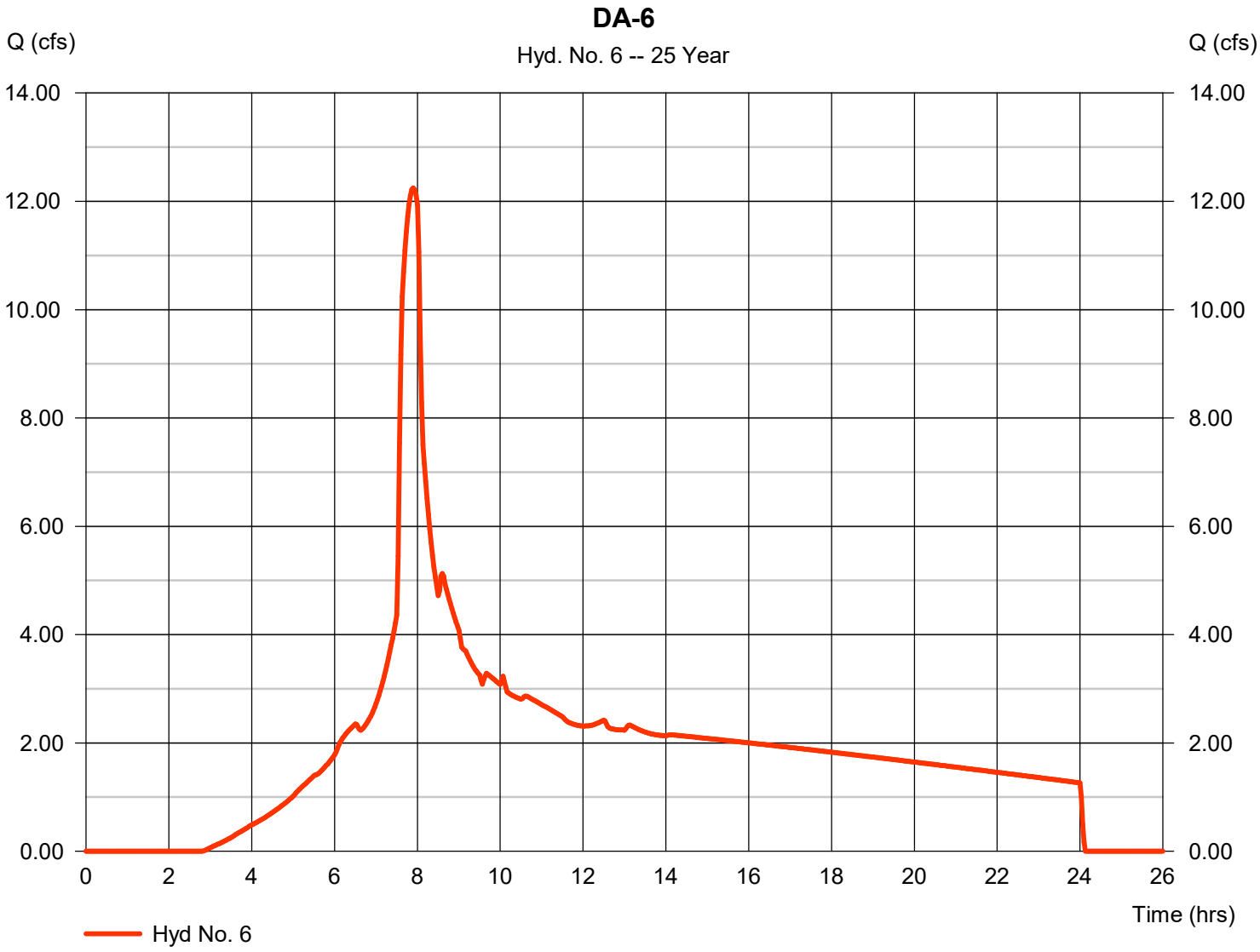


Hydrograph Report

Hyd. No. 6

DA-6

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.25 cfs
Storm frequency	=	25 yrs	Time to peak	=	7.90 hrs
Time interval	=	2 min	Hyd. volume	=	172,994 cuft
Drainage area	=	15.120 ac	Curve number	=	84
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484



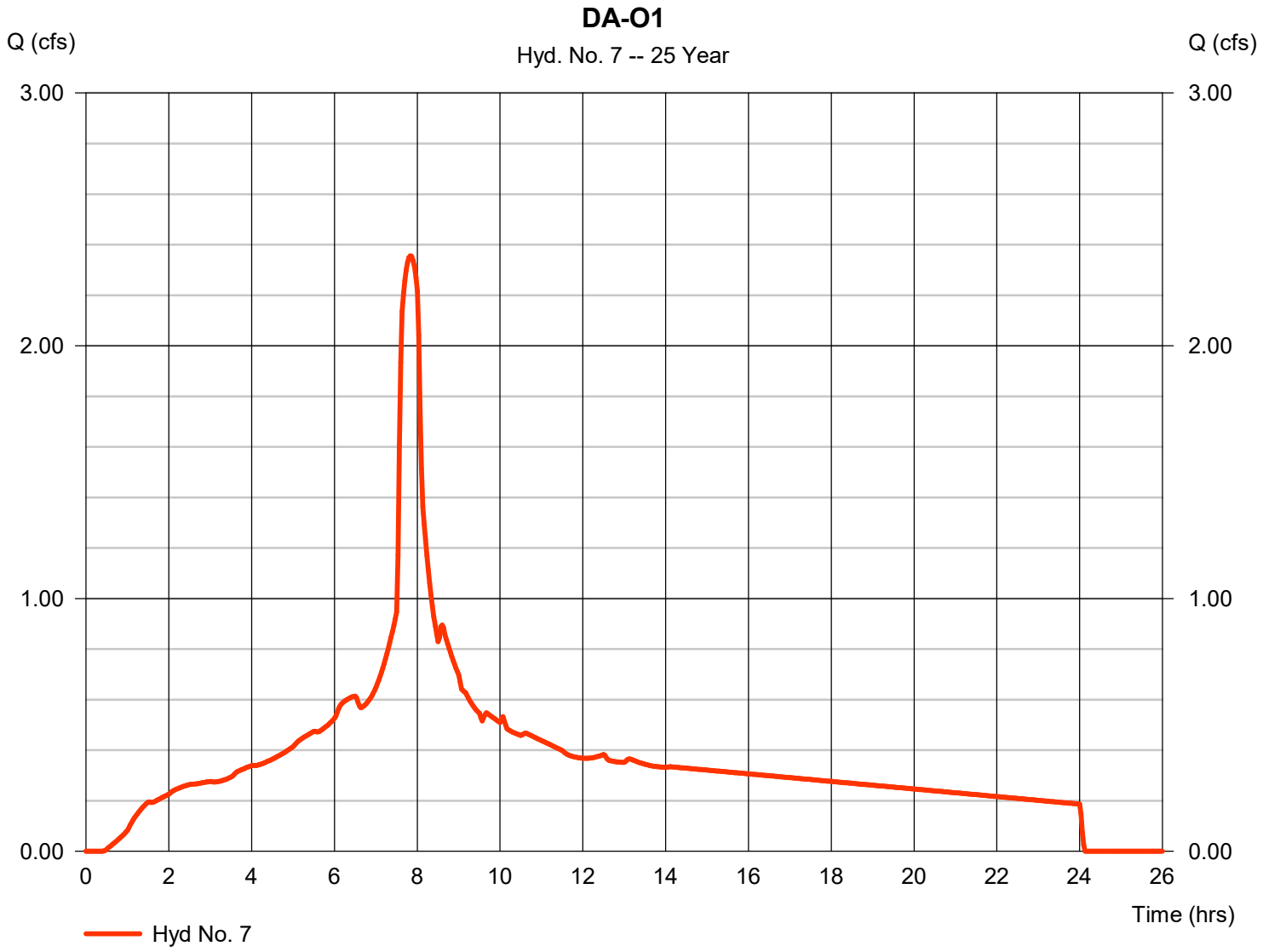
Hydrograph Report

Hyd. No. 7

DA-O1

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.356 cfs
Storm frequency	=	25 yrs	Time to peak	=	7.83 hrs
Time interval	=	2 min	Hyd. volume	=	33,926 cuft
Drainage area	=	2.050 ac	Curve number	=	98*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.10 in	Distribution	=	Type IA
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(1.820 x 84) + (2.050 x 98)] / 2.050

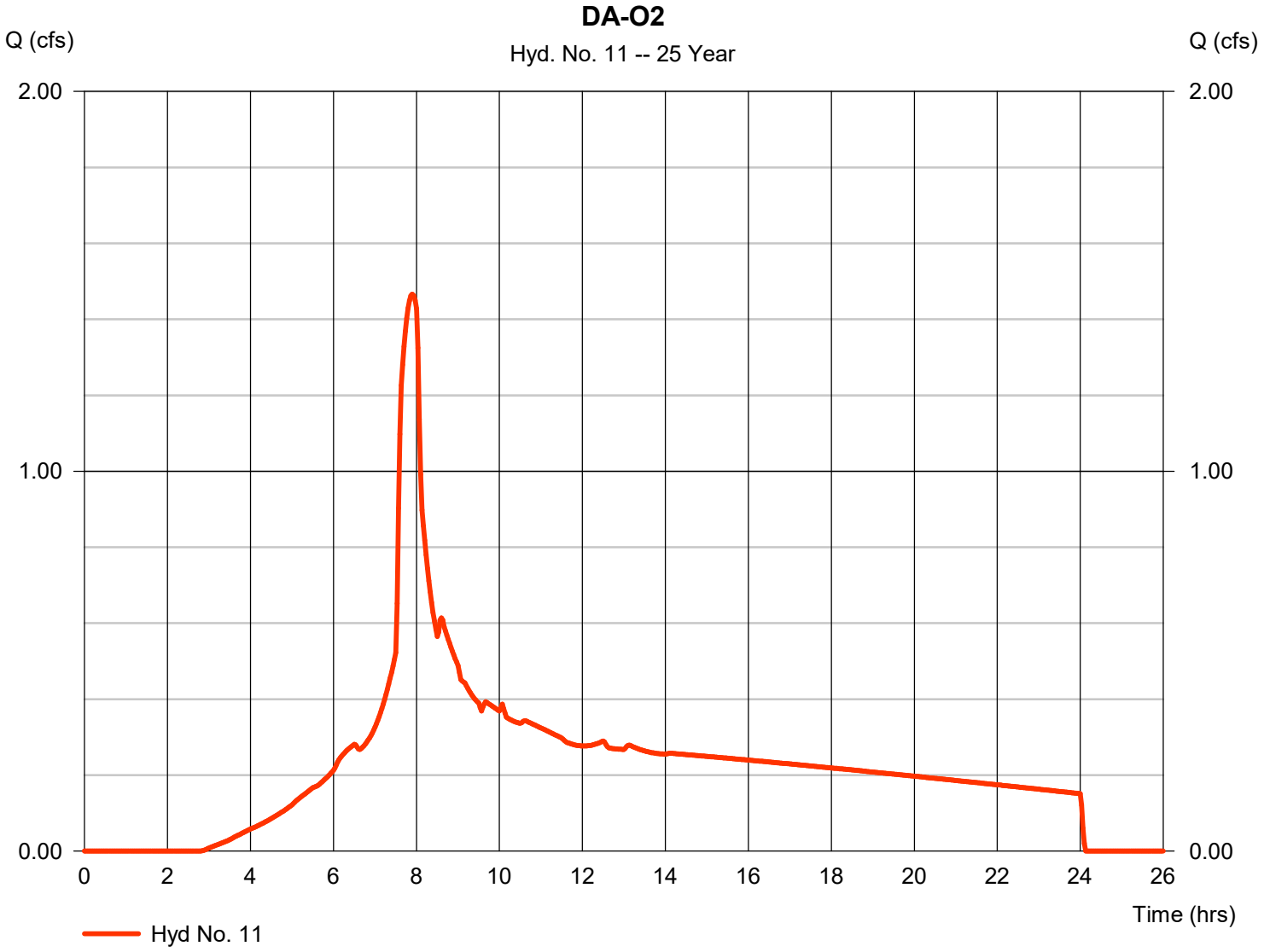


Hydrograph Report

Hyd. No. 11

DA-O2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.466 cfs
Storm frequency	= 25 yrs	Time to peak	= 7.90 hrs
Time interval	= 2 min	Hyd. volume	= 20,709 cuft
Drainage area	= 1.810 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.10 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

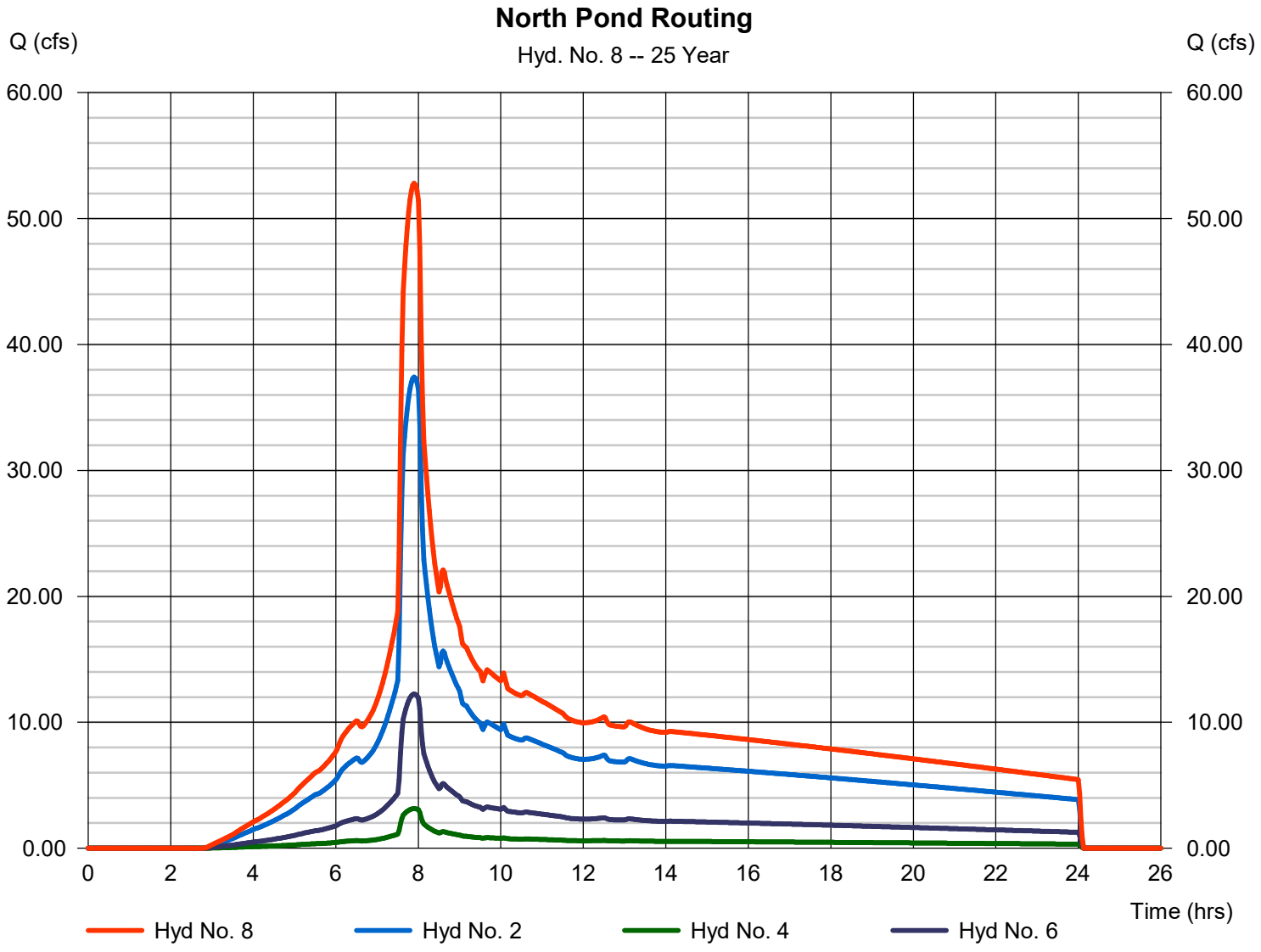


Hydrograph Report

Hyd. No. 8

North Pond Routing

Hydrograph type	= Combine	Peak discharge	= 52.80 cfs
Storm frequency	= 25 yrs	Time to peak	= 7.90 hrs
Time interval	= 2 min	Hyd. volume	= 745,749 cuft
Inflow hyds.	= 2, 4, 6	Contrib. drain. area	= 65.180 ac



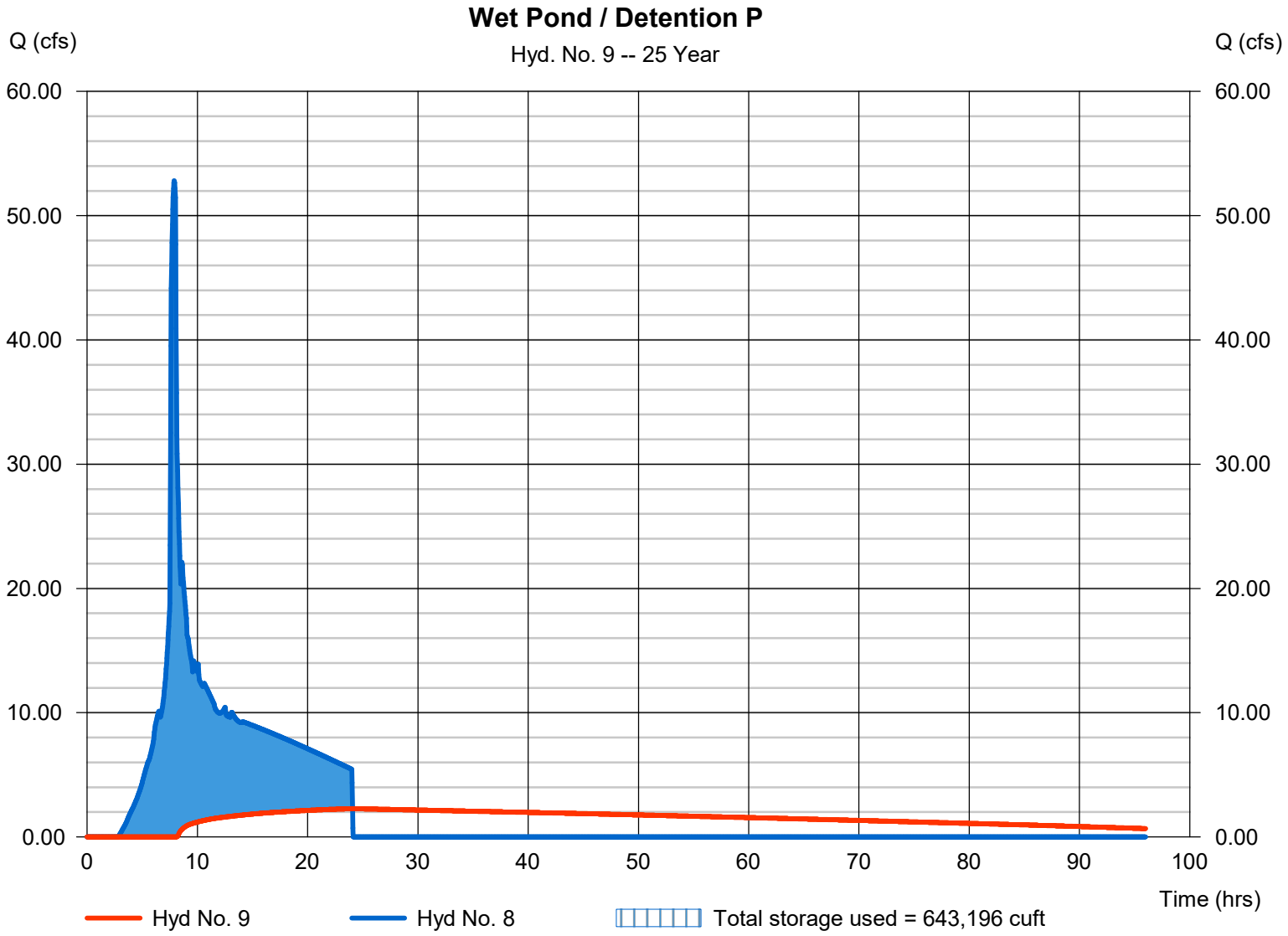
Hydrograph Report

Hyd. No. 9

Wet Pond / Detention P

Hydrograph type	=	Reservoir	Peak discharge	=	2.275 cfs
Storm frequency	=	25 yrs	Time to peak	=	24.07 hrs
Time interval	=	2 min	Hyd. volume	=	498,694 cuft
Inflow hyd. No.	=	8 - North Pond Routing	Max. Elevation	=	248.25 ft
Reservoir name	=	Wet Pond / Detention Pond	Max. Storage	=	643,196 cuft

Storage Indication method used.



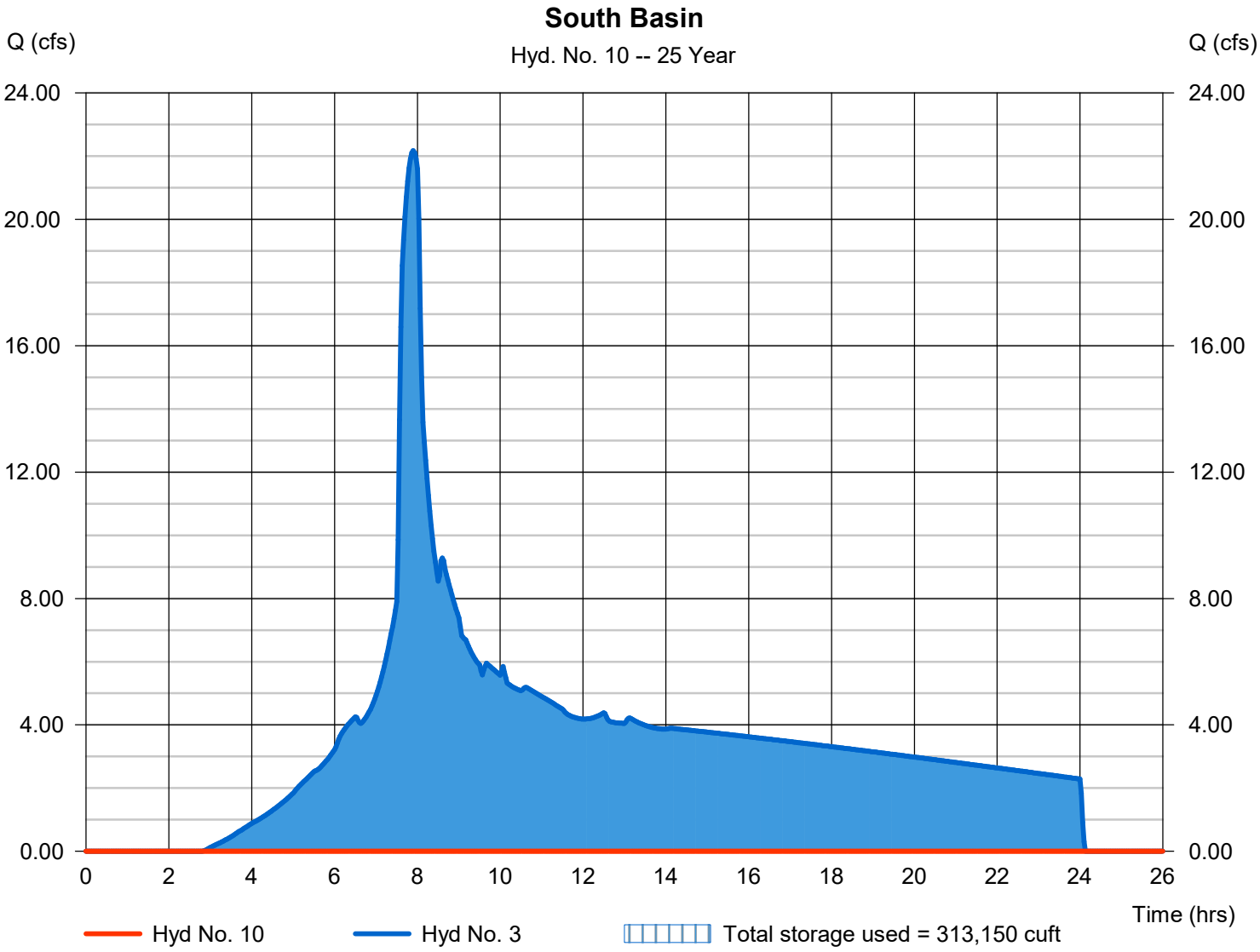
Hydrograph Report

Hyd. No. 10

South Basin

Hydrograph type	=	Reservoir	Peak discharge	=	0.000 cfs
Storm frequency	=	25 yrs	Time to peak	=	n/a
Time interval	=	2 min	Hyd. volume	=	0 cuft
Inflow hyd. No.	=	3 - DA-3	Max. Elevation	=	340.03 ft
Reservoir name	=	South Basin	Max. Storage	=	313,150 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Wet Pond / Detention Pond

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 234.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	234.00	22,907	0	0
2.00	236.00	28,323	51,129	51,129
4.00	238.00	34,399	62,617	113,747
6.00	240.00	41,042	75,336	189,082
8.00	242.00	48,702	89,626	278,708
10.00	244.00	54,688	103,322	382,030
12.00	246.00	60,811	115,433	497,463
14.00	248.00	67,458	128,199	625,662
16.00	250.00	74,547	141,932	767,594

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 8.00	6.00	Inactive	Inactive
Span (in)	= 8.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 240.29	240.29	0.00	0.00
Length (ft)	= 40.00	0.00	0.00	0.00
Slope (%)	= 2.52	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	234.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
2.00	51,129	236.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
4.00	113,747	238.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
6.00	189,082	240.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
8.00	278,708	242.00	0.97 ic	0.97 ic	---	---	---	---	---	---	---	---	0.967
10.00	382,030	244.00	1.51 ic	1.51 ic	---	---	---	---	---	---	---	---	1.514
12.00	497,463	246.00	1.91 ic	1.91 ic	---	---	---	---	---	---	---	---	1.910
14.00	625,662	248.00	2.24 ic	2.24 ic	---	---	---	---	---	---	---	---	2.238
16.00	767,594	250.00	2.52 oc	2.52 ic	---	---	---	---	---	---	---	---	2.521

Pond Report

Pond No. 2 - South Basin

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 332.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	332.00	30,689	0	0
2.00	334.00	34,743	65,384	65,384
4.00	336.00	38,897	73,594	138,977
6.00	338.00	43,152	82,004	220,981
8.00	340.00	47,508	90,616	311,597
10.00	342.00	51,964	99,428	411,025
12.00	344.00	56,521	108,442	519,467
14.00	346.00	61,178	117,656	637,124
16.00	348.00	65,936	127,072	764,196

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	332.00	---	---	---	---	---	---	---	---	---	---	0.000
2.00	65,384	334.00	---	---	---	---	---	---	---	---	---	---	0.000
4.00	138,977	336.00	---	---	---	---	---	---	---	---	---	---	0.000
6.00	220,981	338.00	---	---	---	---	---	---	---	---	---	---	0.000
8.00	311,597	340.00	---	---	---	---	---	---	---	---	---	---	0.000
10.00	411,025	342.00	---	---	---	---	---	---	---	---	---	---	0.000
12.00	519,467	344.00	---	---	---	---	---	---	---	---	---	---	0.000
14.00	637,124	346.00	---	---	---	---	---	---	---	---	---	---	0.000
16.00	764,196	348.00	---	---	---	---	---	---	---	---	---	---	0.000

APPENDIX B
HYDRAULIC CALCULATIONS

Culvert Report

15" HDPE (DA-2)

Invert Elev Dn (ft)	=	238.41
Pipe Length (ft)	=	116.00
Slope (%)	=	0.20
Invert Elev Up (ft)	=	238.64
Rise (in)	=	15.0
Shape	=	Circular
Span (in)	=	15.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

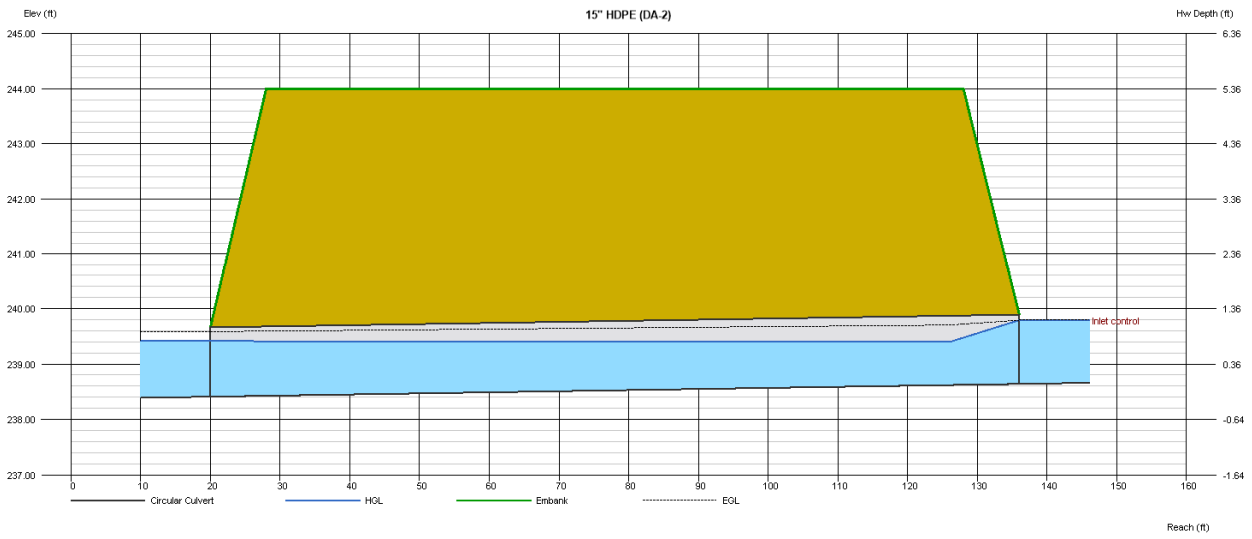
Top Elevation (ft)	=	244.00
Top Width (ft)	=	100.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	3.50
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	3.50
Qpipe (cfs)	=	3.50
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.32
Veloc Up (ft/s)	=	4.52
HGL Dn (ft)	=	239.41
HGL Up (ft)	=	239.39
Hw Elev (ft)	=	239.79
Hw/D (ft)	=	0.92
Flow Regime	=	Inlet Control



Culvert Report

36" HDPE (DA-2)

Invert Elev Dn (ft)	=	236.00
Pipe Length (ft)	=	183.00
Slope (%)	=	0.36
Invert Elev Up (ft)	=	236.66
Rise (in)	=	36.0
Shape	=	Circular
Span (in)	=	36.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

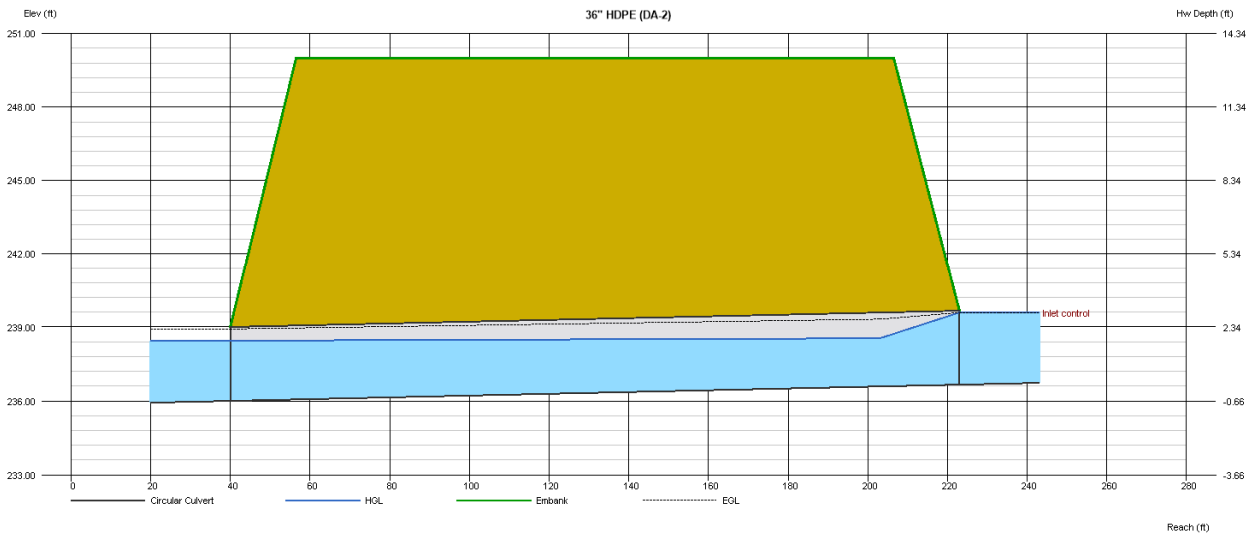
Top Elevation (ft)	=	250.00
Top Width (ft)	=	150.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	34.00
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	34.00
Qpipe (cfs)	=	34.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.51
Veloc Up (ft/s)	=	7.24
HGL Dn (ft)	=	238.45
HGL Up (ft)	=	238.55
Hw Elev (ft)	=	239.59
Hw/D (ft)	=	0.98
Flow Regime	=	Inlet Control



Culvert Report

12" HDPE (DA-4)

Invert Elev Dn (ft)	=	236.00
Pipe Length (ft)	=	76.00
Slope (%)	=	6.75
Invert Elev Up (ft)	=	241.13
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

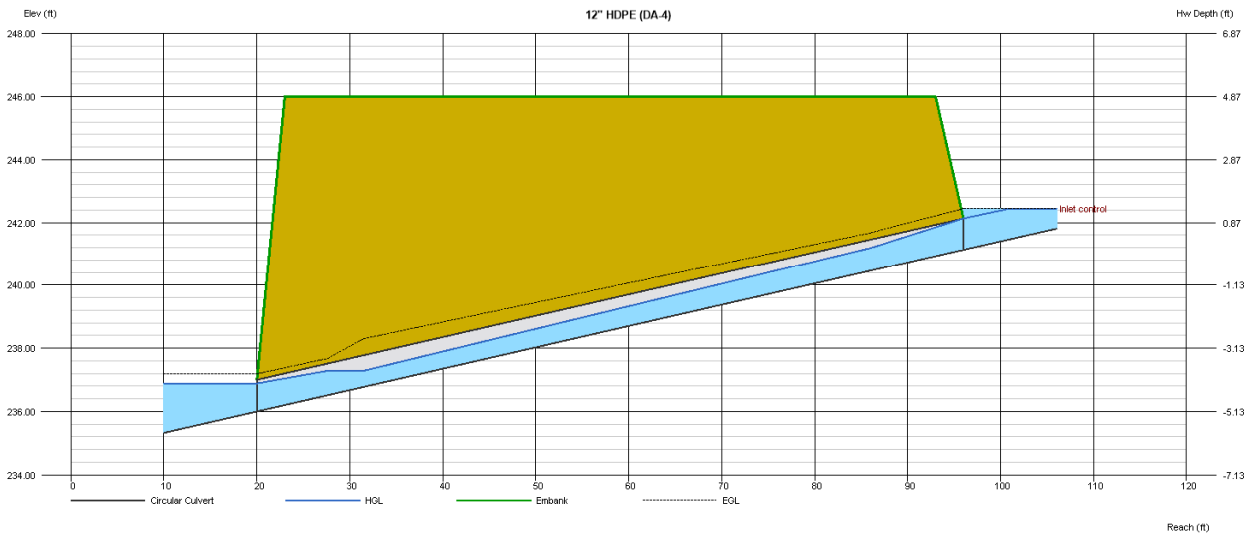
Top Elevation (ft)	=	246.00
Top Width (ft)	=	70.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	3.25
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	3.25
Qpipe (cfs)	=	3.25
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.42
Veloc Up (ft/s)	=	5.00
HGL Dn (ft)	=	236.89
HGL Up (ft)	=	241.90
Hw Elev (ft)	=	242.45
Hw/D (ft)	=	1.32
Flow Regime	=	Inlet Control



Culvert Report

18" HDPE (DA-5)

Invert Elev Dn (ft)	=	259.16
Pipe Length (ft)	=	203.00
Slope (%)	=	0.60
Invert Elev Up (ft)	=	260.38
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

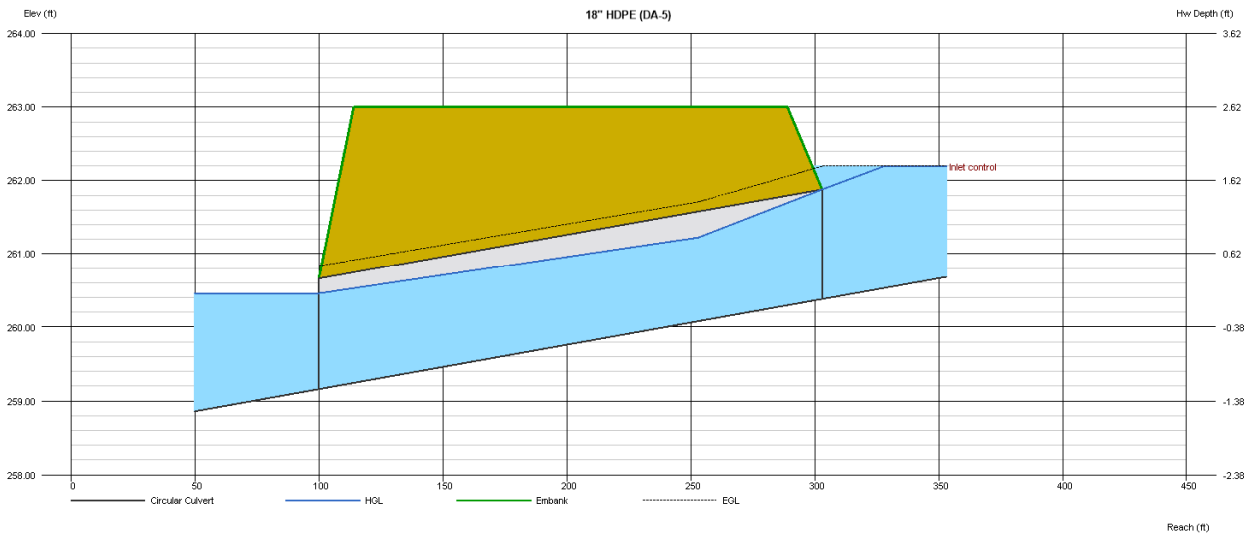
Top Elevation (ft)	=	263.00
Top Width (ft)	=	175.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	8.00
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	8.00
Qpipe (cfs)	=	8.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.92
Veloc Up (ft/s)	=	5.79
HGL Dn (ft)	=	260.46
HGL Up (ft)	=	261.47
Hw Elev (ft)	=	262.20
Hw/D (ft)	=	1.21
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Jan 22 2025

12" CMP (Entrance Culvert)

Invert Elev Dn (ft)	=	237.17
Pipe Length (ft)	=	77.00
Slope (%)	=	1.29
Invert Elev Up (ft)	=	238.16
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

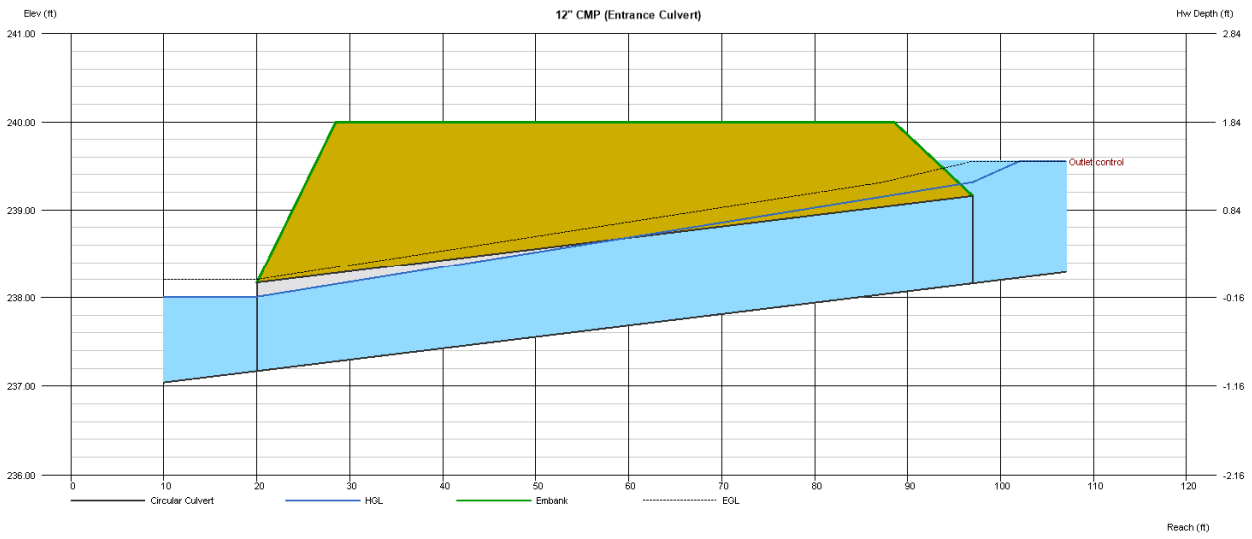
Top Elevation (ft)	=	240.00
Top Width (ft)	=	60.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	2.50
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.50
Qpipe (cfs)	=	2.50
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.56
Veloc Up (ft/s)	=	3.18
HGL Dn (ft)	=	238.01
HGL Up (ft)	=	239.32
Hw Elev (ft)	=	239.55
Hw/D (ft)	=	1.39
Flow Regime	=	Outlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Jan 23 2025

2-Barrel 12" RCP (Coffin Butte Road Culvert)

Invert Elev Dn (ft)	=	232.25
Pipe Length (ft)	=	119.00
Slope (%)	=	0.63
Invert Elev Up (ft)	=	233.00
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

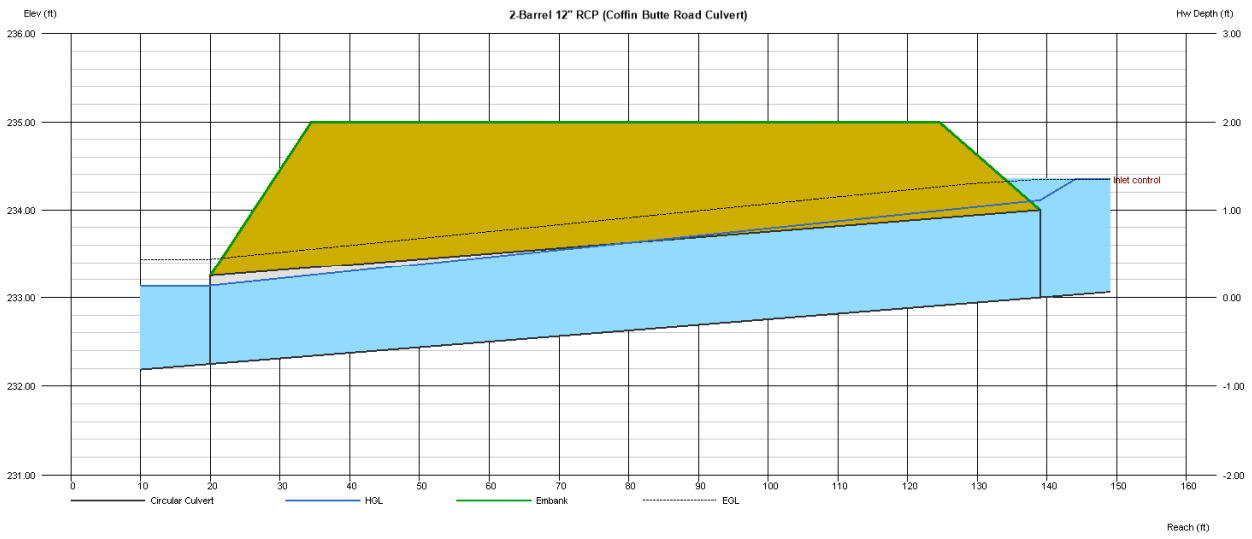
Top Elevation (ft)	=	235.00
Top Width (ft)	=	90.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	6.50
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.50
Qpipe (cfs)	=	6.50
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.42
Veloc Up (ft/s)	=	4.14
HGL Dn (ft)	=	233.14
HGL Up (ft)	=	234.11
Hw Elev (ft)	=	234.35
Hw/D (ft)	=	1.35
Flow Regime	=	Inlet Control



Culvert Report

8" CMP (Emergency Overflow Pipe)

Invert Elev Dn (ft)	=	343.41
Pipe Length (ft)	=	452.00
Slope (%)	=	1.00
Invert Elev Up (ft)	=	347.93
Rise (in)	=	8.0
Shape	=	Circular
Span (in)	=	8.0
No. Barrels	=	1
n-Value	=	0.024
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

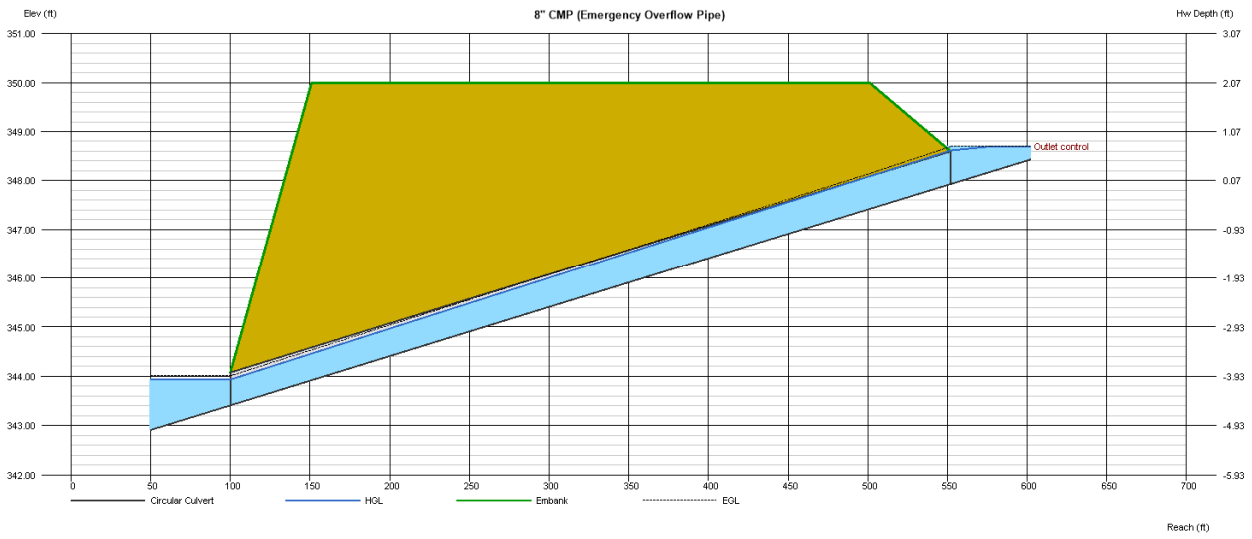
Top Elevation (ft)	=	350.00
Top Width (ft)	=	350.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	0.70
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	0.65
Qpipe (cfs)	=	0.65
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.21
Veloc Up (ft/s)	=	1.86
HGL Dn (ft)	=	343.93
HGL Up (ft)	=	348.62
Hw Elev (ft)	=	348.70
Hw/D (ft)	=	1.15
Flow Regime	=	Outlet Control



Channel Report

Outflow Trapezoidal Ditch 2:1 Sideslope

Trapezoidal

Bottom Width (ft)	= 1.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 233.00
Slope (%)	= 0.97
N-Value	= 0.020

Calculations

Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 1.00
Q (cfs)	= 14.70
Area (sqft)	= 3.00
Velocity (ft/s)	= 4.90
Wetted Perim (ft)	= 5.47
Crit Depth, Yc (ft)	= 1.00
Top Width (ft)	= 5.00
EGL (ft)	= 1.37

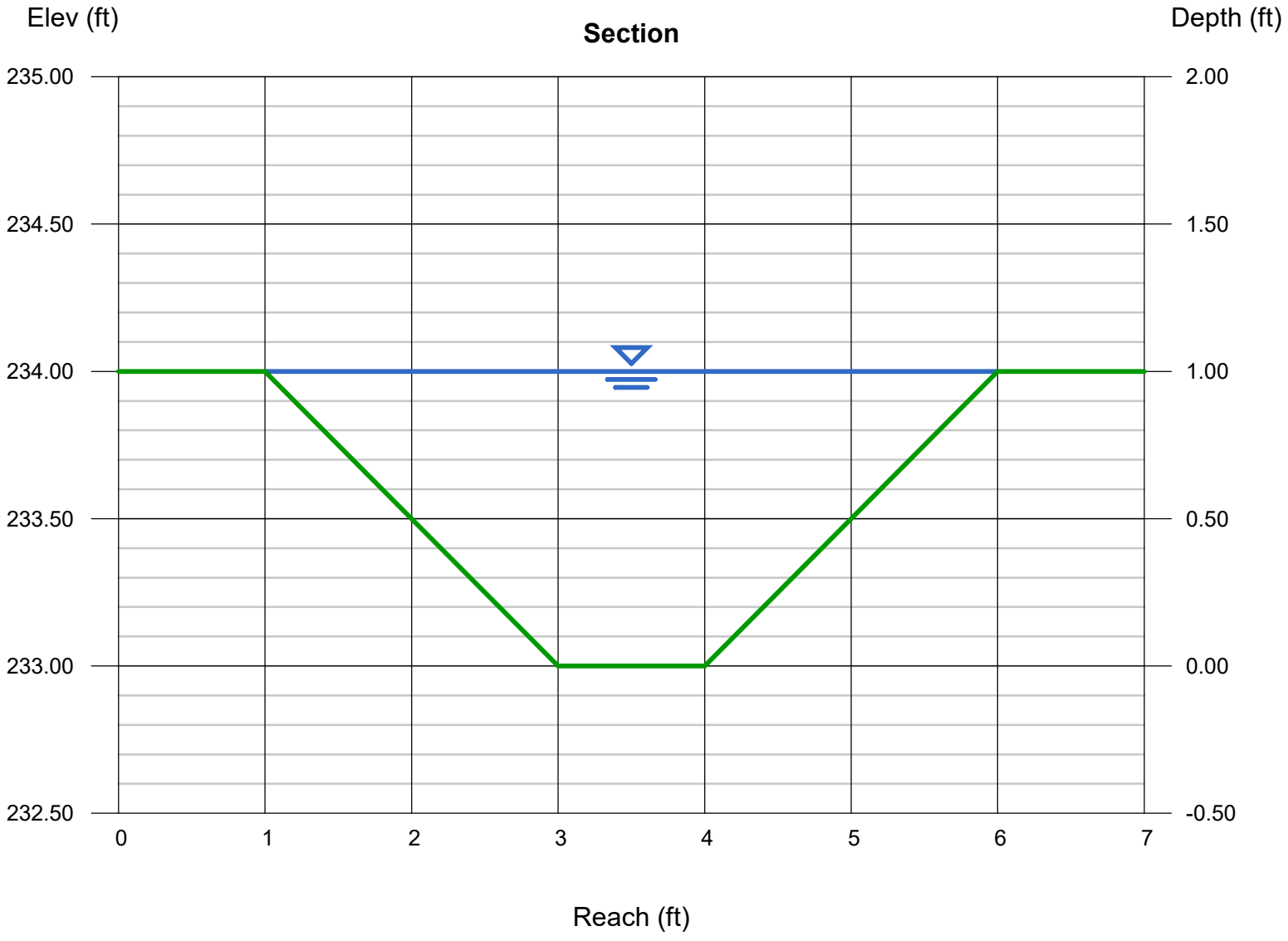


EXHIBIT 18
CURRENT VIEWS OF LANDFILL AND AERIAL RENDERINGS OF COFFIN BUTTE LANDFILL

1. LOOKING SOUTH–SOUTHWEST TOWARDS THE LANDFILL FROM PACIFIC HIGHWAY (99W).

2. LOOKING SOUTHWEST TOWARDS THE LANDFILL FROM LOCAL ROAD.

3. LOOKING WEST TOWARDS THE LANDFILL FROM CAMP ADAIR ROAD.

4. LOOKING NORTHWEST TOWARDS THE LANDFILL FROM QUINLAN ROAD.

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 · Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

EXHIBIT 18 - VISUAL DOCUMENTATION OF LANDFILL VIEWS

DATE:	JULY 2024	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:	322-142	APPROVED BY:	JAS

DRAWING NO.:
A

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2017
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

P:\300-000\322-142\-CAD\Dwg\Exhibits\322142-SW01-18-Visual Documentation.dwg[A] LS(10/21/2024 - jshah) - LP: 10/21/2024 2:48 PM

7. LOOKING SOUTHEAST TOWARDS THE LANDFILL FROM RIFLE RANGE ROAD.

6. LOOKING EAST TOWARDS THE LANDFILL FROM TAMPICO ROAD.

5. LOOKING NORTHEAST TOWARDS THE LANDFILL FROM INTERSECTION OF TAMPICO ROAD AND NW SOAP CREEK ROAD.

REGISTERED PROFESSIONAL ENGINEER
92360PE
OREGON
JULY 13, 2011
JEFF A. SHEPHERD
EXPIRES: 06/30/2026

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 · Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

EXHIBIT 18 - VISUAL DOCUMENTATION OF LANDFILL VIEWS

DATE:	JULY 2024	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:	322-142	APPROVED BY:	JAS

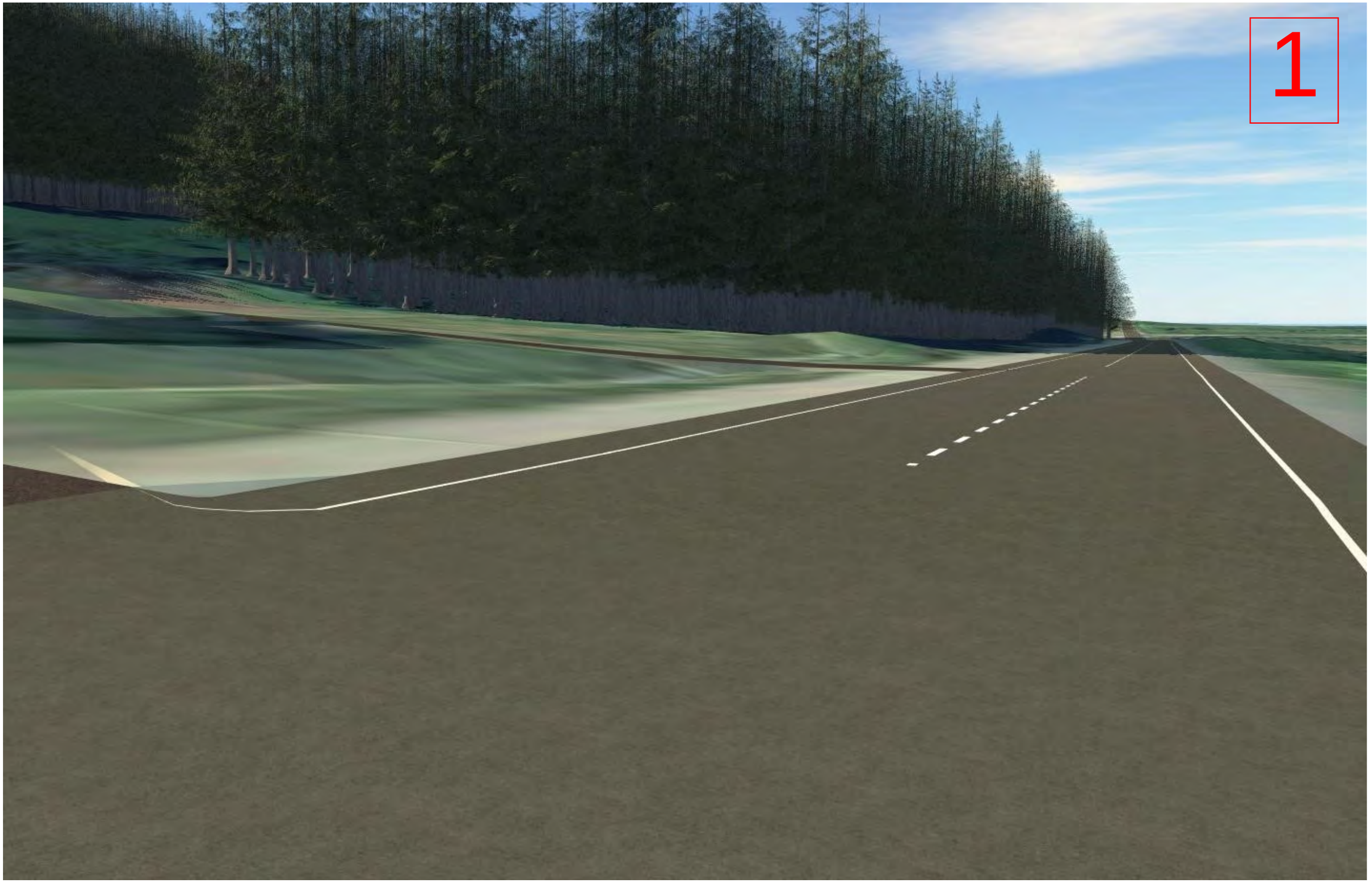
DRAWING NO.:
B

P:\300-000\322-142\-CAD\Dwg\Exhibits\322142-SM01-18-Visual Documentation.dwg[B] LS(10/21/2024 - jshaw) - LP: 10/21/2024 2:49 PM

Artist renderings of Coffin Butte Landfill (with Proposed Expansion)

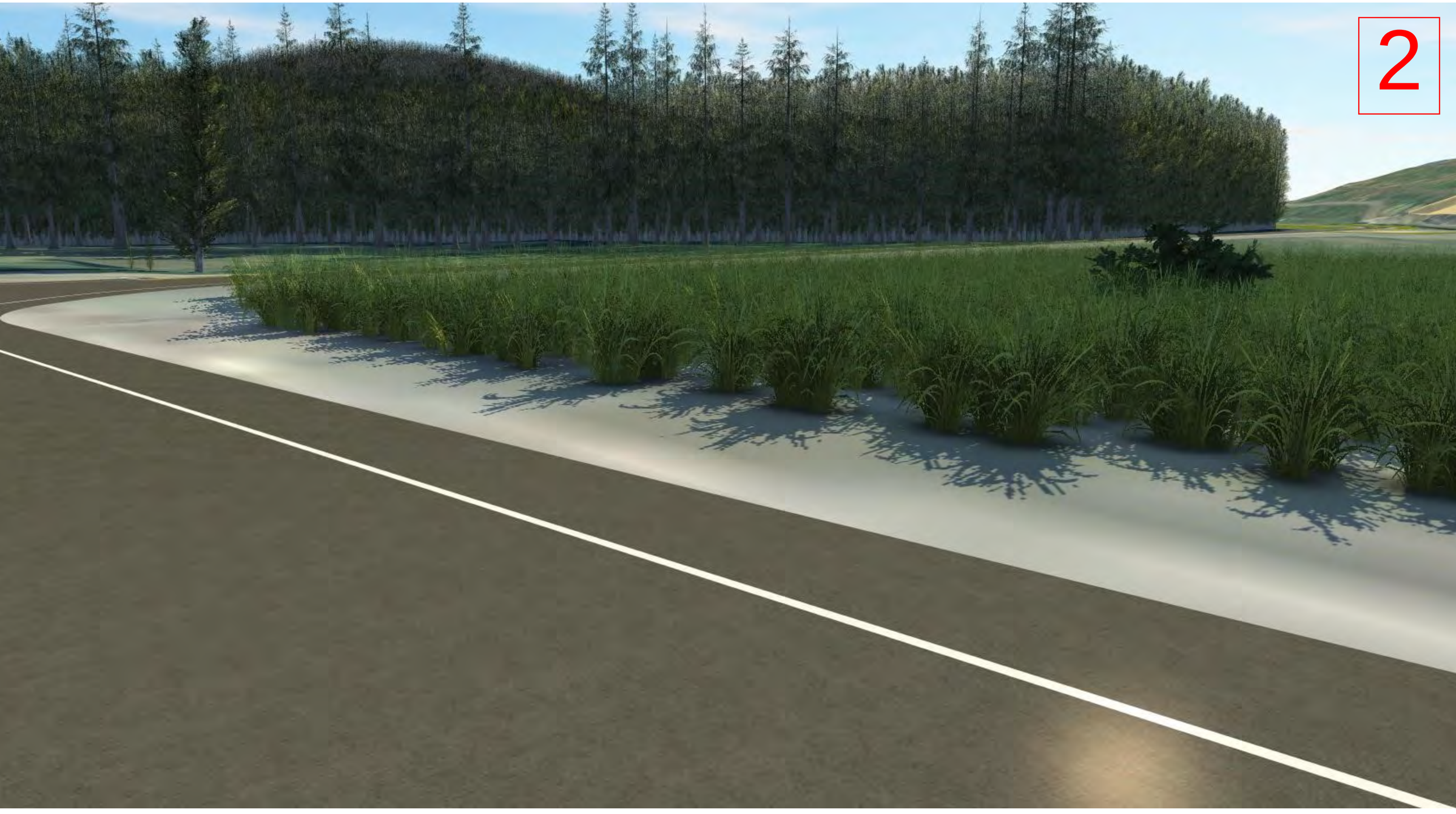
Build-out of Coffin Butte Landfill, with approved expansion

1. Northwest view towards the landfill from Pacific Highway (99 W)



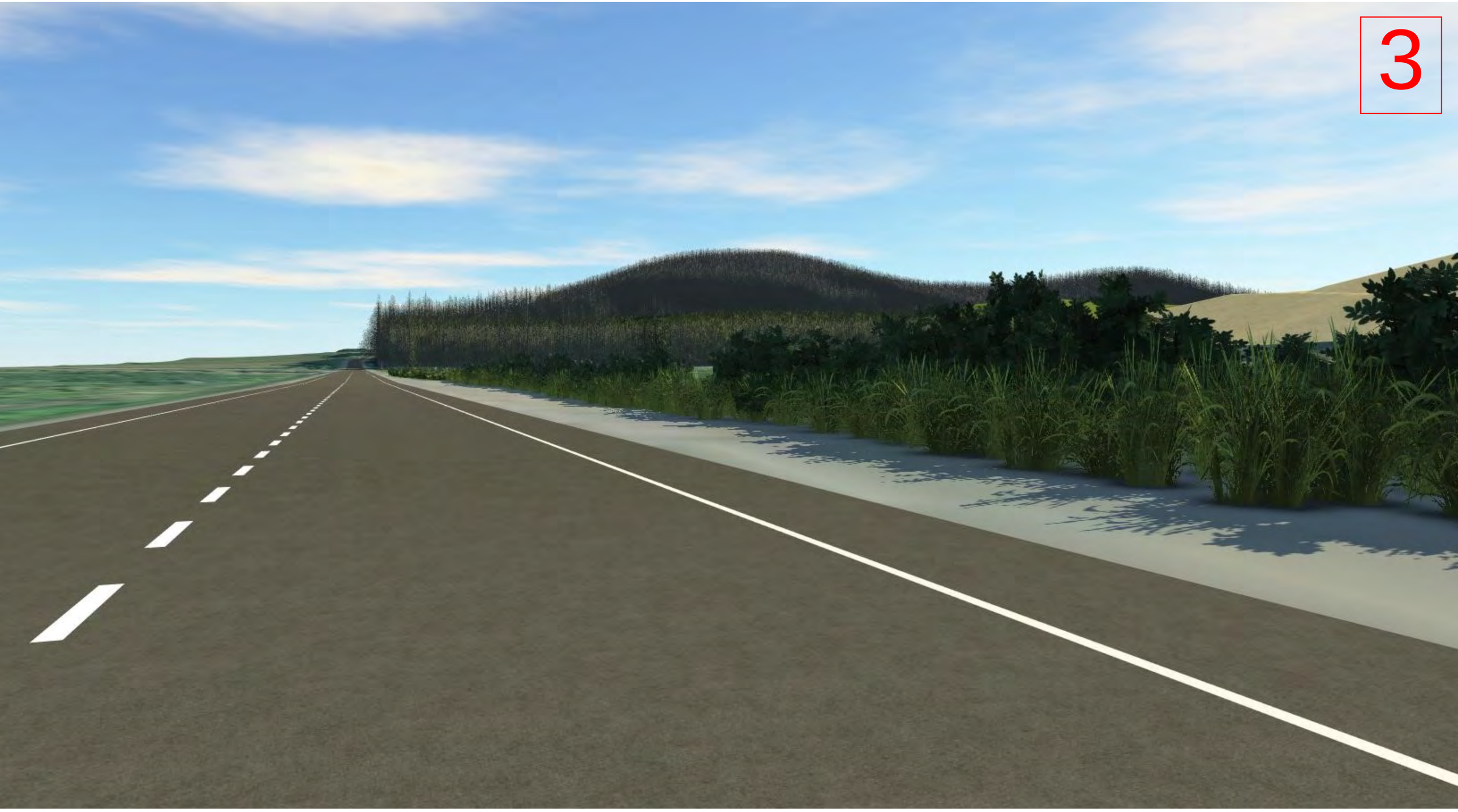
Build-out of Coffin Butte Landfill, with approved expansion.

2. Southwest view towards the landfill from Pacific Highway (99 W)



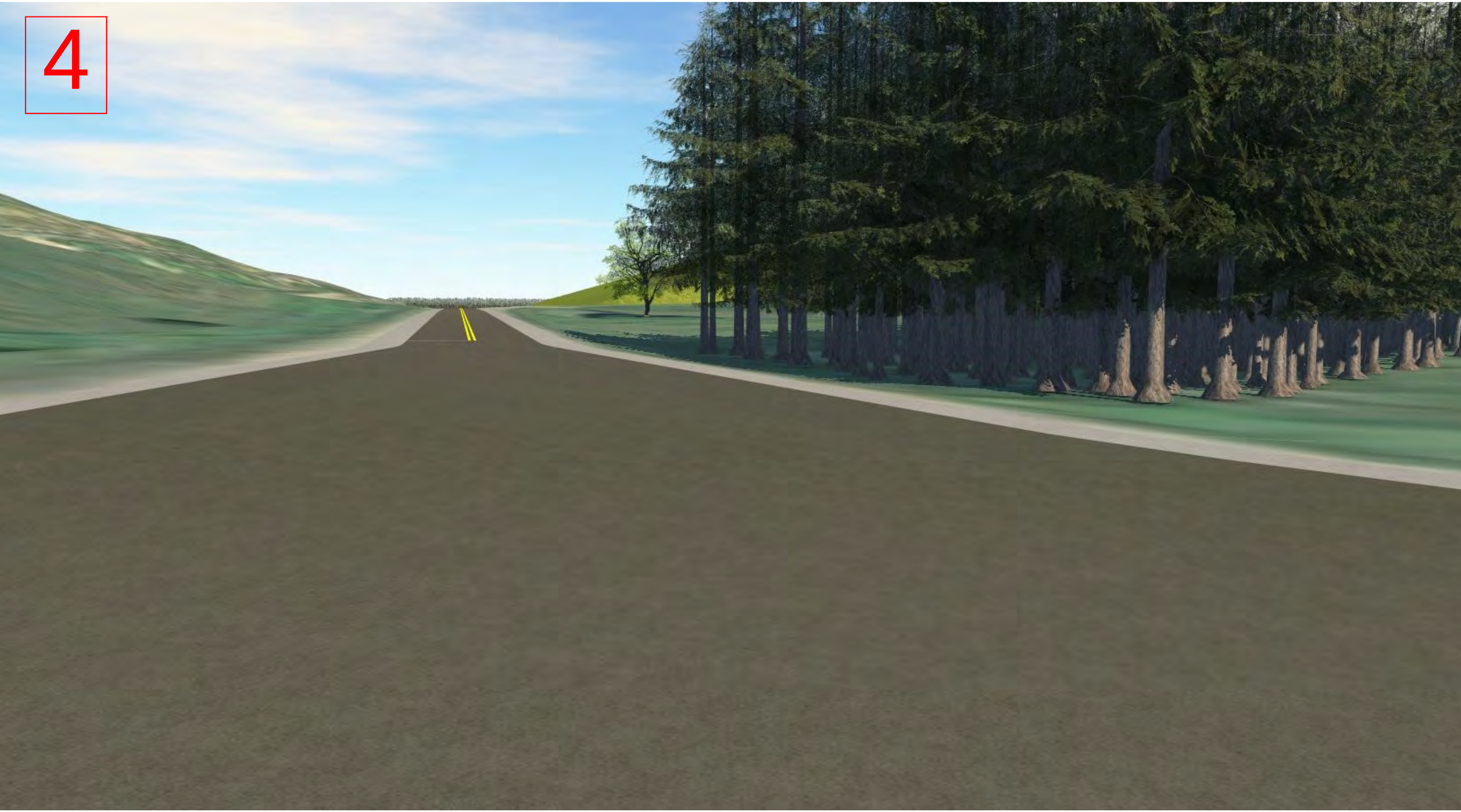
Build-out of Coffin Butte Landfill, with approved expansion.

3. Southwest view towards the landfill from Pacific Highway (99 W)



Build-out of Coffin Butte Landfill, with approved expansion.

4. Southwest view towards the landfill from Coffin Butte Rd



Build-out of Coffin Butte Landfill, with approved expansion.

EXHIBIT 19
SITE LIGHTING SUMMARY

SITE LIGHTING SUMMARY

The current operation of the Coffin Butte Landfill allows the site to open around 4:30 AM and ceases waste acceptance at 5:00 PM, Monday through Saturday. The site uses temporary lights or mobile lighting plants at the tipping face to allow for the landfill operations to be safely conducted, to see what is being disposed of at the tipping face, and complete daily cover placement. These lights are only used when natural light is insufficient to conduct safe operations. This same operation would eventually be moved to the expansion area.

The only additional lights that would be added to the Coffin Butte Landfill, would be security lights near the new parking lot for the new locker room building. These lights would be shielded or hooded so that they only face down towards the ground. These new lights would be designed and installed in accordance with all Benton County code requirements.

Other lights that might be installed, including some at the new scale house and leachate storage ponds would be activated by motion or be motion censored lights. They would also be shielded or hooded so that they only face down towards the ground.

FIRE RISK ASSESSMENT OF COFFIN BUTTE LANDFILL, CORVALLIS, OREGON
PREPARED BY JAMES J. WALSH, P.E., BCEE
SCS ENGINEERS
NOVEMBER 29, 2023
UPDATED SEPTEMBER 24, 2024

Report Purpose

SCS Engineers has been contracted to Republic Services to assess the risks of fire associated with the Coffin Butte Landfill (the "Landfill"). This report will identify possible fire scenarios, including alternative sources, likelihood of occurrence, control measures in place to mitigate fires, and the potential for fires to expand to a size sufficient to have a material impact on the local community or environment.

Landfill Background

The Landfill is located at 29175 Coffin Butte Road, Corvallis, Oregon 97330. It is an active municipal solid waste (MSW) landfill operating under a conditional use permit (CUP) from Benton County, Oregon, and a landfill operating permit from the Oregon Department of Environmental Quality (DEQ). The Landfill serves multiple nearby counties as a designated "Regional Landfill." The current operating permit is dated 2020 and was part of the state's required ten-year renewal process.

The site is permitted for up to 1.1 million tons of MSW per year. In the last full year of 2023, the site received about 1.0 million tons. Since the site is open six days per week, that comes to an average of about 3,200 tons per day. The site is staffed and open for waste receipt and disposal Monday through Friday from 5 a.m. to 5 p.m. for commercial access, and from 8 a.m. to 5 p.m. for public access. The site is open to all from 8 a.m. to 5 p.m. on Saturdays and is closed on Sundays.

Wastes received at the Landfill are 70 percent conventional MSW, mostly from residential and commercial sources. About 30 percent are special nonhazardous wastes, mostly from industrial sources. These include POTW sludges, industrial wastes, petroleum-contaminated soils (PCS), and other special wastes. All special wastes are approved for disposal at the Landfill by both DEQ and Republic Services. Republic has a robust Special Waste Acceptance Program administered from their corporate headquarters in Arizona. Republic reviews all applications, and sources for disposal of special wastes, to any of its landfills, and approvals are generally more conservative than even DEQ would require. Republic rejects any special waste that has any potential to be problematic to handle or bury at its landfills—especially reactive or ignitable wastes.

As at any active landfill, the Coffin Butte site has a combination of areas with final cover, intermediate cover, and daily cover. Final cover has been applied to 45 acres at present, mostly outslopes of the Landfill already at final grade. Final cover includes a prescriptive cap of geomembrane plastic sheet, cover soils, drainage layer, and vegetation—mostly grass. Intermediate cover is over 66 acres of fill, which includes 12 inches of soil topped with an exposed geomembrane cover (EGC) of plastic, which is either EPDM or a 12-mil-thick plastic tarp. Daily cover areas are held to a minimum size, generally no more than 4 acres at any time, before intermediate cover is applied instead. A tarp is applied to the active working face as Alternative Daily Cover (ADC). The ADC is fully approved by DEQ. Six inches of soil or PCS—the latter also approved by DEQ—is periodically applied as daily cover instead of a tarp.

The working face of the Landfill is the open face where waste is dumped during the working day. As is done at any active MSW landfill, wastes are exposed at the working face until the end of the day when daily cover, as described above, is applied. Good practice dictates that the working face be kept to the minimum size practicable, leaving enough room for the number of trucks dumping waste at any one time. On any given day, the working face at the Landfill is about 200 feet wide, which is appropriate for any landfill receiving as much as 2,100 tons per day.

An important environmental control at any MSW landfill is a gas collection and control system (GCCS). The intent of any GCCS is to collect as much landfill gas as possible at its source by utilizing a system of individual gas-extraction wells installed deep into the landfill. Gas collected from the wells is directed through connected header pipes, which typically provide suction and direct flow back to a single blower/flare facility.

The Landfill currently has over 300 gas-extraction wells that are mostly vertical. Most wells are plastic pipe (PVC or HDPE), but some are steel. Connective headers amount to several miles of HDPE plastic pipe. Most of those headers are buried below ground, but some are above ground and laid across the landfill surface, mostly in areas brought to final grade with final cover applied. All headers are connected together, leading to a single blower facility. From there, the gas is partly sent to a gas-to-energy plant that uses the methane to power electric generators producing power for the local electric grid. That plant has a capacity of 2,000 cubic feet per minute (cfm). There is more gas flow than the power plant can use, so the balance of landfill gas is combusted on-site in an enclosed flare. The power plant is owned and operated by PNGC, the local power company, which then transmits the electric power into its local electric grid.

The design, construction, and operation of the GCCS is regulated under provisions of the Clean Air act (New Source Performance Standards (NSPS) for MSW Landfills). The effect of the NSPS rules is to capture the majority of gas generated by landfills to reduce fugitive gas emissions from the landfill surface to atmosphere to the lowest level practicable. Design, construction, and operation of a GCCS must comply with the NSPS regulations. Semiannual reports demonstrating compliance with the operating rules under NSPS must be submitted to state and local air authorities. The Landfill also has a Clean Air Act Title V permit, with additional conditions to manage air emissions and overall air quality at the site. Routine compliance reporting on Title V is required as well. From our review of recent NSPS and Title V reporting, the Landfill appears to be in substantial compliance with both of those regulatory programs.

History of Prior Landfill Fires

The first notable fire at the Landfill occurred in 1999 and was its largest fire to date, as reported in local media at the time. The site was owned and operated by Valley Landfills Inc., before site ownership and operation was assumed by large national waste companies—Allied Waste and Republic Services. The fire broke out in the exposed waste area of the daily working face and reportedly came from an undetected hot load from a large waste-transfer trailer known as a “waste tipper.” Apparently, the fire was not spotted and/or responded to quickly enough and spread over the full extent of exposed waste surfaces. It reportedly expanded beyond exposed waste and burned some grass atop the Landfill and also burned and melted some of the above-ground plastic pipe serving as landfill gas headers.

Valley Landfills operating staff soon responded to extinguish the fire using a combination of smothering soils and water. On-site staff was joined by the local fire department, Adair Rural Fire and Rescue (Adair Fire), which assisted to extinguish the fire after several hours.

A second fire broke out at the Landfill's working face about six years ago. The source of the fire is unknown, but was likely from a smoldering portion of a waste load delivered to the site during working hours. The fire went undetected during staffed daytime operations and broke through to the surface during the night and spread through some of the working face before it was observed by neighbors. Adair Fire quickly extinguished the fire with water.

A third fire occurred on grassed areas adjacent to the Landfill flare. The cause of the fire is unknown, but site operators believe there may have been an ember from charcoal buildup in the flare that ignited grass. The incident occurred during the workday and was quickly extinguished by Landfill personnel. Since then, the areas around the flare at the site have been covered with gravel. With this improvement, it is believed that a repeat of a fire starting in this manner cannot occur. (The author of this report, having significant experience with landfill fires, has never heard of a surface fire starting from landfill gas flare. I am skeptical that the fire occurred from this source and believe this grass fire likely came from some other source.)

A fourth fire was reported to have occurred on May 18, 2024. It is believed that a hot load was delivered to the working face from the public convenience center at the site. Although the subject waste was delivered during the operational day, it apparently was not an obvious hot load and on fire until after the site was closed that day. At about 6:00 pm that day, a trail of smoke was seen rising from the working face of the landfill. The fire was reported to Adair Fire who mobilized to the site after first contacting site operating personnel. The site's Operations Manager and Operations Superintendent responded to the site within 15 minutes of contact from Adair Fire. Site personnel immediately used heavy equipment to extract the affected waste from the working face, moving it nearby to an area isolated from the waste at the working face. Site personnel then used the equipment to apply soil over the waste. The fire was soon extinguished. After that, the waste was observed for another hour, to ensure it did not re-ignite.

Adair Fire was on standby at the site but not needed to actively engage the fire. After a few days, the waste was moved back to the working face. It should be noted there were no grassy areas near the working face nor the area where the affected waste was moved to.

A fifth fire occurred on July 24, 2024. A small fire ignited in a grassy area near the landfill's flaring station. Again, the fire was observed from off-site and reported to Adair Fire. Adair Fire notified site operating personnel, who live nearby and mobilized to the site in 12 minutes. By then, Adair Fire had already extinguished the grass fire with water. The source of the fire is unknown. But since this event, the ground in a large area around the enclosed flare has had its grass removed and replaced by a gravel surface.

The above cases were reported to me by Landfill staff as being memorable to them with details. As at any landfill, hot loads in delivered waste occur multiple times per year and likely do so at the Landfill. Landfill staff reported that these fires have been quickly spotted and extinguished with smothering soil.

Fire Mitigation Plans

Adair Fire has full access to the Landfill and is available to lead or assist operating personnel in extinguishing fires at any time. Water would be used as a primary means of extinguishing fires, with pumper trucks bringing water onto the site and/or filling or refilling trucks from public water available at the site.

The Landfill has addressed a plan for responding to fires written into the Landfill Operations Plan. Section 8.1 of that Plan states:

"In case of fire, the following actions are to be taken:

- *The landfill operations manager and site supervisor are notified.*
- *An assessment is made as to where the landfill can expose and douse the fire using site equipment, or whether fire department help is needed.*
- *If it is decided that help is needed, the fire department is contacted.*
- *Appropriate actions are taken to divert traffic and customers away from firefighting activities.*
- *The DEQ is notified of the event."*

Several contingencies have been put in place to address any fire that may break out at the Landfill. Those measures include:

1. Soil stockpiles arranged in a U-shape are always available near the Landfill working face in accordance with Standard Operating Procedures (SOPs) developed by Republic Services corporate staff for all their landfills nationwide. If a waste truck is determined to contain a hot load, the driver is to immediately notify site operating personnel and back the load into the U-shaped soil stockpiles to deposit the waste on solid ground not connected to or a part of the working face. Once on the ground, any burning parts of the waste are quickly covered with soil by operating personnel to extinguish the fire. The waste is kept separate from the working face and is moved to the working face only after personnel determine that the fire is completely extinguished.

2. Soil stockpiles are always nearby and available for use near the Landfill working face for immediate application by site personnel to extinguish any fire detected on the landfill working face. As any landfill operator knows, the safest and most effective way to extinguish a fire at a landfill working face is to smother it with soil. This contingency is also in full accord with Republic Services SOPs for landfill fire management.

3. The site can readily use water to extinguish grass fires on the landfill or to supplement soil application at the landfill working face. The site has a 4,000-gallon water truck with spray bar and hose attachment that is used routinely in dry weather for dust control. The water truck is loaded with fresh water from a truck-loading station connected to the public water supply.

Landfill Fire Sources, Risk Profiles, and Specific Mitigation Measures

This section will identify the three sources of fires that have a material risk of occurring at the Landfill. For each source, we will describe how and where the fire would occur, the likelihood of occurrence, the control measures in place to mitigate fires, and the potential for fires to expand to a size sufficient to have a material impact on the local community or environment. These three types of fires are generally true for any landfill and are thus appropriate to identify as such for the Landfill. The three landfill fire sources are (1) working face fires, (2) grass fires, and (3) gas well fires.

Working Face Fires

As suggested above, surface fires at the landfill working face are quite common at any landfill. They generally derive from a smoldering part of a waste transfer vehicle's much larger waste load. Once dumped, the smoldering waste can expand to a larger fire when exposed to atmosphere and placed atop other exposed wastes already deposited at the working face. The key to controlling these fires is to quickly identify and extinguish them.

There are ways to avoid a hot waste load being placed atop the working face in the first place. As described above, operating personnel at the Landfill are trained to identify a hot load before it is dumped at the working face. In that case, it is dumped in a separately prepared area, atop solid ground not containing waste, with soil stockpiles always alongside to quickly cover and extinguish any fire before expanding beyond that load, much less to other waste already deposited at the working face.

While some hot loads can be managed in this manner, some inevitably are not detected until unloaded atop other waste at the working face. But again, operating personnel at the Landfill have been trained to quickly spot and contain that kind of fire before it expands beyond its original waste load. Soil stockpiled adjacent to the working face is immediately applied and compacted over the smoldering waste. Several layers of soil are applied and compacted to make absolutely sure that the fire is smothered and sealed off from atmospheric oxygen to help prevent reignition. Additional waste deposits received thereafter are placed in other areas of the working face, so the sealed-off surface atop the hot load can be observed and kept stable for the rest of the day.

The key is to quickly identify and extinguish working face fires with soil to prevent expansion. Quick reaction ensures minimal risk of the fire expanding and consuming larger portions of the working face. Although usually unnecessary, water can be applied to supplement the soil application.

There are three keys to keeping working face fires under control and tightly confined. First, keep the size of the overall working face as small as practicable during the day, appropriate for the size of the landfill operation and the number of trucks dumping at the working face at any one time. Second, cover the waste at the end of each working day, limiting air and oxygen to fuel the fire and the amount of refuse exposed to atmosphere overnight. Third, keep the working face limits, whether during the day when exposed to atmosphere or at night when covered, a sufficient buffer distance from grassland or other flammable materials.

If those provisions are implemented, the risk of a fire consuming the whole working face, much less expanding beyond to grassy areas, is de minimis. The controls put in place by the current owner (Republic Services) makes a recurrence of a working face fire as large and uncontrolled as the 1999 fire highly unlikely.

In summary, fires at any landfill's working face are not unusual, considering that wastes brought to any landfill may from time to time arrive as a hot load, with parts of the load smoldering. Republic Services has put in place a number of contingency supplies and conditions that provide a high level of assurance that such fires will be promptly identified, controlled, and extinguished without expanding beyond the limits of the hot load.

Grass Fires

A portion of the Landfill's existing fill areas and on-property buffer areas are grassland and subject to fires. Grass on the landfill property can be ignited from either on-site or off-site sources.

The risk is low for wildfires starting off site to come on site, and there is no history of wildfires in the area of the Landfill. This part of the county is generally wet most of the year, and wildfires are rare. Wildfires are more likely to be created and expand at higher, dryer elevations in the county, with low risk of spreading the full distance to the Landfill.

If such off-site fires did enter the Landfill, it is assumed that Adair Fire would already be working at controlling the fire. Those efforts could be supplemented by operating personnel using water from the site's water truck, or stockpiled soil would be used to smother the fire. Other control measures could be employed, such as firebreaks and soil barriers, to keep such fires off the Landfill property.

There has been some stated concern that a grass fire entering the Landfill's fill areas would be fueled and exacerbated by methane at the site—presumably by either gas in the GCCS wellheads, in above-grade gas-collection headers, or by surface emissions through the landfill cover. In our judgment, there is no risk that methane from the Landfill would further fuel a grass fire entering the site. Such wildfires have blazed across several MSW landfills with GCCS systems in place in southern California. Such wildfires may destroy portions of the GCCS gas-collection system that are above ground, but these collection systems operate under vacuum; when the plastic components burn, the vacuum is disconnected and gas flows stop. In the end, grass fires entering the Landfill site are no different from fires crossing undeveloped grassy areas far removed from landfills. The fact that it spreads across a landfill makes no difference in the size, spread, or intensity of the fire.

The next concern is grass fires that are created on the Landfill property. These fires are unlikely to come from a working face fire, since working face fires would be quickly identified and controlled within the working face itself, as previously described. Providing a buffer between the working face and grassy areas also assures that a working face fire cannot spread to grassy areas.

As previously described, one reported fire at the Landfill came from the site's landfill gas flare, reportedly via a burning ember that was expelled from the flare. We are skeptical that a grass fire came from this kind of source. Landfill flares tend to burn clean, with no residue or solids of any kind expelled from the flare. Nonetheless, the Landfill has since taken the precaution of maintaining a significant gravel-covered buffer between the flare and grassy areas with no chance of ignition.

There is some risk that vehicles at the landfill could ignite a grass fire if they operate in or travel across grassy areas. Some undercarriage parts of vehicles, such as mufflers and catalytic converters, do have elevated temperatures and have some potential to be hot enough to ignite grass or other combustible materials that may come in contact with vehicles. However, waste vehicles entering the Landfill traverse

paved and graveled roads when approaching and returning from the working face. Landfill operating vehicles mostly travel on nonflammable surfaces as well.

If a grass fire occurs on site from on-site sources, the Landfill would quickly identify it and respond with its water truck or by using other operating equipment to cover and extinguish the fire with soil. As described above, even if the GCCS gas system is burned and destroyed in the process, methane from that system or any emissions from the landfill surface have no risk of fueling or otherwise exacerbating the fire. This again is based on experience with such wildfires sweeping over landfills with and without gas systems in southern California.

In summary, we believe there is low risk of a grass fire occurring from either on-site or off-site sources at the Landfill. And if a grass fire were to develop, it would not be fueled by landfill gas in any way, including gas in wellheads or header lines. In any event, such fires could be quickly extinguished by operating staff or, if necessary, with the support of Adair Fire.

Gas Well Fires

A third possible source of landfill fire is a gas well fire. As previously described, a GCCS collects landfill gas at many landfills such as at Coffin Butte. A blower is used to provide suction to landfill gas wells, and gas then flows from wells through a system of connecting gas pipes known as landfill gas headers. Collected gas at the Landfill ultimately flows to the blower station where part of the gas is directed to a landfill gas-to-energy plant, and the balance to the landfill gas flare. These gas systems are carefully operated, monitored, and maintained. A precise amount of vacuum is applied to each well to provide a steady flow of methane from each gas well. If the vacuum applied and induced flow is too low, methane gas may find ways other than wells and the gas-collection system to exit the landfill as an uncollected surface emission. If too much vacuum is applied, its induced flow can generate an oversized zone of collection around a well—one that breaches the landfill surface and "short-circuits" atmospheric oxygen downward and thence into the wells and headers.

The waste inside a landfill usually decomposes in an "anaerobic" condition, since the waste is at depth in the landfill and sealed off from the landfill surface and atmosphere above. Anaerobic means lacking air or oxygen. Anaerobic conditions in a landfill generate anaerobic decomposition, which has as its primary gaseous byproducts both methane and carbon dioxide. The methane component is natural gas, the same gas used by local natural gas utilities and used to heat our homes.

If excess vacuum is applied to a gas well, it can draw oxygen into the landfill inducing "aerobic" (in the presence of air and oxygen) decomposition and oxidation, with carbon dioxide as its primary gaseous byproduct, with little or no methane. As oxidation progresses, it can end up at the extreme end of oxidation—namely, spontaneous combustion and fire.

If a GCCS is not tightly operated, monitored, and maintained, a landfill fire can break out in the manner described above. Fortunately, such fires stay subsurface in the landfill and are of a limited extent vertically and horizontally, staying in close proximity to the gas well. These fires do not manifest themselves above ground, nor do they have any potential to create a surface fire.

Nonetheless, landfill gas well fires can and do occur at landfills with GCCS gas-collection systems. Identification of these fires can be observed in gas monitoring results recorded at the gas wellhead—with elevated temperatures, increased carbon dioxide, and decreased methane. Physical signs may also

appear with rapid settlement around the wellhead, and in rare cases melted and destroyed gas wells and even low-level smoke emissions.

Being subsurface in the landfill, waste can create some challenges when it comes to extinguishing gas well fires. The first step to extinguish these fires is to close the wellhead valve, cutting any suction or gas flow from the well into the gas-collection system. Sealing off the area around the well with tight compacted soils can help cut the intrusion of atmospheric oxygen to the subsurface fire. Applying water to the landfill surface above the fire, and letting it seep into the landfilled waste below, is unlikely to directly extinguish the fire. By implementing the measures described here, the fire should snuff out on its own over time. Elevated temperatures may persist for months, but will eventually subside.

It should be reiterated that Republic Services has detailed SOPs for operating, monitoring, and maintaining gas-collection systems for their landfills. One of those SOPs addresses ways to avoid "Subsurface Oxidation Events" such as these from ever occurring. That SOP also addresses ways to identify the onset of these events and prescribes action(s) to extinguish them.

Based on our interviews of Landfill staff, no gas well fires have ever occurred at the site. From our review of landfill gas wellhead data over the past several months, including primarily the temperature of extracted gas at all gas wellheads, we see no evidence of such gas well fires at the Landfill at this time. There is always the potential for gas well fires to occur at this or any landfill in the future. However, with proper operation, monitoring, and maintenance of the overall GCCS, the potential for these fires is reduced for the future. And if such a fire were to occur, it would be quickly identified and extinguished using the techniques described above.

In summary, landfill gas well fires can be reduced or avoided altogether with proper operation, monitoring, and maintenance of the GCCS at the gas wellhead. Landfill gas fires have occurred at other MSW landfills with active gas-collection systems installed, but operating staff at the Landfill report that no such fires have occurred to date. Our review of current gas wellhead monitoring data shows no evidence that any wells are poorly operated or have a developing or current gas well fire at this time. Landfill staff have the knowledge and tools to avoid gas well fires in the future, and if one were to occur, can identify and rapidly take steps to extinguish it.

Conclusion

We have identified three possible sources of landfill fires that have a material chance of ever developing at the Landfill. These include (1) working face fires, (2) grass fires, and (3) gas well fires.

With the potential for a hot load to arrive at this or any landfill, working face fires have occurred at the Landfill in the past, and that potential remains. However, the controls implemented by operating staff since the 1999 fire with respect to a working face fire provide assurance that an event of that size will not reoccur. Any fire that occurs at the working face in the future will be promptly identified and extinguished with little to no expansion of that fire beyond the contents of the hot load itself.

The potential for grass fires to develop on Landfill property is low, and certainly no more than anywhere that vehicles come in proximity to grassed areas, such as alongside public highways. Fortunately for the Landfill, operating staff are well trained and attentive to identify the development of any on-site grass fires, and they have the tools and methods to quickly extinguish grass fires before they spread.

There is no history of large wildfires in the part of the county surrounding the Landfill. But like almost anywhere, given dry weather and areas overgrown with natural vegetation like grassland or forest land, that risk, although low, does exist. It is possible that such fires could spread from off-site to on-site areas at the Landfill, but we assume that any such fire, whether off site or spreading onto the Landfill, would be addressed by Adair Fire. To make clear, the presence of a wildfire sweeping across Coffin Butte or any landfill would not be exacerbated at all by the presence of the landfill, its landfill gas, or its gas-collection system. Several wildfires have swept across landfills like Coffin Butte in southern California with no evidence that the fire was in any way affected or accelerated by the landfill beneath.

Lastly, gas well fires can occur with any landfill having a gas-collection system, like Coffin Butte. However, those fires stay subsurface and localized to a given single gas well. There is no evidence that any such fire has occurred in the past at the Landfill. Our review of wellhead monitoring data indicates that none are occurring now. Considering the current procedures in place, the risk of gas well fires occurring in the future is low. And finally, if a gas well fire did occur, the staffing, procedures, and tools are in place to quickly identify, control, and extinguish those fires in the future.

Based upon our analysis, we conclude that operations at the Coffin Butte Landfill do not present a significant fire risk.

ADDENDUM TO
FIRE RISK ASSESSMENT OF COFFIN BUTTE LANDFILL, CORVALLIS, OREGON
PREPARED BY JAMES J. WALSH, P.E., BCEE
SCS ENGINEERS
JANUARY 14, 2025

MFA and subconsultant, Dr. Tony Sperling of Landfill Fire Control Inc. (LFCI), reviewed and commented on a report entitled Fire Risk Assessment of Coffin Butte Landfill by James Walsh of SCS Engineers. Their comments are inserted below. In collaboration with staff from Coffin Butte Landfill, James Walsh has prepared responses to each comment, also inserted below. This document can be considered an Addendum to the latest report of September 24, 2024.

PAGE 2: HISTORY OF PRIOR LANDFILL FIRES

1. MFA/LFCI Comment: This report only references three fire events occurring at the landfill since 1999. However, the County has indicated that there have been at least two additional fire events on this site in the past year or so. The cause of these recent fires and the actions taken should be included in this portion of the document.

   SCS Response: The updated report of September 24, 2024 had already referenced a total of five fire events, consistent with the above comment. We believe the comment above was based on an earlier version of the report.

PAGE 3: FIRE MITIGATION PLANS

2. MFA/LFCI Comment: The first paragraph indicates that water would be used as the primary means of extinguishing a fire. LFCI notes that the most effective and current industry standard for the primary method of fire suppression for a landfill fire is smothering with 12 inches of soil. The Applicant should provide justification for the primary use of water for their initial response.

   SCS Response: It is agreed that soil is to be the initial and primary means of extinguishing fires at the working face of the landfill. Water is secondary and would be used only if appropriate and needed. This is the fire extinguishment practice known to landfill operating personnel and is reflected accordingly in the Landfill's Operating Standards and Best Practices.

3. MFA/LFCI Comment: With consideration to the preceding comment, LFCI recommends that the second paragraph describe the action plan in the case of a landfill fire to first control the fire (using soil or water), then assess and take further steps to extinguish the fire.

   SCS Response: As stated above, soil will be the initial and primary fire extinguishment method at the working face, with water to supplement such soil only if appropriate and needed.

4. MFA/LFCI Comment: The document refers to the availability of public water on site, but the narrative does not indicate the amount of on-site stored volume and/or refilling capacity of the

water system available for fire suppression activities. This information should be included to better understand the firefighting capabilities Of the existing system, as no improvements appear to be proposed, LFCI recommends a minimum sustained flow of 1,000 gallons per minute be available for fire suppression and further information be provided on how the Applicant will provide the logistics for maintaining this flow rate (e.g. available hydrant connections, tanker shuttles).

SCS Response: The clean water supply is from a Village of Adair water stand located near the site. The site has a 4,000-gallon water truck which is loaded and ready for fire extinguishment. Water can also be pumped from fresh water on-site ponds into the water truck, and thence applied to any fire as appropriate and needed. Pump rates into and from the water truck are sufficiently robust to extinguish any fire on site. Pumper fire trucks from Adair or Corvallis can also be employed to supply and apply sufficient water at appropriate rates.

PAGE 4: LANDFILL FIRE SOURCES, RISK PROFILES, AND SPECIFIC MITIGATION MEASURES

5. MFA/LFCI Comment: Battery fires are increasingly becoming a source of landfill fires and should be addressed in this document. Reactive and banned materials should be identified.

   SCS Response: Vehicle batteries are banned from disposal in the landfill. Signage at the landfill entry lists vehicle batteries among other items as banned from landfill disposal. The landfill site has a separately designated recycling center for collection of vehicle batteries and used oil. Any materials collected at this center are removed from the landfill for recycling or disposal elsewhere.

   Signage at the entry to the landfill lists the following as banned from disposal at Coffin Butte Landfill:
   - Hazardous Waste
   - Liquid Waste
   - Chemicals
   - Used Oil
   - Tires
   - Vehicle Batteries
   - Motor Vehicles
   - Electronic Waste
   - Burning Material
   - Infectious Medical Waste

6. MFA/LFCI Comment: For Working Face Fires, LFCI recommends the inclusion of bar hole punch for monitoring the subsurface carbon monoxide (CO) and temperature, as well as infrared camera inspections.

   SCS Response: Coffin Butte Landfill has detailed procedures for identifying and extinguishing working face fires, as described in the report of September 24, 2024. The landfill also abides by Standard Operating Procedures (SOPs) that address the identification and extinguishment of

landfill working face fires. These SOPs were developed by the landfill's parent Republic Services for use at its hundreds of landfills. In total, these procedures have proven effective and sufficient.

7. MFA/LFCI Comment: For Grassland Fires, LFCI recommends that this document specify a measurable fire buffer distance between the landfill and surrounding grasslands. This fire buffer should be adequately maintained at all times. In addition, fire watch provisions or infrared monitoring should be implemented to manage ignition risks during off hours.

   SCS Response: A gravel-covered fire buffer has been installed in and around the blower/flare station, to prevent any sparks from the flare from igniting grassed areas. It should be noted that sparks from the site's flares are rarely if ever observed.

   Perimeter roads around several of the landfill's cells serve as buffers as they now exist. Going forward, the landfill will endeavor to implement additional buffer separations around future landfill fill areas.

8. MFA/LFCI Comment: For Gas Well Fires, LFCI recommends preventive monitoring, including monitoring for CO levels, targeted maximum oxygen concentrations, and balancing gas levels to prevent aerobic decomposition. In addition, the Applicant should provide standard operating procedures for handling high-temperature wells and specify operating temperature thresholds.

   SCS Response: Current procedures or preventive monitoring to detect developing gas well fires in place now, are extraordinarily robust and more than sufficient to detect and prevent gas well fires. First, the site abides by the U.S. EPA's NSPS regulations. These rules prescribe routine monthly monitoring of all gas wells for pressure, temperature, and oxygen. NSPS sets limits for each of those three parameters as a way to detect early on the potential to develop a gas well fire. Second, the landfill's parent Republic Services has a 205-page SOP document specifically for landfill gas management. Several sections in that SOP address the prevention, detection, and mitigation of gas well fires. Coffin Butte Landfill follows that SOP. Third, all Republic Services landfills including Coffin Butte enter all landfill gas monitoring results into an advanced database system for monitoring and managing landfill gas systems. That software is SCSeTools, and it automatically detects any exceedances of the NSPS Standards on gas well fires, and in fact also spots early trends toward a possible gas well fire before actual exceedances occur, so that mitigation measures can be employed early on.

OTHER RECOMMENDATIONS FROM MFA AND LFCI:

9. MFA/LFCI Comment: Spontaneous combustion fires are not addressed in this document, except in relation to gas wells. LFCI notes that spontaneous combustion on slopes is a fire risk that should be included.

   SCS Response: Spontaneous combustion can potentially occur at the landfill's working face. Working face fires are not sourced only to the entry of a hot load. Detection, prevention, and extinguishment of such fires at the working face follow the same robust procedures already in

place for working face fires. Gas well fires are exclusively sourced to a spontaneous combustion event as an overdrawn gas extraction well pulls atmospheric oxygen into an anaerobic environment deep in a landfill. Such fires usually first manifest themselves on the ground surface immediately around the gas well's wellhead. But if the well is located near a sideslope, the gas well's zone-of-influence can also break through laterally and manifest itself on the sideslope some distance from the gas wellhead. Such breakthroughs would be observed by gas operations personnel on the monthly rounds.

It should be noted that for all the reasons under #7 above, the sound management practices applied on the gas system at Coffin Butte ensure that such gas well fires manifesting themselves anywhere will not occur. In fact, Coffin Butte personnel report that a gas well fire has never occurred at the site. That clean record is expected to continue, considering all the sound management practices applied at this site.

10. MFA/LFCI Comment: Typical landfill construction has an inherent risk of capturing LFG at the edges of geomembrane sheets and should be addressed in this document.

    SCS Response: It is assumed that the reference here is to geomembrane sheets applied as part of any given landfill cell's final cover system. Such membrane sheets are tied into the bottom liner in the cell's perimeter anchor trench, thus allowing no gas to escape and no fire associated with any escaping methane can occur. If geomembrane sheets are applied atop fill areas without such an airtight connection, the landfill's operating personnel will properly secure the perimeter to contain that gas under the sheet, not allowing any venting of landfill gas around its edges.

11. MFA/LFCI Comment: Smoking should only be allowed in designated areas and prohibited elsewhere on site.

    SCS Response: Smoking is banned everywhere on-site, with posted signage to that effect. There are two designated smoking areas outside, atop gravel-covered or paved areas. One is outside the landfill office and one is adjacent to employee lockers.

12. MFA/LFCI Comment: The use of bird deterrent flares should be avoided.

    SCS Response: Bird deterrent flares are not used at the site.

13. MFA/LFCI Comment: Annual fire safety and firefighting training should be undertaken for all employees who would respond to a fire along with regular cross-training with Adair Rural Fire & Rescue.

    SCS Response: Management at the landfill conducts fire safety training once per year. This training is usually in the summer months. The training usually takes around 30 minutes. Topics covered in such training include:

    - Understanding the components of a fire
    - The different types of fire extinguishers, and when/how to use them
    - Landfill fires / what landfill heavy equipment to use / what material to use to fight the landfill fire/who to contact / etc.

- When and where to gather during an evacuation.

Coffin Butte Landfill and Adair Fire have a plan on how to work together. That plan is reviewed and updated through regular communication between the parties. Adair Fire has responded to a fire at the Coffin Butte Landfill previously, and the planned coordination worked successfully in practice.

PROPOSED CONDITIONS OF APPROVAL

January 15, 2025, Update

Applicant's proposal is hereby granted Preliminary Conditional Use Approval. Operating (Final) Approval is subject to completion of all Preliminary Approval Conditions listed below. Applicant shall adhere to the following conditions under the terms of approval of this conditional use permit.

Until Applicant completes the Preliminary Approval Conditions, Applicant shall not:

(A) Construct the internal haul road;

(B) Construct the leachate ponds;

(C) Construct the employee building;

(D) Construct the new landfill cell.

Upon Applicant submitting documentation demonstrating that the Preliminary Approval Conditions have been met, the Planning Official will issue a written notice of Operating Approval at which time Applicant may initiate construction of items (A) through (D) above, subject to the Operating Approval Conditions below.

Operating Approval Conditions shall remain in effect for the duration of the Project. Failure by Applicant to comply with the Operating Approval Conditions may result in revocation of the Conditional Use Permit.

Preliminary Approval Conditions

The following Preliminary Approval Conditions shall be completed during the four-year period that begins on the later of: (a) the date of final decision (including resolution of any appeals) of the Conditional Use Permit; or (b) from the date of Oregon Department of Environmental quality ("DEQ") approves of all required environmental permits ("Preliminary Approval Period"). The Planning Official may grant one extension for up to a year prior to the expiration of the Preliminary Approval Period if Applicant makes a written extension request stating the reasons preventing completion within the approval period. Failure to commence the Preliminary Approval Conditions within the Preliminary Approval Period shall render this Conditional Use Permit void.

Phase 1 Preliminary Approval Conditions – Only those activities necessary to complete the following conditions are authorized until all of these Phase 1 Preliminary Approval Conditions have been met.

PA-1 Wetlands. On Tax Lot 1200, Applicant shall prepare and obtain approval from the Oregon Department of State Lands of a wetland delineation. Applicant shall not locate any portion of the project within the mitigation wetland and required buffer of the mitigation wetland as shown in Applicant's Exhibit 2.

PROPOSED CONDITIONS OF APPROVAL

June 13, 2025, Update

Applicant's proposal is hereby granted Preliminary Conditional Use Approval. Operating (Final) Approval is subject to completion of all Preliminary Approval Conditions listed below. Applicant shall adhere to the following conditions under the terms of approval of this Conditional Use Permit.

Until Applicant completes the Preliminary Approval Conditions, Applicant shall not:

(A) Construct the internal haul road;

(B) Construct the leachate ponds;

(C) Construct the employee building; or

(D) Construct the new landfill cell.

Upon Applicant submitting documentation demonstrating that the Preliminary Approval Conditions have been met, the Planning Official will issue a written notice of Operating Approval, at which time Applicant may initiate construction of items (A) through (D) above, subject to the Operating Approval Conditions below.

Operating Approval Conditions shall remain in effect for the duration of the Project. Failure by Applicant to comply with the Operating Approval Conditions may result in revocation of this Conditional Use Permit.

Preliminary Approval Conditions

The following Preliminary Approval Conditions shall be completed during the four-year period that begins on the later of: (a) the date of final decision (including resolution of any appeals) of the Conditional Use Permit; or (b) from the date of Oregon Department of Environmental Quality (DEQ) approval of all required environmental permits (the "Preliminary Approval Period"). The Planning Official may grant one extension for up to a year prior to the expiration of the Preliminary Approval Period if Applicant makes a written extension request stating the reasons preventing completion within the Preliminary Approval Period. Failure to commence the Preliminary Approval Conditions within the Preliminary Approval Period shall render this Conditional Use Permit void.

Phase 1 Preliminary Approval Conditions. Only those activities necessary to complete the following conditions are authorized until all of these Phase 1 Preliminary Approval Conditions have been met.

PA-1 Wetlands. On Tax Lot 1200, Applicant shall prepare and obtain approval from the Oregon Department of State Lands of a wetland delineation. Applicant shall not locate any portion of the Project within the mitigation wetland and required buffer of the mitigation wetland as shown in Applicant's Exhibit 2.

PA-2 Site Plan Map. Applicant shall submit to the Planning Official a final site plan map of the approved proposal. The map shall contain a scale, north arrow, assessor map numbers, location of existing landfill, access, proposed alteration, leachate treatment or monitoring areas surface water systems, and existing and proposed screening (location and types of materials). A statement shall be placed on the map that the site plan map and narrative together are considered as the Site Development Plan. A signature block shall be included for the date the approval is given and the signature of the Planning Official indicating approval.

PA-3 Covenant. If not already completed, the property owner shall sign a declaratory statement to be recorded into the County Deed Records for the subject property on which the conditional use is located that recognizes the rights of adjacent and nearby landowners to conduct forest operations consistent with the Forest Practices Act and Rules, and that recognizes the hazards associated with the area.

PA-4 Screening. Applicant shall install the landscape screening as shown in Applicant's Exhibit 2 and the Site Development Plan. The trees shall be at least eight feet tall upon planting and be of a species to reach a height of at least 40 feet upon maturity.

Phase 2 Preliminary Approval Conditions. Upon completion of the Phase 1 Preliminary Approval Conditions, Applicant may initiate the ground-disturbing activities identified in the following Phase 2 Preliminary Approval Conditions. Elements of this phase that do not include ground disturbance may be initiated in Phase 1.

PA-5 Public Works.

(A) Applicant shall provide calculations, design, and specifications for all proposed public infrastructure to Benton County Public Works staff for review and approval.

(B) Prior to receiving operating approval of this Conditional Use Permit, Applicant shall fulfill ONE of the following TWO options to meet the conditions for improvements noted above:

(i) Applicant shall construct the improvements noted above as required, OR

(ii) Applicant shall enter into an Agreement for Improvements (AFI) with the County. The AFI will require security for the full amount of the work to be

performed, plus a 20 percent contingency. The security may take the form of a bond, a conditional irrevocable line of credit, or a cash deposit. The security serves to ensure faithful performance of the required improvements, as outlined above, within 18 months of execution of the AFI.

(C) Upon completion of the proposed improvements to Coffin Butte Road as shown in the Engineer Plans attached as Applicant's Exhibit 2 and acceptance by the County Engineer, Applicant shall dedicate the improvements and any necessary additional right-of-way to the County.

(D) Applicant shall apply for and obtain a Post-Construction Stormwater Permit as required by BCC 99.670.

PA-6 Construction Phase. During construction of the expansion area for commercial use (construction of the leachate ponds, haul road, new landfill cell, and employee building), Applicant shall:

(A) Limit construction to the hours of 6 a.m. to 6 p.m.

(B) Limit any required blasting to the hours of 12 p.m. to 5 p.m.

(C) Conduct all blasting pursuant to its approved permit issue by the Oregon Department of Geology and Mineral Industries (DOGAMI).

(D) Obtain all required permits applicable to the work.

(E) Comply with all applicable DEQ regulations applicable to the work.

Operating Approval Conditions (to be met for the duration of the Project).

OA-1 Hours of Operation. Operating hours for disposal of waste in the landfill shall be as follows:

(A) Monday through Saturday, the site may open to commercial customers using the commercial tipping area starting at 5 a.m. and to all other customers starting at 8 a.m. The site shall close to both commercial and other customers at 5 p.m.

(B) On Sunday, the site will not open to any customers before 12 p.m. and will close to all customers no later than 5 p.m.

(C) Internal operations, including opening and closing of the site and equipment preparation and inspection, shall start no earlier than one hour prior to opening the site for commercial customers and shall conclude no later than two hours after closing the site to all customers.

(D) Following the start of commercial operations in the expansion area, scheduled infrastructure construction projects, such as new cell and gas facilities construction and road and driveway improvements, will be limited to the hours that the landfill is open to commercial customers. Emergency construction may occur outside these hours. An “emergency” is any unforeseen site condition that could result in property damage, affect site safety, or create negative off-site impacts.

(E) Staff or consultants may be on site or visit the site after the hours listed in sections A through D above for security, when necessary to respond to complaints or concerns, for equipment cleaning and maintenance, or to ensure that leachate disposal is adequately managed.

(F) During an emergency or when requested by a federal, state, or Benton County agency, Applicant may open the landfill outside the hours listed in sections A through D above.

OA-2 Noise.

(A) Prior to the start of commercial operations in the expansion area, Applicant shall verify by field measurement using a Type 1 sound level meter and overseen by a licensed engineer in the state of Oregon that sound levels of on-site equipment have been reduced by at least 10 dB compared to levels in Table 5.3 of the Noise Study dated September 25, 2023 (Applicant’s Exhibit 11). Mitigation measures could include but would not be limited to upgraded engine mufflers, quieter equipment, and local noise barriers around stationary equipment. This condition is limited to on-site vehicles. To verify equipment sound levels, remain 10 dB below the levels shown in the Noise Study:

(i) Sound levels from on-site equipment will be measured at least once each week using a sound level meter or application installed on a mobile device.

(ii) Additional measurements will be made every three years after commencement of operations in the expansion area using a Type 1 sound level meter and will be overseen by a licensed engineer in the state of Oregon. These triennial measurements will be used to prepare updated noise studies.

(B) Prior to the start of commercial operations in the expansion area, Applicant shall replace all tonal back-up alarms on its on-site equipment with ambient sensing back-up alarms.

OA-3 Maintenance of Tree Buffer. Applicant shall maintain the existing tree buffer along Hwy 99W and the new screening measures required in PA-4 above. Applicant will replace any dead trees during the rainy season.

OA-4 Blue Heron Rookeries. Applicant shall continue to monitor the eastern Great Blue Heron rookery in 2025, as recommended in Applicant's Addendum to the Final 2024 Wildlife Habitat Assessment and Surveys attached as Applicant's Exhibit 3. Applicant shall protect the eastern rookery and buffer areas as set forth in Exhibit 3 unless and until it is determined to be abandoned under the rules of the Oregon Department of Fish and Wildlife following the 2025 survey. Applicant shall comply with all Forest Practices Act requirements with regard to any active Great Blue Heron rookery.

OA-6 Outdoor Lighting. On all outdoor lighting, Applicant shall install light shields or use lights with the correct beam angle encased above and to the sides in order to channel the light downward and reduce the amount of light pollution.

OA-7 Maximum Elevation. The final grade of the new landfill cell shall not exceed 450 feet above mean sea level in elevation.

OA-8 Compliance with Application Materials. Applicant shall construct and operate the expanded landfill as described in the application materials, except as modified by these conditions of approval.

OA-9 Odor Monitoring and Mitigation.

(A) After Applicant completes construction of the new landfill cell, but prior to commencing disposal operations, Applicant shall determine a minimum of four odor survey points located on the perimeter of the development site boundary. Applicant shall designate two site personnel to be trained to detect odors on an n-butanol scale by using a Nasal Ranger Field Olfactometer or comparable technology. Each working day, one of the trained personnel will conduct at least one odor survey at each odor survey point and record the observations on a survey form, including data about the time, location, weather conditions, and intensity and description of any odor. If odors are detected, steps shall be taken to attempt to identify the source. If it is determined to be attributable to the Project, Applicant shall mitigate the source of the odor consistent with the practices set forth in Applicant's Exhibits 12 and 15. Applicant shall maintain the survey documentation and documentation about steps taken to mitigate odors detected at the survey points for a minimum of four years. A summary format of the information will be provided in Applicant's annual report to the County. In addition, while site personnel is conducting the daily odor patrol, he/she will wear a portable gas monitor (or similar portable device) set to measure the level of hydrogen sulfide (H2S), which at certain thresholds can indicate the presence of landfill gas odors. The monitor will be set to an appropriate threshold; if the monitor detects levels of H2S above the threshold, it will be recorded in the survey documentation and site personnel will promptly attempt to identify and mitigate the source of the elevated level if it is determined to be attributable to the Project.

(B) Applicant shall maintain a log of odor complaints that are received directly by the landfill (via phone, e-mail, or website) to include the following information (if provided): date, time, person making complaint, and location of reported odor. Applicant will maintain the log of odor complaints for five years. Applicant shall also maintain any odor complaints received via ODEQ for five years. Odor complaints which are verified by site personnel shall be remediated where possible.

OA-10 Maintenance of Other Require Permits. Applicant shall obtain and maintain all required federal, state, and Benton County permits for construction and operation of the landfill. Applicant shall file copies of all such permits with the Benton County Planning and Development Department within 30 days of issuance.

OA-11 Compliance with Archeological Report Conditions. Applicant will comply with the operational conditions set forth in Applicant's Exhibit 26.

OA-12 Environmental Regulations. Applicant shall comply with all applicable regulations adopted by DEQ, the United States Environmental Protection Agency (EPA), or any other agency of competent jurisdiction with regard to PFAS/PFOA, methane, and any other landfill gas component.

OA-13 Site Operations.

(A) The working face (area of active disposal operations) shall not exceed two acres in size unless it is necessary to increase the size to accommodate disposal due to a natural disaster such as a fire or other event requiring a larger working face to meet public health needs.

(B) Applicant shall install daily cover over the working face at the conclusion of every day that the expansion area is open to the public.

(C) Applicant shall provide interim daily cover of twelve inches of compacted soil on all areas of the expansion area not actively receiving waste in compliance with applicable rules and regulations.

(D) Applicant shall keep all landfill infrastructure in good repair, and shall repair as promptly as possible any disabled, damaged, or nonworking infrastructure.

(E) Applicant shall not develop a use, construct any structures, or make any site improvements that are not contained in the approved site plan (Applicant's Exhibit 2) unless such uses or facilities are outright permitted uses in the zone. Any other structures, uses, or site improvement not shown in the approved site plan will require a conditional use permit to modify the site plan.

(F) Applicant shall not accept regulated hazardous waste as defined in 40 CFR 258.20(b) at the site.

(G) Groundwater sampling wells shall be installed as provided in Applicant's Exhibit 2 and monitored in accordance with state and federal requirements.

(H) Litter-control patrols shall be performed at the site a minimum of once per week. Applicant shall take reasonable efforts to prevent litter from leaving the site.

OA-15 Fire Protection.

(A) Applicant shall maintain the 4000-gallon water truck in good repair so that it is fully available at all times to help extinguish fires. At such time as Applicant may replace or update the water truck or other firefighting infrastructure in the expansion area, such new truck or equipment will provide protection equal to or better than the truck or equipment being replaced.

(B) Applicant shall maintain a log of all fire incidents on Applicant's property use for landfill activities and accessory uses. Applicant will provide a verbal report of any fire events that have occurred since the last meeting at each Benton County Disposal Site Advisory Committee meeting. Applicant shall ensure that it is reporting such fire incidents to DEQ.

(C) Applicant shall conduct semi-annual fire-protection and emergency-preparedness training of its on-site personnel.

OA-16 Groundwater Monitoring.

(A) Well Volume Impacts. The Applicant shall take the follow methodological, step-by-approach to monitoring and evaluation of potential groundwater impacts to wells on adjacent properties.

(i) As part of the proposed expansion project and prior to excavation of the new cell in the expansion area, a network of four monitoring wells will be constructed along the southern side of the development. (Anticipated/approximate well locations are shown on Exhibit 50, though terrain and other ground conditions may dictate some adjustment in placement). Water levels in these four wells will be regularly monitored as part of the CBL routine monitoring program. These wells will effectively function as "sentinel" wells to provide an added level of monitoring.

(ii) Should these four new wells show four successive decreases demonstrating a 10% decrease in the potentiometric surface over the baseline established prior to excavation, or a dramatic change across two events (not associated with local climactic conditions or residential water use), the Applicant will request the ability to evaluate yield and water levels at residential wells. As part of this analysis VLI may install additional sentinel wells to the south of the four new monitoring wells.

(iii) If the sentinel wells show a decrease that is affecting neighbors that is unrelated to local climate conditions or changes in residential use, VLI will conduct outreach to those neighbors to evaluate and implement mutually agreeable solutions at VLI's expense.

(iv) VLI will remain open to discussion with interested residents about their wells and water levels and will promptly respond to any concerns or complaints.

(B) **Arsenic.** The four sentinel wells noted above will also be used to obtain background water quality data prior to placement of waste in the new cell. In addition, the Applicant, subject to property-owner approval, will sample the domestic water wells immediately south of the landfill (i.e., along Blaze Drive and Ploughshares Road) for arsenic once a year to track levels moving forward. This sampling program will begin before landfill construction to establish a baseline for arsenic concentrations in those wells. If changes in arsenic concentrations above baseline levels are measured and can be attributed to landfill operations, the Applicant will work with property owners to remedy the condition.

Advisory Notices.

Advisory 1. Endangered Species Act. Federal law requires that Applicant comply with the federal Endangered Species Act and is responsible for obtaining any required permit approvals from the U.S. Fish and Wildlife Service. Failure to do so may be a violation of federal law.

Advisory 2. Public Works.

(A) Existing survey monuments must be preserved and protected. Any survey monuments disturbed during construction must be replaced at the expense of Applicant or Applicant's contractor.

(B) All public improvements shall be subject to a three-year warranty period. At the start of the three-year warranty period, Applicant shall provide Benton County Public Works with a warranty bond in the amount of 15 percent of the value of the work performed within the Benton County right-of-way.

(C) Applicant shall apply and obtain approval for a Permit to Perform Work in the Benton County right-of-way for all work within County rights-of-way. The permit will be issued when construction drawings are approved and all supporting documentation has been provided to the County.

(D) Applicant shall provide the County with a unit-price cost estimate for the work to be performed within Benton County rights-of-way. This estimate shall include trenching, backfilling, paving, striping, signing, grading/restoration, seeding, mulching,

fence replacement, and any required landscaping. Permit fees will be 4 percent of the estimate provided.

(E) Applicant shall obtain a DEQ 1200-C permit and a Benton County ESC permit prior to the start of land-disturbing activities.

(F) Applicant shall obtain approval for all required local, state, and federal permits prior to start of land-disturbing activities.

(G) Construction and post-construction storm drainage discharge shall conform to the standards and tenets established by Oregon Drainage Law and shall conform to all DEQ and Benton County stormwater quality standards using Oregon Department of Transportation erosion- and sediment-control details and best management practices.

Advisory 3. Wetlands. Prior to ground disturbance, Applicant shall prepare and obtain approval from the Oregon Department of State Lands of a wetland delineation and removal-fill permit. Any amount of disturbance to a compensatory mitigation area requires a removal-fill permit. A federal permit may be required by the U.S. Army Corps of Engineers.

EXHIBIT 22
RECLAMATION PLAN FOR EXPANSION AREA

RECLAMATION PLAN FOR EXPANSION AREA

COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON

APRIL 2022

PREPARED FOR:
VALLEY LANDFILLS, INC.
28972 Coffin Butte Road
Corvallis, Oregon 97330

PREPARED BY:
Civil & Environmental Consultants, Inc.
11811 N. Tatum Boulevard, Suite 3057
Phoenix, Arizona 85028

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 General 1
1.2 Site Description 1
2.0 RECLAMATION Plan 1
2.1 General 1
2.2 Final Cover System 2
2.3 Areas to Receive Final Closure 2
2.4 Inventory of Waste 2
2.5 Closure Schedule 2
3.0 RECLAMATION Post-Closure Plan 3
3.1 General 3
3.2 Maintenance Requirements 4
3.3 Reclamation Post-Closure Monitoring Requirements 4
3.4 Reclamation Post-Closure Land Use 5
3.5 Reclamation Post-Closure Contact Person 5
3.6 Reclamation Post-Closure Schedule 5
4.0 References 5

LIST OF FIGURES

FIGURE 1 **SITE LAYOUT**

FIGURE 2 **PROPOSED FILL PLAN**

1.0 INTRODUCTION

1.1 General

This Reclamation Plan documents the procedures necessary to completely close the Expansion Area of the Coffin Butte Landfill (CBLF) located in Corvallis, Oregon. This report was prepared as part of the CBLF's Conditional Use Permit for Landfill Expansion South of Coffin Butte Road dated April 2022 in accordance with Oregon Administrative Rules (OAR) 340-094-0110 and 40 Code of Federal Regulations (CFR), Part 258, Subpart F, and is a submittal to the Oregon Department of Environmental Quality (ODEQ). This report is to be periodically updated as the landfill footprint grows and should be replaced by a Final Engineered Site Closure Plan within five years before the anticipated final closure date of the entire landfill [OAR 340-094-0110(1)(b)]

1.2 Site Description

The CBLF is located in Benton County, Oregon, approximately 10 miles north of the city of Corvallis. The CBLF is owned and operated by Valley Landfills, Inc. (VLI), a subsidiary of Republic Services (RS). The CBLF is an active municipal solid waste landfill (MSWLF) operating under ODEQ Solid Waste Permit No. 306. The site address is 28972 Coffin Butte Road, Corvallis, Oregon. Valley Landfills, Inc. is applying for a Conditional Use Permit to expand the Coffin Butte Landfill to the south of the existing permitted landfill on property that Valley Landfills, Inc. owns. This expansion area will include a new cell of approximately 41.2 acres in size. The proposed development plan, and general site layout are shown in Figure 1.

2.0 RECLAMATION PLAN

2.1 General

OAR 340-094-0110(2)(a) states that the requirements for the reclamation plan shall include all elements specified in 40 CFR §258.60, and consist of at least the following:

- A description of the steps necessary to close all municipal solid waste landfill units at any point during their active life;
- A description of the final cover system that is designed to minimize infiltration and erosion;
- An estimate of the largest area of the municipal solid waste landfill unit ever requiring a final cover;
- An estimate of the maximum inventory of wastes ever on-site over the active life of the landfill facility; and
- A schedule for completing all activities necessary to satisfy the closure criteria in 40 CFR §258.60.

2.2 Final Cover System

The final cover system for closure of the expansion area at CBLF is detailed below. This final cover system is the same that is detailed in the site's most recent Site Development Plan (SDP) authored by Geo-Logic Associates (2021). The planned final cover is a geosynthetic composite cover system that will be constructed over the entire lined waste footprint, consisting of the following from top to bottom:

- Vegetative Cover (1.5 Feet Thick)
- Drainage Layer
- Geomembrane Liner
- Soil Barrier Layer (1.5 Feet Thick)
- Geocomposite Gas Collection Layer
- Existing Waste/Interim Cover

Primary drainage of the expansion area proposed final cover system may be achieved with the same drain liner system, and may also be achieved by using a double sided geocomposite drainage layer over a double textured geomembrane liner. The soil barrier layer will be a compacted fill and is specified to have a saturated hydraulic conductivity of 1.0×10^{-5} cm/s or less. Hydroseeding of the vegetative cover layer will be performed using the site's native grass and wildflower seed mix from Willamette Valley Ecoregion stocks between August 15th and October 15th, or during periods when successful growth results can be obtained.

2.3 Areas to Receive Final Closure

The present reclamation plan consists of constructing a final cover over the proposed development area. The new proposed cell south of the existing permitted landfill is approximately 41.2 acres. Therefore, the area to receive final cover is 41.2 acres.

2.4 Inventory of Waste

Based on the proposed grading plan, the new cell in the expansion area south of the existing permitted landfill will have an airspace volume of 6,524,162 cubic yards (CY). The proposed fill plan is shown in Figure 2.

2.5 Closure Schedule

In terms of schedule, the CBLF will be closed in accordance with OAR and CFR requirements. The closure reclamation schedule is defined in 40 CFR §258.60 (f), (g), and (h) as follows:

> The owner or operator must begin closure activities no later than 30 days after the date on which the MSWLF unit receives the known final receipt of wastes or, if the MSWLF unit has remaining capacity and there is a reasonable likelihood that the MSWLF unit will receive additional wastes, no later than one year after the most recent receipt of wastes. Extensions beyond the one-year deadline for beginning closure may be granted by the Director of an approved State if the owner or operator demonstrates that the MSWLF unit has the capacity to receive additional wastes and the owner or operator has taken and will continue to take all steps necessary to prevent threats to human health and the environmental from the unclosed MSWLF unit.

The owner or operator of all MSWLF units must complete closure activities of each MSWLF unit in accordance with the closure plan within 180 days following the beginning of closure. Extensions of the closure period may be granted by the Director of an approved State if the owner or operator demonstrates that closure will, of necessity, take longer than 180 days and he has taken and will continue to take all steps to prevent threats to human health and the environment from the unclosed MSWLF unit.

Following closure of each MSWLF unit, the owner or operator must notify the State Director that a certification, signed by an independent registered professional engineer or approved by Director of an approved State, verifying that closure has been completed in accordance with the reclamation plan, has been placed in the operating record.

3.0 RECLAMATION POST-CLOSURE PLAN

3.1 General

OAR 340-094-0115(1) defines the requirements for two types of written reclamation post-closure plans as follows:

- "Subtitle D" reclamation post-closure plan as required by 40 CFR §258.61(c)
- A Final Engineered Reclamation Post-Closure Plan as required by OAR 340-094-0100 (Closure and Post-Closure Care: Closure Permits)(2)(b). When prepared, this shall include all requirements of and replace the "Subtitle D" reclamation post-closure plan

This document was written in accordance with the "Subtitle D" reclamation post-closure plan, which OAR 340-094-0115(3)(a) requires to address the following:

- Maintaining the integrity and effectiveness of any final cover;
- Maintaining and operating the leachate collection system;
- Monitoring the groundwater;
- Maintaining and operating the gas monitoring system;
- Monitoring and providing security for the landfill site; and
- Description of the planned uses of the property during the post-closure care period.

3.2 Maintenance Requirements

Maintenance activities associated with landfill closure systems are described in this section. A record of all maintenance activities at the CBLF will be kept at VLI's office throughout the reclamation post-closure care period, and such information will be included with monitoring results in annual reports.

- Reclamation Post-closure maintenance will consist of the following activities:
    - Maintaining the integrity and effectiveness of the final cover system including the effects of settlement, subsidence, erosion, and/or vegetative coverage;
    - Maintaining and operating the leachate collection system;
    - Maintaining and operating the landfill gas monitoring system;
    - Maintaining the integrity and effectiveness of stormwater drainage features; and
    - Maintaining the integrity and effectiveness of miscellaneous site infrastructure such as active buildings, security fences, survey monuments, and roads.

3.3 Reclamation Post-Closure Monitoring Requirements

Reclamation Post-Closure monitoring requirements are described in this section. A record of all monitoring activities at the CBLF will be reported in annual report which will be kept at VLI's office throughout the post-closure care period. Reclamation Post-Closure monitoring requirements consist of the following activities:

- Groundwater monitoring;
- Landfill gas monitoring;
- Inspecting the integrity of the final cover system;
- Inspecting the integrity and effectiveness of stormwater drainage features; and
- Inspecting the integrity and effectiveness of miscellaneous site infrastructure such as active buildings, security fences, survey monuments, and roads.

Monitoring programs are described in the site's Environmental Monitoring Plan (Tuppan Consultants, 2014). Monitoring events and inspections will be performed at the frequencies listed in the CBLF's most recent Environmental Monitoring Plan. Immediate inspections will also be conducted after any major event such as significant earthquakes, fires, storms, and other unforeseen significant events that may impact the integrity of the landfill and it control systems, human health or the environment.

3.4 Reclamation Post-Closure Land Use

The final closed surface of the completed landfill will appear to be a sloped grassy savanna that blends with, and appears to be part of, the adjacent butte. Planned land use for the property will be open space grassland. Any development over filled areas of the CBLF should not include permanent enclosed structures where differential settlement and/or methane gas may cause risk.

3.5 Reclamation Post-Closure Contact Person

At the start of post-closure activities, CBLF will create a roster of contact persons responsible for post-closure care. The list will be updated as necessary to reflect changes in personnel throughout the post-closure period. The current contact for post-closure is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330
541-745-5792

3.6 Reclamation Post-Closure Schedule

Reclamation Post-Closure care is to be conducted for 30 years following closure. The length of the reclamation post-closure period may be decreased by ODEQ if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the ODEQ. The length of the reclamation post-closure period may be increased by ODEQ if the ODEQ determines that the lengthened period is necessary to protect human health and the environment.

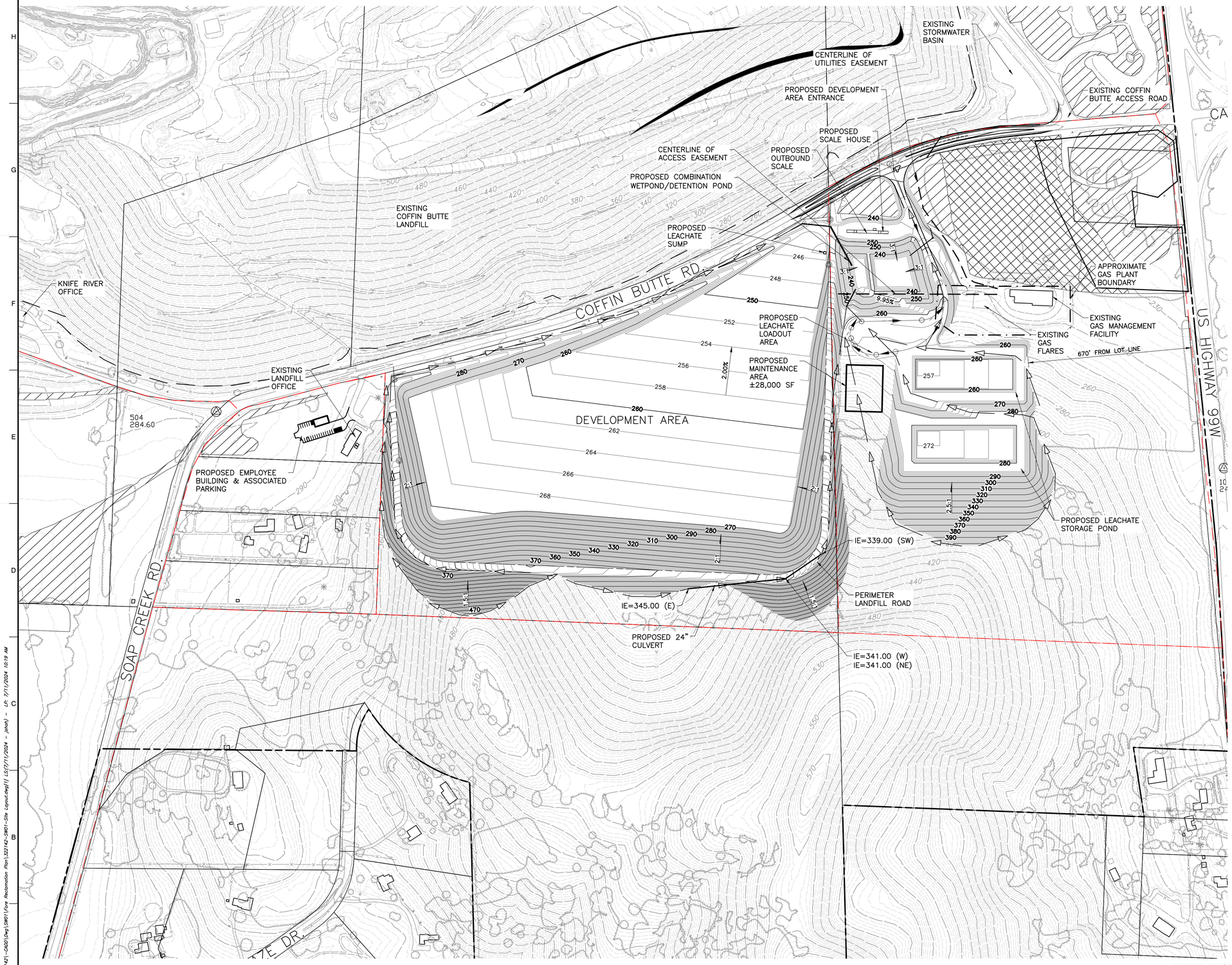
4.0 REFERENCES

Geo-Logic Associates (2021). “Site Development Plan,” Coffin Butte Landfill, Benton County, Oregon, Prepared for Valley Landfills, Inc., December 30, 2021.

Tuppan Consultants (2014). “Environmental Monitoring Plan,” Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc. by Tuppan Consultants LLC, Lake Oswego,
Oregon, Rev.3, June 27, 2014.

FIGURE 1

SITE LAYOUT



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 — EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 — PROPOSED 10-FT CONTOUR
- 254 — PROPOSD 2-FT CONTOUR
- FLOW PATH

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 · Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

SITE LAYOUT

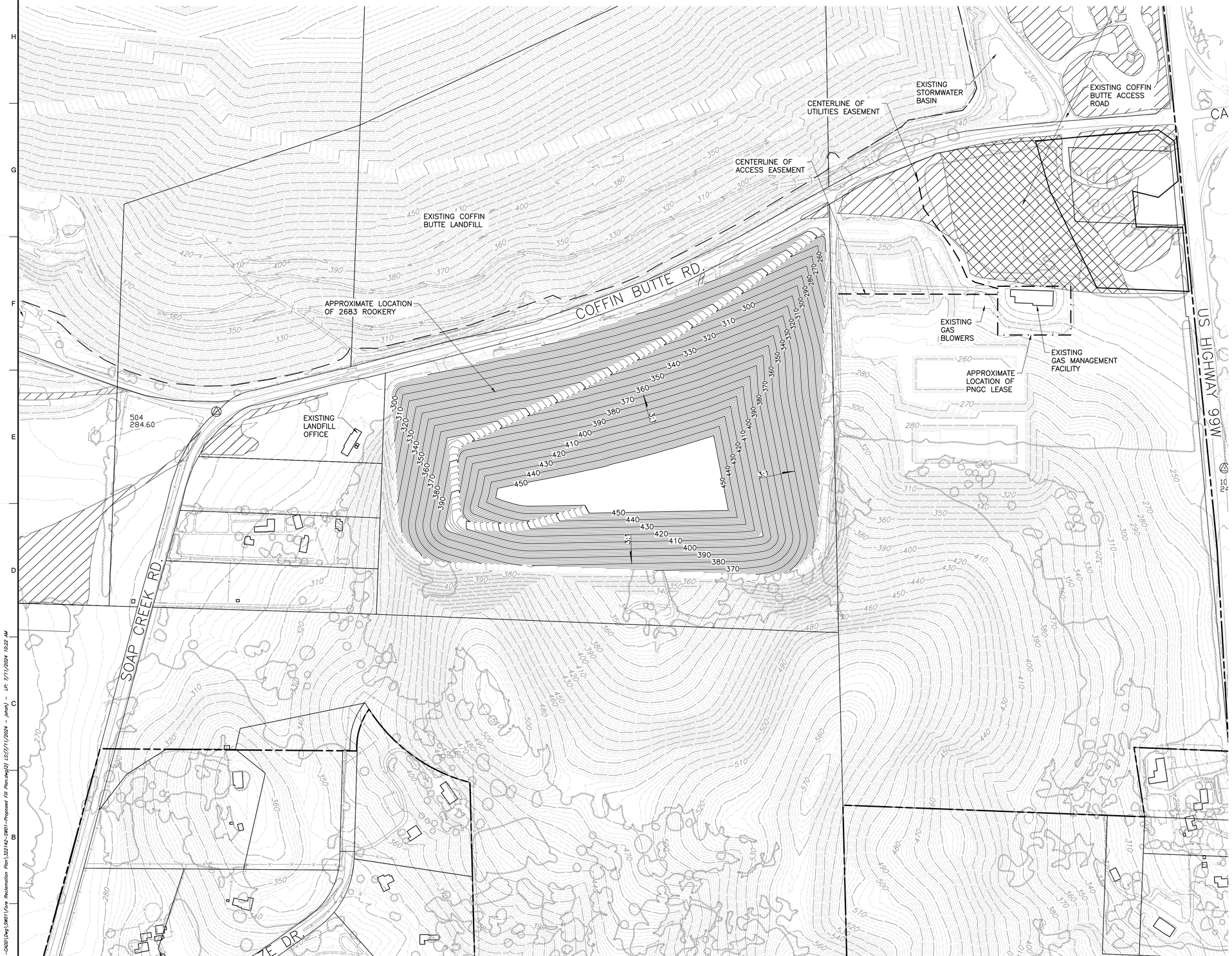
DATE:	JULY 2024
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: 1

P:\320-0001_322-142\-CADD\Dwg\SWD1\Fore Reclamation Plan\322142-SWD1-Site Layout.dwg[1] LS(7/11/2024 - jkash) - LP: 7/11/2024 10:19 AM

FIGURE 2

PROPOSED FILL PLAN

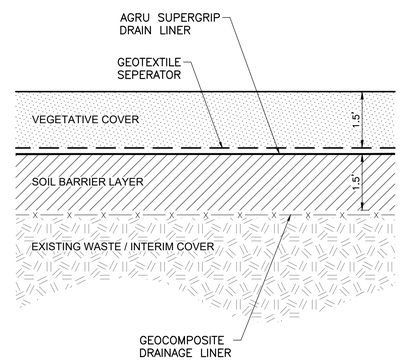


LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 — EXISTING 10–FT CONTOUR
- EXISTING 2–FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 — PROPOSED 10–FT TOP OF WASTE CONTOUR
- 254 — PROPOSD 2–FT TOP OF CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. PERIMETER LANDFILL ROAD WILL ONLY BE FOR PICKUP TRUCKS OR SMALLER VEHICLES.



FINAL COVER SYSTEM

NORTH

SCALE IN FEET

0 200 400

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

REVISION RECORD		
NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 · Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

PROPOSED FILL PLAN

DATE:	JULY 2024
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: **2**

P:\322-2001\322-1421-CAD\Dwg\3401\Fore Reclamation Plan\322142-3401-Proposed Fill Plan.dwg[2] LS(7/11/2024 - jstab) - LS 7/11/2024 10:22 AM

EXHIBIT 23
OREGON DEQ PERMIT #306 MATERIALS

SOLID WASTE DISPOSAL SITE PERMIT:

Municipal Solid Waste Landfill

Oregon Department of Environmental Quality
165 E. Seventh Ave., Suite 100
Eugene, OR 97401-3049
541-687-7465

Issued as authorized by ORS 459.245 and in accordance with the provisions of Oregon Revised Statutes Chapter 459, 459A, Oregon Administrative Rules 340 Divisions 64, 90, 93, 95, 96 and 97 and subject to the Land Use Compatibility Statement referenced below.

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

541-745-5792

FACILITY NAME AND LOCATION:

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

Section 13&18, T10S, R5&4W, Benton County

OWNER:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

541-745-5792

OPERATOR:

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

541-230-5546

ISSUED IN RESPONSE TO:

- Solid waste permit renewal application received Dec 6, 2019
- Land Use Compatibility Statement from Benton County dated Dec. 20, 2000.

The determination to issue this permit is based on findings and technical information included in the permit record.

ISSUED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Brian Fuller
Material Management Manager
Western Region

July 28, 2020
Date

Permitted Activities

Until this permit expires or is modified or revoked, the permittee is authorized to establish, operate, and maintain a solid waste land disposal site in conformance with the requirements, limitations, and conditions set forth in this document, including all attachments.

TABLE OF CONTENTS

INTRODUCTION

This document is a solid waste permit issued by the Oregon Department of Environmental Quality in accordance with Oregon Revised Statutes (ORS) 459 and Oregon Administrative Rules (OAR), Chapter 340.

SECTION	TOPIC	SEE PAGE
PERMIT ADMINISTRATION		**3**
1.0	PERMIT ISSUANCE	3
2.0	DISCLAIMERS	4
3.0	AUTHORITY	4
4.0	PERMIT MODIFICATION	4
5.0	AUTHORIZATIONS	5
6.0	PROHIBITIONS	6
7.0	OPERATIONS PLAN	7
8.0	RECORDKEEPING AND REPORTING – OPERATIONS	8
9.0	SPECIFIC OPERATING CONDITIONS	9
10.0	SITE DEVELOPMENT AND DESIGN	12
11.0	RECYCLING REQUIREMENTS	13
12.0	CLOSURE CONSTRUCTION AND MAINTENANCE	14
13.0	FINANCIAL ASSURANCE	15
14.0	SITE CHARACTERIZATION	16
15.0	ENVIRONMENTAL MONITORING PLAN	16
16.0	ENVIRONMENTAL SAMPLING REQUIREMENTS	18
17.0	ESTABLISHING PERMIT-SPECIFIC CONCENTRATION LIMITS (PSCLs), ACTION LIMITS (ALs), CONCENTRATION LIMIT VARIANCES (CLVs) AND SITE-SPECIFIC LIMITS (SSLs)	18
18.0	ENVIRONMENTAL MONITORING STANDARDS	19
19.0	RECORDKEEPING AND REPORTING – ENVIRONMENTAL MONITORING	20
20.0	ENVIRONMENTAL MONITORING NETWORK	21
21.0	SUMMARY OF DUE DATES	22
22.0	ATTACHMENT	24

PERMIT ADMINISTRATION

1.0 PERMIT ISSUANCE

1.1 Permittee

This permit is issued to Valley Landfills, Inc.

1.2 Permit number

This permit is DEQ Solid Waste Permit Number 306.

1.3 Permit term

The permit is issued on the date it is signed. The permit's expiration date is June 30, 2030.

1.4 Facility type

The facility is permitted as a municipal solid waste landfill.

1.5 Facility owner/ operator

The owner of this facility is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

The operator of this facility is:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

1.6 Basis for permit issuance:

This permit is issued based upon the following documents submitted by the permittee:

- Solid waste permit application received Dec. 6, 2019
- Land Use Compatibility Statements from Benton County dated Dec. 20, 2000

1.7 Definitions

Unless otherwise specified, all terms are as defined in OAR 340-093-0030.

1.8 Legal control of property

The permittee shall at all times maintain legal control of the disposal site property; including maintaining a current permit, contract or agreement that allows the operation of the facility if the site is not owned by the permittee.

1.9 Submittal & notification address

Unless otherwise specified, all submittals and notifications to DEQ under this permit must be sent to:

Oregon Department of Environmental Quality
Manager, Materials Management Program
165 E Seventh Ave., Suite 100
Eugene, OR 97401-3049

Telephone: 541-687-7465

All submittals must include, at a minimum, one paper copy and one electronic copy in a format that is approved by the DEQ project manager. Note that some submittals may require more paper copies. Therefore, the permittee must confirm with the permit manager how many copies are necessary prior to submittal of a document.

Note: Whenever possible, the permittee should submit two-sided paper copies of all reports. DEQ may accept electronic submittals for portions of some reports, as approved in the Environmental Monitoring Plan or by DEQ.

2.0 DISCLAIMERS

2.1 Property rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights.

2.2 Department liability

DEQ, its officers, agents or employees do not sustain any liability on account of the issuance of this permit or on account of the construction, maintenance or operation of facilities pursuant to this permit.

3.0 AUTHORITY

3.1 Ten year permit

This permit is issued for a maximum of 10 years as authorized by Oregon Revised Statutes 459.245 (2).

3.2 Documents superseded

This document is the primary solid waste permit for the facility, superseding all of other solid waste permits issued for Coffin Butte Landfill by DEQ.

3.3 Permittee responsibility and liability

Conditions of this permit are binding upon the permittee. The permittee must conduct all facility activities in compliance with the provisions of the permit. The permittee is liable for all acts and omissions of the permittee's contractors and agents in carrying out the operations and other responsibilities pursuant to this permit.

3.4 Other compliance

This permit's issuance does not relieve the permittee from the responsibility to comply with all other applicable federal, state, or local laws or regulations, including the following solid waste requirements, and any future updates or additions to these requirements:

- Solid waste permit application received Dec. 6, 2019
- Oregon Revised Statutes, Chapters 459 and 459A
- Oregon Administrative Rules Chapter 340
- Any documents submitted by the permittee and approved by DEQ

3.5 DEQ access to disposal site

The permittee shall allow representatives of DEQ access to the disposal facility at all reasonable times for the purpose of making inspections, surveys, collecting samples, obtaining data and carrying out other necessary functions related to this permit.

Reference: OAR 340-093-0050(6).

3.6 Penalties

Violation of permit conditions will subject the permittee to civil penalties of up to $25,000 for each day of each violation.

Reference: ORS 459.995(1)(a)

4.0 PERMIT MODIFICATION

4.1 Five year review

In the permit's 4th to 6th year, DEQ will review the permit and amend it if necessary. DEQ will consider the following factors in making this determination:

- Compliance history of the facility
- Changes in volume, waste composition, or operations at the facility
- Changes in state or federal rules which should be incorporated into the permit

- A significant release of leachate or landfill gas to the environment from the facility
- Significant changes to a DEQ-approved site development plan, and/or conceptual design
- Other significant information or events

4.2 Permit modification

DEQ or the permittee may, at any time during the permit's term, propose to change the permit.

Once approved by DEQ, any permit-required plans become part of the permit by reference. DEQ may provide notice and opportunity for review of permit-required plans.

4.3 Modification and revocation by DEQ

DEQ may, at any time before the expiration date, modify, suspend or revoke this permit in whole or in part, in accordance with Oregon Revised Statutes 459.255, for reasons including but not limited to the following:

- Violation of any terms or conditions of this permit or any applicable statute, rule, standard or order of the Commission;
- Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts
- A significant change in the quantity or character of solid waste received or in the operation of the disposal site

4.4 Modification by permittee

The permittee must apply for a modification to this permit if there is a significant change in facility operations or a deviation from permitted activities.

4.5 Public participation

DEQ will issue a public notice to inform the public of any significant changes to the permit.

4.6 Changes in ownership or address

At least 10 days in advance, the permittee must report to DEQ any change in the facility's ownership or the permittee's or operator's name and/or address.

Reference: OAR 340-093-0070(6)(a)(A)

ALLOWABLE ACTIVITIES

5.0 AUTHORIZATIONS

5.1 Wastes authorized for receipt

This permit authorizes the facility to accept:

- Solid waste as defined in OAR 340-093-0030(91)
- The following waste, when special handling and management requirements for their disposal are included in a special waste management plan approved by DEQ:
  - Cleanup Materials Contaminated with Hazardous Substances as defined in OAR 340-093-0030(19), in accordance with OAR 340-093-0170
  - Waste requiring special management as defined in OAR 340-093-0190
  - Industrial solid wastes as defined in OAR 340-093-0030(53)

5.2 Authorization of other wastes

DEQ may authorize the permittee to accept other waste if:

- The permittee develops a Special Waste Management Plan and submits it to DEQ for review and approval;
- DEQ approves the Special Waste Management Plan
- The permittee can demonstrate that the materials are not hazardous waste, as defined by state and federal regulations or otherwise a threat to human health or waters of the state.

5.3 Tires for recycling

This permit authorizes the permittee to accept up to 100 whole tires at this facility for storage and removal.

This permit authorizes the permittee to accept up to 2,000 whole tires at this facility for storage and removal if the permittee maintains a continuous contract with a waste tire carrier to remove the tires from the site.

5.4 Salvaging and recycling

This permit authorizes the permittee to conduct salvaging and recycling in a controlled and orderly manner. The permittee must notify DEQ prior to changing salvaging and recycling operations. These operations must be described in the site Operations Plan.

6.0 PROHIBITIONS

6.1 Hazardous waste disposal

The permittee must not accept any regulated hazardous waste.

Reference: 40 CFR 258.20 (b).

In the event discovered waste is hazardous or suspected to be hazardous, the permittee must, within 24 hours, notify DEQ and initiate procedures to identify and remove the waste. Hazardous waste must be removed within 90 days, unless DEQ approves otherwise. The permittee's temporary storage and transportation practices must comply with DEQ rules.

6.2 Liquid waste disposal

The permittee must not accept liquid waste for disposal.

Definition: Liquid waste is waste that does not pass the paint filter test performed in accordance with EPA Method 9095B.

6.3 Vehicle disposal

The permittee must not accept discarded or abandoned motor vehicles, including trailers or mobile homes, for disposal.

6.4 Used oil disposal

The permittee must not accept used oil for disposal.

6.5 Battery disposal

The permittee must not accept lead-acid batteries for disposal.

6.6 Tire disposal

The permittee must not accept waste tires for disposal.

6.7 Recyclable material disposal

The permittee must not landfill or dispose of any source separated recyclable material brought to the disposal site.

Exception: If the source separated material is unusable or not recyclable it may be landfilled. DEQ must agree to such disposal and pre-approve the identified sources of unusable source separated material prior to its disposal.

6.8 Open burning

The permittee must not conduct any open burning at the site.

6.9 Electronic waste disposal

The permittee must not knowingly accept the following covered electronic devices for disposal:

- Computer monitors having a viewable area greater than four inches diagonally
- Televisions having a viewable area greater than four inches diagonally

- Desktop computers
- Portable computers

Reference: Oregon Revised Statutes 459.247 and 459A.300-365.

OPERATIONS AND DESIGN

7.0 OPERATIONS PLAN

7.1 Operations plan submittal

Within 270 days of the permit issue date, the permittee must review and submit any necessary updates to the site Operations Plan to DEQ for review and approval. The updated plan must be consistent with the conditions of this permit. A DEQ-approved plan becomes an integral part of the permit.

7.2 Plan content

The Operations Plan must describe facility operations, including the elements listed below, and demonstrate how the facility will comply with all regulatory and permit requirements:

General Topics	Describe plans or procedures for:
General operations	• Screening incoming waste to detect unauthorized or prohibited waste as required by 40 CFR 258.20(a) • Handling and removing unauthorized wastes discovered at the facility • Managing landfill gas • Managing landfill leachate in compliance with Subsection 9.15 • Recirculating landfill leachate & gas condensate in compliance with Subsections 5.5 and 9.15 • Monitoring landslide stability in compliance with Subsection 9.22 • Designing surface water and erosion control structures • Responding to non-compliance events or situations
Disposal operations	• Placing daily and interim cover • Detecting and preventing the disposal of regulated hazardous waste, and any other DEQ-prohibited waste • Disposing of putrescible waste • Disposal, handling and recordkeeping of cleanup materials contaminated with hazardous substances • Waste unloading and handling • Disposing of special waste • Using, stockpiling and tracking the receipt and use of waste approved for use as alternative daily cover • Reducing and controlling the risk of a landfill fire • Fill progression and phasing that is consistent with landslide stability recommendations, and takes into account other operational considerations
Special Waste Management Plan	• Identifying and characterizing special waste (i.e., waste which requires special management or waste streams not otherwise authorized by this permit) • Identifying the source of all special waste • Determining appropriate handling and disposal procedures • Documenting plan implementation, including waste characterization and location of waste disposition References: OAR 340-093-0190, OAR 340-094-0040[11][b][J]
Ancillary operations	• Waste unloading and handling • Solidifying liquid waste prior to disposal

General Topics	Describe plans or procedures for:
	• Handling and removal of waste tires • Placing and maintaining interim cover over inactive landfill areas • Managing transfer containers
Inspection and maintenance	• Washing equipment • Maintaining leachate and gas collection systems • Maintaining monitoring stations and devices • Periodically inspecting the continuity and integrity of primary leachate collection pipes • Maintaining surface water control structures
Operating record	• Establishing and maintaining the operating record
Contingency	• Backup methods for storing and/or disposing of leachate • Providing fire protection equipment, and arrangements made with local fire control agency • Notifying DEQ about emergencies and fires

7.3 Operations and maintenance manual

Within 60 days of the Operations Plan's approval the permittee must prepare and submit an updated Operations and Maintenance Manual which includes detailed inspection and maintenance procedures and an associated schedule for all facility components that require periodic inspection. The manual must include specific procedures for routine preventative maintenance and repairs and for response to emergency situations. The preventative inspection and maintenance program should address the following equipment and facilities: personnel safety equipment, operating equipment, support facilities, environmental control systems, environmental monitoring systems, and the transportation system. The permittee must keep a copy of the Operations and Maintenance Manual with the Operating Record, readily available for DEQ inspection and review.

7.4 Plan and manual updates

The permittee must update and revise both the Operations Plan and the Operations and Maintenance Manual as necessary to reflect current and future facility conditions and procedures.

The permittee must submit any associated revisions or updates to DEQ for review and approval.

7.5 Plan and manual compliance

The permittee must operate the facility in accordance with the approved Operations Plan and Operations and Maintenance Manual, and any amendments to these documents.

8.0 RECORDKEEPING AND REPORTING – OPERATIONS

8.1 Non-compliance reporting

The permittee must take immediate corrective action for any violations of permit conditions or DEQ rules and notify DEQ.

DEQ response: DEQ may investigate the nature and extent of the compliance problem and evaluate the adequacy of the permittee's corrective action plans.

8.2 Permit display

The permittee must display this permit where operating personnel can easily refer to it.

8.3 Access to records

DEQ must have access, when requested, to all records and reports related to the permitted facility.

8.4 Procedures

The permittee's recordkeeping and reporting procedures are as follows:

Step	Action
1	Keep the Operating Record at the facility or at another DEQ-approved location.
2	Place information required by 40 CFR 258.29 and this permit in the Operating Record.
3	During facility operations, record the daily amount of each waste type received and approved alternative daily cover - qualified waste used for daily cover. Record 0 if the waste is not received. *Identify the following waste types received and categorize them as either in- or out-of-state waste:* • Domestic solid waste and construction and demolition waste • Industrial solid waste • Asbestos • Contaminated cleanup materials (except materials counted as alternative daily cover qualified waste) • Approved alternative daily cover qualified waste received • Other (i.e., specify any waste type not included in the above list).
4	If applicable, every quarter, record the amount of each material recovered for recycling or other beneficial purpose.
5	Submit the information collected in Step 3 above on the Solid Waste Disposal Report/Fee Calculation form provided by DEQ. Pay solid waste fees as required by OAR 340-097. Date due: last day of the month following the end of the calendar quarter.
6	Submit the information collected in Steps 3 & 4 above to the Wasteshed Representative on DEQ provided or approved form. Date due: Jan. 25 of each year.
7	Retain copies of all records and reports for 10 years after their creation.
8	Update all records to reflect current conditions at the facility.

8.5 Submittal address

Send required submittals to:

Oregon Department of Environmental Quality
Materials Management Section
Environmental Solutions Division
700 NE Multnomah St., Suite 600
Portland OR 97232

503-229-5913

9.0 SPECIFIC OPERATING CONDITIONS

9.1 Discovery of prohibited waste

If the permittee discovers prohibited wastes, the permittee must notify DEQ within 24 hours and begin to isolate or remove the waste. In addition, the permittee must take digital photos of the prohibited waste to document its quantity, nature, identity and source.

Within 60 days following the discovery, the permittee must transport non-putrescible, non-hazardous prohibited waste to a disposal or recycling facility authorized to accept such waste, unless otherwise approved or restricted by DEQ. The permittee must obtain DEQ's written approval to store putrescible, non-hazardous, prohibited waste.

9.2 Spills notification

Oregon Revised Statue 466.635 and Oil and Hazardous Materials Emergency Response Requirements, Chapter 340, Division 142 require immediate notification to Oregon Emergency Response System (OERS) after taking any required emergency actions to protect human health and the environment when

oil or hazardous materials are spilled. The spill must be immediately reported to OERS at 1-800-452-0311 if the spill is of a reportable quantity. Reportable quantities include:

- *Any* amount of oil spilled to waters of the state
- Oil spills on land in excess of 42 gallons
- Two hundred pounds (25 gallons) or more of spilled pesticide residue
- Spills of hazardous materials that are equal to, or greater than, the quantity listed in the Code of Federal Regulations, 40 CFR Part 302 (List of Hazardous Substances and Reportable Quantities), and amendments adopted before July 1, 2002.

For a complete list of hazardous materials required to be reported, please refer to OAR 340-142-0050.

9.3 Access roads

The permittee must provide all-weather access roads from the landfill property line to the active operational area and the environmental monitoring stations, and maintain them in a manner that prevents traffic hazards, dust and mud.

The permittee must use appropriate means, including truck washing, as needed to prevent haul trucks from tracking mud on external roadways outside the landfill boundaries. Any truck washing activities must be conducted on a hard surface and any disposal of wastewater must be accomplished in a manner approved by DEQ.

9.4 Unloading area

The area(s) for unloading incoming waste must be clearly defined by signs, fences, barriers or other devices. The permittee must minimize width of the unloading area to the maximum extent practicable.

9.5 Daily cover

At the end of each working day the permittee must cover all solid waste with a six inch, or thicker, layer of compacted soil or with a DEQ-approved, alternative daily cover.

9.6 Interim cover

As specified in DEQ-approved design and operations plans, the permittee must place and maintain interim cover over fill areas that will not receive additional waste for an extended period of time [i.e., greater than 120 days] and actively revegetate, in a DEQ-approved manner, any interim cover that will remain exposed for more than two years.

9.7 Surface water structures

The permittee must maintain all stormwater drainage structures in good functional condition, report to DEQ any significant malfunctions or damage and complete repairs within 60 days of discovery the problem.

9.8 Stormwater pollution control plan

The permittee must update and implement the Storm Water Pollution Control Plan consistent with site conditions and the stormwater permit requirements. Refer to the National Pollutant Discharge Elimination System Stormwater Discharge Permit No. 1200-Z. In addition, the permittee must keep a current copy of the permit in the facility Operating Record.

9.9 Asbestos waste management

The permittee must offload and dispose of friable asbestos-containing solid waste as specified in DEQ-approved Operations Plan, Operations & Maintenance Manual, and in OAR 340-248.

9.10 Leachate management systems

The permittee must operate the disposal site in a manner that deters leachate production to the maximum extent practicable, and construct, operate and maintain in good functional condition all DEQ-approved leachate containment, collection, detection, removal, storage and treatment systems. The permittee must remove leachate continuously from all landfill leachate collection systems, to minimize fluid buildup on the bottom liner and prevent the hydraulic head (fluid depth) from exceeding one foot.

9.11 Leachate surface impoundments

The permittee must: 1) completely contain leachate stored within lined surface impoundments; 2) maintain a minimum dike freeboard of two (2) feet above the maximum leachate level in those impoundments unless otherwise approved by DEQ; 3) fence the impoundments to control public access; and 4) lock all gates when no attendant is on duty. In addition, the permittee must post clearly legible, visible signs that describe the surface impoundment's contents and display the words "no trespassing".

9.12 Litter control

The permittee must at all times minimize windblown litter and collect it quickly and effectively to prevent scattering, nuisance conditions and unsightliness.

9.13 Vector control

The permittee must minimize vectors in the active disposal area, including insects, rodents and birds.

9.14 Air emissions

The permittee must control air emissions, including dust, malodors, air toxics, etc. related to disposal site construction, operation and other activities, and comply with DEQ air quality standards.

9.15 Access control

The permittee must control public access to the landfill as necessary to prevent unauthorized entry and dumping.

9.16 Landfill entrance sign

A prominently displayed sign must indicate the following:

- The name of facility
- The emergency telephone number
- The days and hours of operation
- The authorized and prohibited waste
- The Solid Waste Permit number
- The operator's address
- The consequences to haulers if they attempt to dispose of prohibited materials
- Any other information critical to the safe and efficient operation of the facility.

9.17 Fire protection and reporting

The permittee must provide complete and sufficient protection equipment and facilities in accordance with DEQ-approved Operations Plan.

Arrangements must be made with the local fire control agency to immediately acquire their services when needed. The permittee must implement preventative measures to ensure adequate on-site fire control, as determined by the local fire control agency. Fires must be immediately and thoroughly extinguished.

Fires shall be reported to DEQ within 24 hours.

9.18 Water supply

The permittee must provide water in sufficient quantities for fire protection, dust suppression, establishment of vegetation, and other site operations requiring water.

9.19 Landfill gas management

The permittee must control landfill gas in accordance with the requirements of 40 CFR Parts 51, 52 and 60 and OAR 340-094-0060(4).

9.20 Landfill gas control system operation and maintenance

The permittee must operate and maintain the landfill gas control and monitoring systems in good working order as required to prevent nuisance odors, air emissions and landfill gas migration (see methane compliance limits in Section 18).

If critical landfill gas equipment is significantly damaged or compromised, the permittee must replace or repair that equipment, within 60 days of discovering the problem, and submit a written inspection report to DEQ.

10.0 SITE DEVELOPMENT AND DESIGN

10.1 Site development plan

Within 360 days of the permit issue date, the permittee must submit any necessary update to the long-term Site Development Plan to DEQ for review and approval. Once approved, the plan becomes an integral part of this permit.

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes the basic elements of a Site Development Plan. Organizing the plan in accordance with the Guidance will expedite DEQ's review.

10.2 Baseline design criteria

New municipal landfill waste landfill disposal units must include the following engineering controls:

- A composite liner system, including a DEQ-approved geomembrane liner (at least 60 mils thick for high density polyethylene, and at least 30 mils thick for approved alternative geomembranes) and at least two feet of compacted soil with an in-place permeability of 1 X 10^{-7} cm/sec or less, or a DEQ-approved alternative liner pursuant to 40 CFR Part 258.40(a)(1);
- A primary leachate collection and removal system (LCRS) which fully covers the liner system and maintains a leachate depth of less than a one foot above the liner, per 40 CFR 258.40(a)(2). All leachate collection pipes must be serviceable by clean outs;
- A secondary leachate collection and removal system(s) designed to effectively monitor the overlying composite-liner system's performance and (1) detect and collect leachate at locations of maximum leak probability; and (2) prevent groundwater intrusion and related monitoring biases;
- A leachate collection sump(s) with a double composite liner system and a leak detection and removal system. Each composite liner must meet the minimum design criteria previously cited in this subsection;
- An operations layer that covers and protects the primary LCRS and liner system from physical damage; and
- A leachate surface impoundment (if applicable) with a double liner and leak detection and removal system. One liner must meet the minimum composite liner criteria described above.

10.3 Design plans

At least six months prior to the anticipated construction date for new disposal units, closure of existing units, or development of other ancillary facilities, the permittee must submit engineering design plans to DEQ for review and approval. The design plans must be prepared and stamped by a qualified Professional Engineer with current Oregon registration and specify and/or provide the following:

- All applicable performance criteria, construction material properties and characteristics, dimensions and slopes
- The design basis and all relevant engineering analyses and calculations

10.4 Construction requirements

The permittee must construct all improvements in accordance with:

- The approved plans and specifications
- Any DEQ imposed conditions of approval
- Any future DEQ approved amendments to the plans and specifications
- Construction work must begin within 18 months of plan approval

10.5 Construction documents

Prior to constructing any landfill engineering controls (e.g., final cover, new disposal unit, or other waste containment facilities or improvements), the permittee must submit complete construction documents and receive DEQ's written approval. The construction documents must:

- Define the construction project team
- Specify material and workmanship requirements to guide the constructor in executing work and furnishing products
- Include a Construction Quality Assurance Plan that describes how the project team will monitor the quality of materials and the constructor's work performance and assure compliance with project specifications and contract requirements.

Reference: Follow the current *Solid Waste Guidance* to expedite DEQ review of the construction documents.

10.6 Construction inspection

During construction of a new landfill disposal unit, final cover system, or any other landfill controls or engineered features, the permittee must provide DEQ with a summary and schedule of planned construction activities to facilitate DEQ's inspection and oversight.

10.7 Construction report submittal

Within 90 days of completing construction of a new landfill disposal unit, a final cover system, or other engineering controls, the permittee must submit to DEQ a Construction Certification Report prepared by a qualified independent party. The report must document and certify that the construction of all required components and structures complies with this permit and DEQ-approved design specifications.

10.8 Construction report content

The construction report must include:

- An executive summary describing the construction project and any major problems encountered
- A list of the governing construction documents
- A summary of all construction and construction quality assurance activities
- The manufacturer's written certifications that all geosynthetic materials conform with project specifications
- Test data documenting that soil materials conform with project specifications
- A summary of all construction quality assurance observations, including daily inspection records and test data sheets documenting that materials deployment and installation conform with project specifications
- A description of the problems encountered and the corrective measures implemented
- The designer's acceptance reports for errors and inconsistencies
- A list/description of any deviations from the design and material specifications, including justification for the deviations, copies of change orders and recorded field adjustments, and copies of DEQ's written approvals for deviations and change orders
- Signed certificates for subgrade acceptance prior to placement of soil liner and for acceptance of the soil liner prior to deployment of geomembrane liner
- Photographs and as-constructed drawings, including record surveys of the subgrade, soil liner, granular drainage layer and protective soil layer
- The certification statement(s) and signatures of the construction quality assurance consultant, designer, and facility owner. One of these representatives must be a professional engineer with current Oregon registration.

10.9 Approval to use new disposal units

The permittee must not dispose of solid waste in newly constructed disposal units until DEQ has accepted the Construction Certification. If DEQ does not respond to the Construction Certification Report within 30 days of its receipt, the permittee may place waste in the unit.

11.0 RECYCLING REQUIREMENTS

11.1 Materials

The permittee must provide a place for receiving the following recyclable materials:

☒	ferrous scrap metal	☒	mixed paper
☒	motor oil	☒	non-ferrous scrap metal (including aluminum)

☒	newspaper	☒	corrugated cardboard and kraft paper (brown paper bags)
☒	container glass	☒	tin cans

11.2 Receiving location

The place for receiving recyclable material must be located at the disposal site or at another location more convenient to the population served by the disposal site. The recycling center must be available to every person whose solid waste enters the disposal site.

11.3 Material use

All source separated recyclable materials must be reused or recycled.

11.4 Recycling information

The permittee must provide, to disposal site users, the following recycling information on printed handbills:

- The on-site or off-site location of the recycling center
- The recycling center's hours of operation
- A list of acceptable materials for recycling
- Instructions for preparing source separated recyclable material
- Reasons why people should recycle

11.5 Sign

A prominently displayed sign must indicate the following:

- The availability of recycling at the disposal site or another location

Note: The sign must indicate the recycling center location, if not at the disposal site

- The materials accepted at the recycling center
- The recycling center's hours of operation (if different than disposal site hours)

11.6 Storage

Unless DEQ approves otherwise, all recyclable materials, except car bodies, white goods and other bulky items must be stored in containers.

SITE CLOSURE

12.0 CLOSURE CONSTRUCTION AND MAINTENANCE

12.1 Worst-case closure plan development

Within 90 days of permit issuance, the permittee must develop a conceptual "worst-case" closure plan and a conceptual post-closure plan(s), obtain DEQ approval of the plan(s), and maintain up-to-date copies of these plan(s) in the facility file.

Reference: The plans must comply with 40 CFR, Part 258, Subpart F, and OAR 340-094-0110.

12.2 Notification

The permittee must notify DEQ and receive DEQ approval when the conceptual "worst-case" closure and conceptual post-closure care plans are updated and placed in the file.

12.3 Closure permit

In accordance with OAR 340-094-0100, the permittee must apply for a closure permit at least five years prior to the landfill's anticipated final closure.

12.4 Closure plan approval

At least six months prior to final closure of any portion of the landfill, the permittee must submit detailed engineering plans, specifications, and a closure schedule to DEQ for review and approval.

The design plans must be prepared and stamped by a qualified professional engineer with a current Oregon registration and specify and/or provide the following:

- All applicable performance criteria, construction material properties and characteristics, dimensions and slopes
- The design basis and all relevant engineering analyses and calculations

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes Closure Plan preparation. Following that format will expedite DEQ review of the plan.

12.5 Closure schedule

The permittee must initiate and complete closure of each landfill disposal unit in accordance with 40 CFR 258.60(f)&(g), or an alternate schedule approved by DEQ.

12.6 Final cover

Unless DEQ approves otherwise, the final landfill cover must be:

- At least three feet thick {OAR 340-094-0120(2)(a)}
- Designed to minimize infiltration of precipitation as required by 40 CFR Part 258.60
- Graded to compensate for estimated differential settlement and maintain positive drainage. Final (post-settlement) slopes must range between two percent and 30 percent.

12.7 Vegetation

The permittee must establish and maintain a dense, healthy growth of native vegetation over the closed areas of the landfill consistent with the proposed final use.

12.8 Final cover maintenance.

The permittee must maintain the final surface contours of the landfill cover such that:

- Erosion is minimized and ponding of water is prevented
- The integrity of the cover system is preserved in accordance with the approved plans

The permittee must reconstruct the cover system with approved materials and grade and seed all areas that have settled or where water ponds, and all areas where the cover soil has been damaged or thinned by cracking or erosion. Areas where vegetation has not been fully established shall be fertilized, re-seeded and maintained. Any damage repair or other reconstruction of a geomembrane barrier component in the final cover system shall be conducted in accordance with a construction quality assurance plan approved by the DEQ.

12.9 Slope stability

The permittee must maintain the stability of the landfill slopes and the overall structural integrity of the landfill.

12.10 Deed record

Within 30 days after the disposal site's final closure, the permittee must record a notation on the deed to the facility property as required by 40 CFR 258.60(i) and OAR 340-094-0130(1)(a), and submit a copy of the notation on the deed to DEQ.

13.0 FINANCIAL ASSURANCE

13.1 Financial assurance plan

The permittee must submit an updated financial assurance plan to the DEQ for review and approval and provide financial assurance for the costs of site closure, post-closure care, and potential corrective action. In addition, the permittee must place the plan in the facility file.

Reference: The plan must be prepared in accordance with OAR 340-094-0140. Acceptable mechanisms are described in OAR 340-094-0145.

13.2 Financial assurance required.

The permittee must comply with applicable financial assurance criteria requirements prescribed by OAR 340-094-0140. The permittee must maintain an up-to-date Financial Assurance Plan in the facility Operating Record, and provide financial assurance for landfill closure, post-closure care and, if required, corrective action. The financial assurance provided must:

- Be in the amount required by OAR 340-094-0140(5)
- Be updated, annually, in accordance with OAR 340-094-0140(6)(e)
- Consist of a financial assurance mechanism complying with OAR 340-094-0145

13.3 Recertification of financial assurance.

The permittee must annually review and update their financial assurance in accordance with OAR 340-094-0140(6)(e).

By April 1 of each year, a notarized annual recertification of financial assurance must be submitted to DEQ demonstrating that this review has been completed. If a discount rate is used to estimate costs, the annual update must also include the certifications listed in OAR 340-094-0140(6)(d).

13.4 Use of financial assurance

The permittee must not use the financial assurance for any purpose other than to finance the permitted facility's approved closure, post-closure, and corrective action activities or to guarantee that those activities will be completed.

13.5 Continuous nature

The permittee must continuously maintain financial assurance for the facility until the permittee or other person owning or controlling the site is no longer required by DEQ to demonstrate financial responsibility for closure, post-closure care or corrective action.

ENVIRONMENTAL MONITORING

14.0 SITE CHARACTERIZATION

14.1 Workplan

At least 270 days prior to any new landfill construction or expansion beyond the currently characterized and approved footprint, the permittee must submit two (or more) copies of a detailed workplan to DEQ for review and approval. The workplan must summarize all site characterization completed to date, describe further site characterization that will be accomplished and include at least the following elements:

- A description of the landfill expansion
- A proposal for monitoring all relevant media within the expansion area
- An update to the Environmental Monitoring Plan that reflects all approved changes to the facility
- A detailed description of the planned investigation
- A detailed project schedule

14.2 Site characterization report

Within 180 days of DEQ's approval of the workplan, the permittee must submit at least two copies of the report to DEQ for review and approval. This report must be based on DEQ-approved workplan and any conditions of the approval. The report must be prepared and stamped an Oregon registered geologist or an Oregon registered engineering geologist. The permittee must submit the report and receive DEQ's approval before starting construction or operation of the new landfill area. Once approved, this report and any conditions of approval become an integral part of the permit.

Reference: The *Solid Waste Landfill Guidance, September 1996,* describes the applicable elements of a Site Characterization Report. Organizing the report in that manner will expedite DEQ's review of the plan.

15.0 ENVIRONMENTAL MONITORING PLAN

15.1 Environmental Monitoring Plan Submittal

Within 120 days when requested by DEQ, the permittee must submit an updated Environmental Monitoring Plan to DEQ for approval.

Major changes in updates to the original plan require that the entire plan be submitted as a stand-alone document; at a minimum, this must be done at least once every 10 years. The plan, or any updates to the plan, must be prepared and stamped by an Oregon registered geologist or an Oregon registered engineering geologist. Upon approval, this plan is incorporated into this permit by reference.

15.2 Environmental Monitoring Plan contents

The updated plan must include plans (other than monitoring that is already handled by an NPDES permit) implementing an environmental monitoring program that will characterize potential facility impacts, including leachate collection, containment, treatment and disposal. The updated plan may incorporate parts of the previous approved plan with any changes or additions since that time (i.e., approved permit-specific concentration limits, revised parameter lists, revised schedules and new wells).

The updated plan must include the following contents, as well as applicable elements from the reference document:

- Monitoring Network Design and Construction
- Sampling and Analysis Plan
- Field QA/QC Procedures
- Lab QA/QC Procedures
- Data Analysis and Evaluation
- Report Format and Executive Summary

Reference: The *Solid Waste Landfill Guidance, September 1996,* provides information on applicable elements of an Environmental Monitoring Plan. Following the organizational format provided in the Guidance will expedite DEQ review of the plan.

15.3 Environmental Monitoring Plan revisions and updates

The permittee must revise the current plan as necessary to reflect current and future environmental conditions, facility development and regulatory requirements. A geologist or certified engineering geologist, with current Oregon registration, must prepare and stamp the plan revisions and submit two copies (one printed and one electronic) to DEQ for review and approval.

15.4 Environmental Monitoring Plan public comment period

Plan changes may require a public comment period.

15.5 Long-term monitoring plan

After DEQ approves any Risk-Based Concentration Limits (RBCs), Permit-Specific Concentration Limits (PSCLs), Concentration Limit Variances (CLVs), Action Limits (ALs), or Site-Specific Limits (SSLs), the permittee must update the EMP to reflect the long-term monitoring program and submit the updated plan for DEQ review and approval.

Note: Also see this permit's requirements for establishing PSCLs, ALs, or SSLs and OAR 340-040-0030(4) for procedures to establish CLVs.

15.6 Leak Detection System

Any significant increase in flow rate in the leak detection system (or degradation of water quality) that have not been corrected (or significant progress made) within two years, also require an updated plan submittal. This plan update is required if a statistical analysis indicates that normal monitoring of detection and compliance sampling points have shown a degradation of water quality. The analysis should cover the period of time from before the changes to after the increased leakage (or degradation of water quality) occurred. The updated plan submittal must detail any proposed increases in frequency or parameter monitoring, as well as any additional monitoring points.

15.7 Additional monitoring points

The permittee must incorporate any new or replacement monitoring point or device into the Environmental Monitoring Plan and submit the updated plan to DEQ for review and approval.

15.8 Environmental Monitoring Plan Compliance

The permittee must conduct all environmental monitoring at the facility in accordance with the approved plan, including any conditions of approval, amendments and updates.

16.0 ENVIRONMENTAL SAMPLING REQUIREMENTS

16.1 Notification of sampling events

The permittee must notify DEQ, in writing, at least 10 working days prior to a scheduled sampling event.

16.2 Split sampling events

The permittee must split samples with DEQ at DEQ's request, and schedule split-sampling events with DEQ's laboratory at least 45 days ahead of time.

Oregon Department of Environmental Quality
Laboratory, Groundwater Monitoring Section
7202 NE Evergreen Parkway, Suite 150
Hillsboro, OR 97124
Phone: 503-693-5700 Fax: 503-693-4999

The permittee must conduct the following split sampling events with DEQ:

Fall or Spring 2024 (TBD)
Fall or Spring 2029 (TBD)
Other sampling events if requested by DEQ

16.3 Monitoring schedule

The permittee must refer to the approved EMP for environmental monitoring procedures. Quarterly monitoring benchmarks are defined below:

If sampling in the...	Schedule the sampling event	
	On, or after....	But on, or before...
Winter	Jan. 1	Feb. 28
Spring	April 1	May 31
Summer	July 1	Aug. 31
Fall	Oct. 1	Nov. 30

16.4 Monitoring after Environmental Monitoring Plan approval

The permittee must monitor the facility in accordance with: 1) the approved plan; 2) any conditions of DEQ's approval; and 3) any DEQ-approved amendments and updates.

16.5 Changes in sampling or split sampling

The permittee must submit a written request and obtain DEQ's written approval before changing the sampling program, including sampling frequency, parameters, or locations. Approved changes will become an integral part of the plan.

DEQ reserves the right to add to or delete from the list of scheduled sampling events, sampling locations, and sampling parameters, and to conduct unscheduled sampling or split sampling events.

If the split-sampling schedule changes, DEQ will try to notify the permittee at least 30 days prior to the next scheduled event.

17.0 ESTABLISHING PERMIT-SPECIFIC CONCENTRATION LIMITS (PSCLs), ACTION LIMITS (ALs), CONCENTRATION LIMIT VARIANCES (CLVs) AND SITE-SPECIFIC LIMITS (SSLs)

17.1 Gathering data

The permittee must monitor the designated background wells in accordance with the approved Environmental Monitoring Plan or propose an alternative intrawell approach. Site specific limits (SSLs) exist for several parameters at two wells and remedial action concentration limits exist for additional parameters at some other wells. Background monitoring shall continue until all necessary data sets have been collected, and may be used for creation of additional PSCLs, ALs and/or SSLs for parameters of concern. The permittee then must demonstrate to DEQ's satisfaction that the selected background-data set is valid and unaffected by facility releases.

17.2 Future disposal units or cells

Before using a new landfill unit or cell for waste disposal, the permittee must collect enough samples to determine background groundwater quality. Alternatively, the permittee may develop a program, to be approved by DEQ, for determining background groundwater quality with wells installed at the time of landfill cell construction.

17.3 Statistical analysis

To establish compliance concentration limits (PSCLs, ALs, and SSLs), the permittee must perform statistical evaluations of the monitoring results for each sampling event.

Use methods outlined in 40 CFR 258.53 or other DEQ accepted statistical methods.

References:

The permittee should use methods outlined in Environmental Protection Agency's "Statistical Analysis of Groundwater Monitoring at RCRA facilities" (March 2009) or other DEQ accepted statistical methods. DEQ's 2011 Guidance Document "Developing Concentration Limits at Permitted Solid Waste Facilities" provides some examples of acceptable methods.

17.4 Proposing PSCLs, ALs, and/or SSLs

The permittee must propose for DEQ's review and approval, a PSCL, AL or SSL pursuant to the guidelines specified in OAR 340-040. The proposal must address all required parameters. Once a statistically valid data set (at least nine acceptable data points) are established from the appropriate background well(s), the permittee may generate a PSCL, AL, or SSL for each designated, long-term monitoring parameter.

17.5 Changing PSCLs, ALs, and/or SSLs

If the permittee demonstrates to DEQ's satisfaction that background groundwater quality has significantly changed since the PSCL, AL or SSL was established, and if the change is unrelated to the permitted facility's influence, the permittee can propose to DEQ a revised level for the affected PSCL(s), AL(s) or SSL(s).

17.6 Establishing and changing CLVs

The permittee should refer to DEQ's Groundwater Quality Protection Rules [OAR 340-040-0030(4)] for guidance in establishing and changing Concentration Limit Variances (CLVs).

18.0 ENVIRONMENTAL MONITORING STANDARDS

18.1 Applicable regulatory standard

The permittee must not allow the release of any substance from the landfill into groundwater, surface water, or any other media which will result in a violation of any applicable federal or state air or water limit, drinking water rules, or regulations, beyond the solid waste boundary of the disposal site or an alternative boundary specified by DEQ. Refer to OAR 340-094-0080.

18.2 Compliance points

Compliance wells are defined in the most current site Environmental Monitoring Plan.

18.3 Review of results

The permittee must review the analytical results after each monitoring event according to the protocols established in the most currently approved site-specific Environmental Monitoring Plan.

18.4 Resampling results

Upon receipt of data from resampling, the permittee must review the analytical results according to the protocols established in the most currently approved site-specific Environmental Monitoring Plan.

18.5 Secondary leachate collection system (SLCS)

If the permittee observes liquids in the leak detection system, the permittee must respond in accordance with the approved plan procedures for sampling, analysis and reporting. If testing confirms landfill impacts

in the leak detection or secondary leachate collection system, and that system is compromised as a compliance point, DEQ may require the permittee to install additional detection or compliance wells and conduct further investigations.

The permittee must design each secondary leachate collection system-equipped landfill cell or sub-unit to allow for discrete sampling of the secondary leachate collection system without mixing, co-mingling or compositing of samples with other leachate sources.

18.6 Methane limits

The methane concentration must not exceed:

- Twenty-five percent of methane's Lower Explosive Limit in onsite structures (excluding gas control structures or gas recovery system components)
- Methane's Lower Explosive Limit at the facility property boundary

Note: Methane's Lower Explosive Limit is equal to a concentration of five percent by volume in air.

18.7 Methane exceedance

If methane levels exceed the specified limits, the permittee must:

1. Take immediate steps to protect human health and safety and notify DEQ within 24 hours
2. Within seven days of detection, confirm the measures taken to protect human health and safety (unless DEQ approves an alternative schedule), and describe the methane test results and response measures in the facility operating record
3. Within 60 days of the methane exceedance, develop and implement a remediation plan, incorporate the plan into the monitoring records, and submit a progress report to DEQ.

18.8 Certified environmental laboratory data

To assure the best possible data quality, DEQ requests that the permittee contract with environmental labs certified under the Oregon Environmental Laboratory Accredited Program (ORELAP) or the National Environmental Laboratory Accreditation Program (NELAP). The permittee should include a copy of the lab's certification with every data submittal. Use of an ORELAP or NELAP approved lab will facilitate DEQ's future review of Environmental Monitoring Plan updates, Annual Environmental Monitoring Reports, and RI/FS documents.

19.0 RECORDKEEPING AND REPORTING – ENVIRONMENTAL MONITORING

19.1 Annual Environmental Monitoring Report (AEMR)

Prior to March 31 of each year, the permittee must submit to DEQ two copies (one paper copy and one electronic copy) of an annual monitoring report for the previous calendar year's monitoring period. The report must conform to the format detailed in the approved plan and be prepared and stamped by a geologist or a certified engineering geologist, with current Oregon registration. Extensive ancillary information such as laboratory reports, and the historical analytical database, may be provided only in the electronic copy and not in the printed copy.

Note: The permittee should submit two-sided copies of all reports and may submit electronic submittals of reports.

19.2 Statement of compliance

The Annual Environmental Monitoring Report must include a brief (approximately one-page) cover letter that:

- Compares the analytical results with the relevant monitoring standards (RBCs, PSCLs, CLVs, ALs, or SSLs)
- Documents any exceedances of or federal or state standards for relevant media
- Documents any significant change in water quality, land quality, air quality or methane levels in monitored media

19.3 Annual Environmental Monitoring Report contents

The Annual Environmental Monitoring Report must reflect the facility's current conditions, present accurate data that correspond with the original field and lab data, and include the elements presented in the most recently approved plan.

19.4 Annual leachate treatment report

Prior to March 31 of each year, the permittee must submit an annual leachate monitoring report.

Reference: The report format should reflect DEQ's guidance: *Solid Waste Landfill Guidance*, September 1996, or the format presented in the most recently approved plan.

19.5 Annual leachate treatment report contents

This annual report must include the elements presented in the most recently approved plan.

Reference: The report format should reflect DEQ's guidance: *Solid Waste Landfill Guidance*, September 1996, or the format presented in the most recently approved plan.

19.6 Split sampling submittal

Within 90 days of any split sampling event, the permittee must submit the following information to DEQ's laboratory:

- A copy of all information pertinent to the sample collection handling, transport and storage, including field notes
- Copies of all laboratory analytical reports
- Copies of all laboratory Quality Assurance Quality Control reports
- A copy of the lab certification (ORLAP or NVLAP, see Certified Environmental Lab Data condition above)
- A hydrogeologic map of the site showing groundwater flow directions and water table contours
- Any other data or reports requested by DEQ

19.7 Lab address

Report all required split sampling information to:

Oregon Department of Environmental Quality
Laboratory, Groundwater Monitoring Section
7202 NE Evergreen Parkway, Suite 150
Hillsboro, OR 97124

Phone: 503-693-5700 Fax: 503-693-4999

19.8 DEQ response to split samples

If the permittee submits all required split sampling data and requests DEQ's results, DEQ's lab may provide, to the permittee, copies of the following information:

- DEQ's analysis of the split sample
- The QA/QC report
- The analytical report
- The field data sheets

20.0 ENVIRONMENTAL MONITORING NETWORK

20.1 Monitoring device installation

For future disposal units or cells, the permittee must install DEQ-approved background and detection and/or compliance wells at least 12 months before refuse disposal occurs in the new cells. A Site Characterization Report may also be required for any proposed new cell. DEQ may waive or modify this requirement if the permittee provides adequate justification for an alternative approach.

20.2 Monitoring stations and equipment

To assure that every sample is representative of the site's environmental conditions, the permittee must protect, operate, and maintain all environmental monitoring stations and equipment in accordance with DEQ's requirements.

20.3 Access to monitoring stations and equipment

To facilitate sample collection and/or inspection and maintenance activities, the permittee must maintain reasonable all-weather access to all monitoring stations and associated equipment.

20.4 Reporting equipment damage

Within 14 days of discovering any damaged monitoring equipment or station, the permittee must submit to DEQ a report describing the damage, the proposed repair or replacement measures, and the schedule to complete this work.

Example: a well's impaired function or altered position/location.

20.5 Monitoring well construction

The permittee must complete any monitoring well or gas monitoring probe abandonment (decommissioning), replacement, repair, or installation in a manner that complies with the Water Resources Rules, OAR 690-240, and with DEQ's *Guidelines for Groundwater Monitoring Well Drilling, Construction, and Decommissioning*, dated August 1992.

20.6 Reporting well construction and repairs

The permittee must document all monitoring well or gas probe repair and construction activities, including driller's logs, well location information, and construction information in a report prepared and stamped by a geologist or certified engineering geologist, with current Oregon registration. The permittee must submit the report to DEQ within 30 days of the action and include this documentation in the next Annual Environmental Monitoring Report.

20.7 Well decommissioning or replacement

The permittee must submit a written recommendation to DEQ prior to decommissioning or replacing any well or gas monitoring probe in the monitoring network. After receiving DEQ's approval, the permittee must decommission or replace any well or gas probe that meets the following criteria:

- The well or gas probe was installed in a borehole that hydraulically intersects two saturated stratas
- The permittee lacks supporting documentation demonstrating that the well or gas probe was properly installed and constructed
- The well or gas probe was damaged beyond repair or destroyed
- Other reasons as determined by either the permittee or DEQ

COMPLIANCE SCHEDULE

21.0 SUMMARY OF DUE DATES

21.1 Summary

The permittee must comply with the event-driven schedule shown below. This compliance schedule does not apply to many of the routine reporting requirements specified in other sections of the permit.

Due Date	Activity	See section...
120 days prior to new landfill construction or expansion	Submit updated Environmental Monitoring Plan	15.1 Environmental Monitoring Plan submittal
Within 90 days of permit issuance	Review and submit conceptual "worst-case" closure and post closure plan	12.1 Worst case closure plan development

April 1st of each year	Submit financial assurance plan and mechanism	13.3 Recertification of financial assurance
Within 360 days of permit issuance	Review and submit site development plan update	10.1 Site development plan
Within 270 days of permit issuance	Submit updated Operations Plan	7.1 Operations plan submittal
Within 60 days of Operations Plan approval	Submit updated Operations and Maintenance Manual	7.3 Operations and Maintenance Manual
By March 31 for each year	Submit an Annual Environmental Monitoring Report	19.1 Annual Environmental Monitoring Plan
By March 31 for each year	Submit an Annual Leachate Treatment Report	19.4 Annual leachate treatment report
SAMPLING:		
At least 10 working days prior to scheduled sampling event	Notify DEQ	16.1 Notification of sampling events
At least 45 days prior to split sampling event	Schedule split sampling event with DEQ laboratory	16.2 Split sampling events
Within 90 days of split sampling event	Submit required data/documents to DEQ laboratory	19.6 Split sampling submittal
EVENTS:		
Within 30 days of DEQ notification of need to install monitoring well or probe	Install groundwater monitoring well and/or probe	20.1 Monitoring device Installation
Within 30 days of any well construction	Submit well construction report	20.6 Reporting well construction and repairs
At least 6 months before any new disposal unit and/or closure construction	Submit engineering design plans and, if applicable, closure schedule	10.3 Design plans 12.4 Closure plan approval
At least 270 days prior to new construction or expansion	Submit a Site Characterization Report Workplan	14.1 Workplan
Within 180 days of DEQ approval of SCR workplan	Submit a Site Characterization Report	14.2 Site characterization report
Within 90 days after completion of any major construction	Submit Construction Certification Report	10.7 Construction report submittal
Within 18 months of plan approval	Begin construction	10.4 Construction requirements

ATTACHMENTS

22.0 ATTACHMENT

Attachments to the permit include:

Number	Description
1	Parameter Groups
2	Permit-specific concentration limits

22.1 Attachment 1: Parameter Groups

Overview

This attachment describes the environmental-monitoring parameter groups and associated requirements

Due to the duration of this permit, suggested analytical methods may change. If that is the case, use the most currently promulgated EPA method or DEQ-approved equivalent.

Note: Method means EPA SW 846 Method [suggested methods are in square brackets].

Group 1a: Field indicators

The field indicators parameter group includes the following parameters:

Elevation of water level
pH
Temperature
Specific Conductance
Dissolved Oxygen
Eh

With instruments calibrated to relevant standards, measure these parameters in the field when collecting samples. Acceptable methods include:

- Down-hole in situ
- In a flow-through well
- Immediately following sample recovery

Group 1b: Leachate indicators

The laboratory indicators parameter group includes the following parameters:

Total Dissolved Solids (TDS)
Total Suspended Solids (TSS)
Total Organic Carbon (TOC)
Chemical Oxygen Demand (COD)

Proper techniques for sample handling, preservation, and analysis are specific to each individual analyte: Follow appropriate EPA techniques or AWWA Standard Methods.

Group 2a: Common anions and cations

The common anions and cations parameter group includes the following parameters:

Calcium (Ca)
Sulfate (SO_4)
Total Ammonia (NH_3+NH_4)
Sodium (Na)
Nitrate (NO_3)
Silicon (Si)
Iron (Fe)
Manganese (Mn)
Magnesium (Mg)
Chloride (Cl)
Carbonate (CO_3)
Potassium (K)
Bicarbonate (HCO_3)

Dissolved concentrations must be measured. Field-filter and field-preserve samples according to standard DEQ and/or EPA guidelines and analyze by appropriate EPA or AWWA Standard Methods techniques. Report results in mg/L and meq/L.

Group 2b: Trace metals

The trace metals parameter group includes the following parameters:

Antimony (Sb)	Chromium (Cr)	Selenium (Se)
Arsenic (As)	Cobalt (Co)	Silver (Ag)
Barium (Ba)	Copper (Cu)	Thallium (Tl)
Beryllium (Be)	Lead (Pb)	Vanadium (V)
Cadmium (Cd)	Nickel (Ni)	Zinc (Zn)

If the Total Suspended Solids concentration is...	analyze for...
less than or equal to 100.0 mg/L in the sample	total concentrations (unfiltered)
Greater than 100.0 mg/L in the sample	both total (unfiltered) and dissolved (field-filtered)

Field-preserve samples according to standard DEQ and/or EPA guidelines and analyze by EPA Method 6010C or DEQ-approved equivalent.

Group 3: Volatile organic constituents

Analyze for all compounds detectable by EPA Method 8260B (C- other method 8/06) or EPA Method 524.2, include a library search to identify any unknown compounds present. The volatile-organic-compounds parameter group is equivalent to the EPA Method 8260B list.

DEQ must pre-approve alternative methods like EPA Method 8021B

Group 4: Assessment monitoring

The assessment monitoring parameter group includes the following parameters:

Semi-volatile Organic Constituents, including Phenols, EPA Method 8270D
Mercury, EPA Method 7470A
Cyanide, EPA Method 9010C (manual distillation) or 9012B (automated distillation)
Nitrite

All Method 8270D analyses must include a library search to identify any unknown compounds present.

Group 5: Surface water and leachate

The surface water parameter group includes the following parameters:

Total Kjeldahl Nitrogen (TKN)	Total Coliform Bacteria [EPA Method 9131]
Total Phosphorus (P)	Fecal Coliform Bacteria [EPA Method 9131]
Orthophosphate (PO_4)	E. Coli
Biological Oxygen Demand (BOD)	

22.2 Attachment 2: Remedial Action Concentration Limits and Permit Specific Concentration Limits

In accordance with OAR 340-040-0050(2) and as defined in the site Record of Decision (dated October 2004); Remedial Action Concentration Limits are established for the "west side" monitoring points specified in Section 18.2 of this permit as follows:

Compound	RACL	Basis	COPC
Volatile Organic Compounds (µg/L)			
1,4-Dichlorobenzene (1,4-DCB)	75	MCL/RL	Yes
Tetrachloroethene (PCE)	5	MCL	Yes
Trichloroethene (TCE)	5	MCL/RL	Yes
Vinyl chloride	2	MCL/RL	Yes
Trace Metals (µg/L)			
Antimony	6	MCL	No
Arsenic	10	MCL	Yes
Barium	1,000	RL	No
Beryllium	4	MCL	No
Cadmium	5	MCL	Yes
Chromium	50	RL	No
Lead	50	RL	No
Nickel	100	MCL	No
Selenium	10	RL	No
Silver	50	RL	No
Thallium	2	MCL	No
Dissolved Metals (µg/L)			
Iron	300	SMCL	Yes
Manganese	50	SMCL	Yes
Inorganic Compounds (mg/L)			
Chloride	250	SMCL	Yes
Total Dissolved Solids (TDS)	500	SMCL	Yes

RACL: Remedial Action Concentration Limit

Basis: The lower of either Federal primary Maximum Contaminant Level (MCL) or State Reference Level (OAR 340-040-0020, Tables 1 through 3).

SMCL: Secondary MCL

COPC: Chemical of Potential Concern

In accordance with Section 17 of this permit, Permit-Specific Concentration Limits are established for the "east side" monitoring points specified in Section 18.2 of this permit as follows:

Site Specific Limits for MW 26 and 27
Assumes 2 Compliance Wells, 7 or 8 COCs, Semiannual Sampling

Indicator Parameters (Date set: 2011-2018)	Statistical Distribution	Prediction Limits (mg/L)		Retesting
		MW-26	MW-27	
Bicarbonate	Normal	175[a]	495	1 of 2
Chloride	Normal	6.2	15.0	1 of 2
TDS	Normal	246[a]	499	1 of 2
Calcium	Normal	32.0[a]	100	1 of 2
Iron	NP/Normal	4.5	17.6	1 of 2
Magnesium	Normal	10.1	46.0	1 of 2
Manganese	Normal	0.74	8.9	1 of 2
Sodium	Normal	30.0	44.4	1 of 2

Note: [a] surrogate value calculated from MW-22.
Retesting scenario achieves annual site wide false positive rate of 10% per EPA Unified guidance.

EXHIBIT 24
OREGON DEQ PERMIT WORK PLAN

DEVELOPMENT AREA HYDROGEOLOGIC AND GEOTECHNICAL CHARACTERIZATION WORKPLAN

COFFIN BUTTE LANDFILL

BENTON COUNTY, OREGON

Prepared for

Republic Services, Inc.
Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, Oregon 97330

July 9, 2021

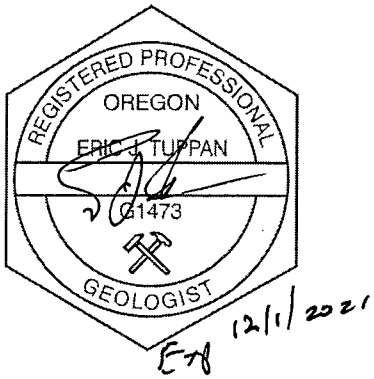
Prepared by

TUPPAN CONSULTANTS LLC
Lake Oswego, Oregon 97034

Project CEC-001-002

Development Area
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill
Benton County, Oregon

The material and data in this report were prepared under the supervision and direction of the undersigned.



TUPPAN CONSULTANTS LLC

Eric J. Tuppan, R.G.

CONTENTS

SIGNATURE PAGE **ii**

LIST OF TABLES AND ILLUSTRATIONS **vi**

SUMMARY **vi**

1 INTRODUCTION **1-1**
1.1 Background and Plan Organization 1-1
1.2 Project Objectives 1-2
1.3 Project Team 1-2

2 GOALS OF INVESTIGATION **2-1**
2.1 Phase I Site Characterization 2-1
2.1.1 Existing Conditions 2-1
2.1.2 Climate and Meteorology 2-2
2.1.3 Hydrology 2-2
2.1.4 Water Balance 2-2
2.1.5 Water Use Inventory 2-3
2.1.6 Geology and Hydrogeology Investigation 2-3
2.2 Phase II Characterization 2-3
2.3 Geotechnical Characterization 2-4

3 SITE BACKGROUND **3-1**
3.1 Site Location and History 3-1
3.2 Site Geology and Hydrogeology 3-2
3.2.1 Hydrogeologic Units 3-2
3.2.2 Groundwater Occurrence and Flow 3-3
3.3 Water Quality 3-4
3.3.1 East Side – North of Coffin Butte Road 3-4
3.3.2 Development Area – North Slope of Poison Oak Hill 3-5
3.3.3 Surface Water and Underdrains 3-5
3.4 Existing Monitoring Network 3-6
3.5 Geotechnical Information 3-6

CONTENTS (Continued)

4 DATA GAPS AND PROPOSED CHARACTERIZATION 4-1
4.1 Phase I Data Elements Evaluation 4-1
4.1.1 Existing Conditions 4-1
4.1.2 Climate and Meteorology 4-1
4.1.3 Hydrology 4-2
4.1.4 Water Balance 4-2
4.1.5 Water Use Inventory 4-2
4.1.6 Geology, Hydrogeology and Geologic Hazards Summary 4-3
4.2 Phase II Characterization Goals and Tasks 4-4
4.2.1 Distribution of Geologic and Hydrogeologic Units 4-4
4.2.2 Geotechnical Evaluation 4-5
4.3 Groundwater Characterization Elements 4-6
4.3.1 Monitoring Network Modifications 4-6
4.3.2 Water Quality Monitoring 4-7
4.3.3 Hydraulic Testing 4-7

5 SCOPE OF WORK 5-1
5.1 Distribution of Test Pits and Geotechnical Borings 5-1
5.2 Proposed Boring Depths 5-2
5.3 Field Activities 5-3
5.3.1 Geologic Mapping 5-3
5.3.2 Test Pits 5-3
5.3.3 Borehole Drilling and Soil Sampling 5-4
5.3.4 Laboratory Testing 5-5
5.3.5 Surveying 5-6

6 REPORTING 6-1

7 SCHEDULE 7-1

REFERENCES

LIMITATIONS

CONTENTS (Continued)

APPENDIX A INFORMATION FROM OTHER REPORTS

APPENDIX B BORNG LOGS – DEVELOPMENT AND ADJACENT AREAS

APPENDIX C FIELD FORMS

TABLES AND ILLUSTRATIONS

Following Report:

Tables

1 Description of Monitoring Network
2 Well Construction Information
3 Proposed Soil Boring and Test Pit Program
4 Geotechnical Testing Program

Figures

1 Site Location
2 Landfill Cells - Aerial View
3 Existing Conditions
4 Hydrographs – Development Area
5 Proposed Drilling and Test Pit Locations

1 INTRODUCTION

This document presents a plan for site characterization at the Coffin Butte Landfill in Benton County, Oregon, which is owned and operated by Valley Landfills, Inc., a subsidiary of Republic Services, Inc. Republic is in the process of permitting, site characterization, and preliminary planning and design to develop the landfill south of Coffin Butte Road. In addition to the landfill development, Republic is also planning to move or build new support areas and structures for the landfill, including: a new access road around the south side of the landfill, leachate ponds proposed for east of the landfill footprint, an employee building area, and pump stations.

1.1 Background and Plan Organization

Past investigations have extensively characterized site hydrogeology and geotechnical parameters for the area north of Coffin Butte Road, where a multiunit landfill has been operating since the mid 1970s. The area south of Coffin Butte Road is currently used for ancillary structures and buildings that support landfill operations. Hydrogeologic and geotechnical characterization has also occurred in the area south of the road, primarily as it relates to the construction and operations of the leachate holding ponds. Currently, characterization includes ongoing groundwater quality monitoring.

The workplan is organized in roughly three parts. The first describes the goals of site characterization as defined in Oregon Department of Environmental Quality's (DEQ) *Solid Waste Guidance, Municipal Solid Waste Landfills* (DEQ, 1996), including the elements specifically listed in Sections 2, 3, and 4 of that guidance. Second, the workplan summarizes information from past studies for Coffin Butte Landfill that focuses on the development area, and identifies elements where additional data are needed to refine our understanding of the site hydrogeology and geotechnical attributes of soil and bedrock. Last, we develop a scope of work that addresses the data gaps, provides the types of technical information that will be needed for a conceptual design for the landfill, and as appropriate, for developing design-level information that satisfies the permit requirement for hydrogeologic and geotechnical characterization.

1.2 Project Objectives

Over a period of over 40 years, consultants have studied the surface soils and subsurface geology of the site, as well as the groundwater hydrogeology and geochemistry. With this substantial historical record, at least for the area north of Coffin Butte Road, much of the site character for surface soils and for shallow and deep water-bearing zones, is known. However, south of Coffin Butte Road, less is known regarding the constructability of a landfill. Given this amount of known information, objectives for this study include:

- Update information to satisfy DEQ's Phase I site characterization elements which focus on regional and area-wide data needs.

- Evaluate the site geology and hydrogeology, including stratigraphic units and the water-bearing zones as part of Phase II site characterization. More specifically, this aspect will examine subsurface conditions that include the depth and extent of the water bearing hydrogeologic units, the hydraulic connection between units, the lithologic and hydraulic properties of these units, groundwater flow patterns, and other factors. It should be noted that the groundwater-related investigation will be phased later with a separate workplan as described in Section 4.3.

- Acquire geotechnical information about the site to satisfy both a Phase I and II geotechnical assessment, including design-level data on the distribution of overburden (i.e., alluvium), depth of bedrock, and competency of units in the south development area. This aspect of study will include:
  - Characterize the variability, depth, aerial extent and engineering properties of onsite soils and other overburden deposits.
  - Inventory soils and other overburden deposits suitable for use in construction, and identify a proposed use for these materials.
  - Identify geotechnical considerations (such as settlement and slope stability) which must be addressed in the engineering design.

- In a future phase, Republic will augment the groundwater monitoring network in the south development area. We anticipate that this will include installing upgradient, and cross- and down-gradient wells along the perimeter of the landfill footprint as well as decommissioning several wells along Coffin Butte Road that are within the planned footprint of the landfill.

1.3 Project Team

The characterization project will be overseen by Tuppan Consultant who will coordinate office and field tasks, and be the primary author of the site characterization report. The

Wallace Group, Inc., of Bend, Oregon, will provide field personnel for test pits and borings, in addition to performing geotechnical analyses necessary for the site characterization report. Civil & Environmental Consultants, Inc. (CEC) will provide CAD support for preparing figures for the report.

2 GOALS OF INVESTIGATION

This section provides background and context to the scope of work that will be developed later in the workplan. The primary goal of the site characterization report is to satisfy the various elements outlined in the DEQ's guidance on landfill characterization. In the guidance, these are organized into two phases that focus on geology and hydrogeology, plus another phase for the geotechnical evaluation.

2.1 Phase I Site Characterization

The main objectives of the Phase I site characterization study are to describe existing site conditions, determine if the site is suitable for landfill construction, provide sufficient base-line information for developing the facility design, construction program, operations plan, and the environmental monitoring program. As the site has already been zoned and developed as a landfill, many of the site suitability elements have been provided in past reports. Specific topics taken from the Section 2 of the DEQ guidance are described below.

2.1.1 Existing Conditions

Much of this information on existing conditions at the site has been presented in documents listed in the references. This includes:

- Site Location. Describe the site location with respect to known or easily identifiable landmarks, include the section, township, and range location for the site. Describe access to the site from the nearest U.S. or State Highway.

- Legal Description. Provide a legal description of the tract or tracts of land which have been or are proposed to be used for waste disposal activities.

- Vicinity Map. This will include a map or series of maps showing the facility and the area within at least a five-mile radius of the site boundary. Additional elements to be included on the vicinity map are provided in the guidance.

- Aerial Photographs. Prepare a stereo pair of standard size (9 inches by 9 inches) recent vertical aerial photographs with a scale up to 1:40,000, which

shows the site and the area within at least a one-mile radius of the site boundary.

- Adjacent Landowners. Show on a location map or on County Tax Lot map(s), the names and mailing addresses of all landowners within one-quarter mile of the property and any other landowners identified as being affected by the proposed facility.

- Site Map. Prepare a detailed site map scaled at not more than one inch equals 200 feet (or other scale approved by the Department) that shows existing conditions in addition to the proposed landfill development footprint, soil borrow areas, and wells.

2.1.2 Climate and Meteorology

Current information based on or extrapolated from data collected at the closest reporting weather station or stations including:

- Average annual precipitation and monthly distribution of precipitation.
- Average annual evaporation and monthly distribution of evaporation.
- Average annual prevailing wind direction and monthly variation in wind direction.
- Average and maximum wind velocities and monthly variations in wind velocity.
- Average annual temperature and monthly variations in temperature.

2.1.3 Hydrology

Evaluate and describe the surface water drainages of the site and of the surrounding area within at least a one-mile radius of the site. This information should include a map or maps at a scale of 1:24,000 showing major perennial, ephemeral and intermittent drainage channels, and their tributaries.

2.1.4 Water Balance

Analyze the average annual site water budget including precipitation, runoff, infiltration and evapotranspiration. Determine the monthly variations of each of these parameters for a one-year period. Acceptable water balance methods include Thornthwaite-Mather (1957), the EPA Water Balance (1975), the EPA Help Model (1984), and/or other methods approved in advance by the Department.

2.1.5 Water Use Inventory

Identify all active and inactive water wells, irrigation wells, and surface water usage points within the targeted radius. As needed, identify and field check water usages within this radius which are listed in the drillers' log files or other records of the Oregon Water Resources Department (WRD). Areas within the radius of investigation that are served by a municipal water supply should be included in the WRD well records search.

2.1.6 Geology and Hydrogeology Investigation

Conduct a preliminary geology and hydrogeology investigation. Evaluate the regional geology and hydrogeology based on geological reconnaissance field mapping and existing published or unpublished reports and data from state and federal agencies, universities, consultants or other sources.

In addition to the hydrogeology, describe the geologic hazards that may include seismic impacts, mass movement (e.g., landslides), unstable soils, flood inundation, shallow groundwater levels, tsunami, and volcanic eruptions. Location restrictions under OAR 340-94-030 address considerations such as Holocene fault zones, seismic impact areas and unstable areas.

Assessment of geologic hazards will also evaluate the earthquake safety of the site, including:

- A description of the seismotectonic setting and seismic history of the area, including size, frequency, and location of historic earthquakes. ·
- Potential for area to be affected by surface rupture, including sense and amount of displacement, and width of surface deformation zone.
- Probable response of site to likely earthquakes, including estimated ground motion, maximum ground acceleration, velocity and displacement.
- Potential for area to be affected by earthquake-induced landslides or soil liquefaction.
- Potential for area to be affected by regional tectonic deformation (subsidence or uplift).

Finally, to the extent possible, identify and evaluate other known or suspected geologic hazards which may affect the design, construction, and operation of the facility.

2.2 Phase II Characterization

The main objective of the Phase II site characterization is to describe and evaluate the site geology and hydrogeology, including stratigraphic units encountered, the uppermost

aquifer or water-bearing zone, and other potential zones of contaminant transport. Elements will include:

- Surface investigations such as surface geologic mapping and excavating test pits.
- Subsurface investigations will include geotechnical borings, and, in a later phase, groundwater monitoring wells.
- Hydrogeologic testing to provide aquifer parameters, also as part of subsequent phase for future monitoring wells.
- Environmental testing to assess groundwater and surface water quality.

2.3 Geotechnical Characterization

Section 4 of landfill guidance calls for characterizing the variability, depth, aerial extent, and engineering properties of onsite soils and other overburden deposits. This should include:

- Inventory soils and other overburden deposits suitable for use in construction, and identify the proposed use for these materials.
- Identify geotechnical considerations, such as settlement and slope stability as listed in Phase I geotechnical investigation guidance.
- Perform additional geotechnical investigations as required by a Phase II work scope that includes design calculations and analyses, and that could include:
  - Potentially unstable natural slopes and other on-site areas that could be destabilized by construction activities such as excavation, regrading or other site modifications.
  - Stability of the landfill foundation considering site-specific topographic and geologic conditions, static and dynamic loads, pore-water pressures at the subgrade-liner interface, and any other relevant factors.
  - Compressibility of underlying geologic units and potential settlement of the landfill unit. Estimate total and differential settlement based on appropriate field and laboratory methods and design parameters.

3 SITE BACKGROUND

The information summarized in this section provides the framework for identifying data needs and in developing the proposed scope of work. Technical details are provided in several reports cited in the references section. Much of the information discussed below was summarized in the *Site Characterization - Cell 3 Coffin Butte Landfill* (EMON, 1999), the *Environmental Monitoring Plan* (EMP)(Tuppan, 2014), and the *2020 Annual Environmental Monitoring Report* (Tuppan, 2021), and the reader is referred to those documents for more details.

3.1 Site Location and History

Coffin Butte Landfill is in the west-central Willamette Valley, eleven miles north of Corvallis, Oregon (see Figure 1). Topographic elevations in the area range from 220 to over 740 feet above mean sea level (msl) at the summit of Coffin Butte. The landfill is in a predominantly agricultural area. The land adjacent to the site is zoned exclusive farm use, forest conservation, and rural residential with either a 5- or 10-acre lot minimum.

Landfilling began in 1945 on the southwest flank of Coffin Butte and has continued to the east along the southern flank (Figure 2). The first area of landfilling (referred to as the Closed Landfill) was initially quarried for crushed rock after which it received waste from 1945 to 1977. In 1977, the Closed Landfill was capped with soil and closed. Subsequent landfill development progressed eastward across the site. Recently, in 2019, VLI began source removal of the Closed Landfill, which physically removed the old waste and hauled it to Cell 5 in the active part of the landfill. This process continued into 2021 at which time the entire waste mass of the Closed Landfill will have been removed.

In 1975, VLI began filling Cells 1 and 1A, with most waste being placed in Cell 1 beginning in 1977. Cell 1A (approximately 4 acres) primarily handled waste from Teledyne Wah Chang and was not used for disposal after 1988. Cell 1 (approximately 30 acres) has a clay bottom liner and leachate collection system that conveyed the leachate to an adjacent holding pond. Placement of waste in Cell 1 stopped in early 1993, when cell 2B was constructed. Cell 1A has gone through final closure, and Cell 1 has been closed along the southern, central, and western parts. A “piggyback” liner system was constructed over the east side of Cell 1 as part of the development of Cell 3D. The lower half was constructed in 2006, and the upper half constructed in 2008. Final stages of

filling Cell 2 ended in 2004 with final cover constructed along its southern flank in summer 2003.

Cell 3 has also been filled, and final closure construction has occurred over a portion of the south face of Cell 3. Cell 4 was constructed in summer 2011 with operations moving into the northern half of that cell in fall 2011. In summer 2012, the remaining features of Cell 4 were completed, including moving the primary and secondary leachate sumps to their locations on the southern perimeter of the cell. Cell 5A was excavated north of Cell 4 in summer 2012 with construction completed in 2013**.** Cells 5B, 5C, 5D and 5E were excavated over the summers of 2015 to 2017. Cell 5B was subsequently completed in the summer of 2017, Cell 5C during the summer of 2019, and Cell 5D completion is currently under construction. Filling operations are currently taking place in Cell 5C.

Coffin Butte serves Benton, Linn, Polk, Lincoln, and Tillamook counties. The facility is permitted as a municipal solid waste disposal site and is authorized under Section 5 of its solid waste permit to accept domestic, commercial, industrial, construction, demolition, and agricultural waste, sewage sludge and grit, petroleum contaminated soil, and asbestos.

3.2 Site Geology and Hydrogeology

The geology and hydrogeology of the site have been described in a number of documents. One of the most comprehensive was the site characterization report for Cell 3 (EMCON, 1999), which synthesized the regional and site geology and hydrogeology from a number of earlier reports and the scientific literature. Discussions of water quality conditions at the site are summarized in annual reports (since 1992), the remedial investigation and its addendum (EMCON, 1994, 1996b), the preliminary assessment for the area downgradient of the 1977-closed landfill (EMCON, 1996a), previous versions of the EMP (EMCON, 1997; TC, 2005, 2011a, 2012b) and the focused risk assessment and feasibility study (TC, 2003a). The following descriptions are taken primarily from the EMP, and has been updated to include information from more recent drilling associated with Cell 5, and with regard to current trends in groundwater quality at the site as it is relevant to the south development area.

3.2.1 Hydrogeologic Units

The current cells of the landfill are situated along the south flank of Coffin Butte (Figure 2). In undeveloped areas, the upper third (approximately) of the butte consists of steep grass-covered slopes, the middle third of exposed bedrock with little vegetation, and the lower third of gentle, soil-covered slopes. The development area borders an interior, north-facing drainage of Poison Oak Hill. The upper part of the hill is steeper, forest-covered slopes, with the lower areas either grassy or developed as part of the landfill infrastructure. Generally, the upper slopes from the top of Poison Oak Hill to

approximately the current locations of the leachate ponds are underlain by basalt bedrock and the lower, flatter slopes underlain by alluvium that generally consist of silty clay to clayey silt with variable amounts of thin, interbedded sands and silty to sandy gravel (commonly referred to as Willamette Silt). The lower slope transitions eastward to the relatively flat Willamette Valley where alluvium is transected by small drainages or creeks. For the current landfill, solid waste in Cells 1/1A and the Closed Landfill is generally inferred to rest on bedrock, which in places was lined with clay (e.g., in Cell 1). Cells 2 through 5 are constructed with composite liners and leak detection systems, with Cells 3 through 5 also designed with underdrains. The vertical relationship of alluvium, bedrock, and waste units in the east side of the landfill, Cell 2 and 4 area is illustrated in Appendix A, Figure 2-2 from the EMP.

There are two principal water-bearing units: unconsolidated alluvium and bedrock volcanics. Groundwater occurs in both units, although the alluvial deposits are absent or unsaturated over much of the site where the development area occurs. Where both units are present, they are not separated by a confining layer but are hydraulically interconnected. The two units are monitored separately by groundwater monitoring wells.

3.2.2 Groundwater Occurrence and Flow

Depth to groundwater depends on season and topography. In site wells, the groundwater depths can range from over 80 feet below the ground surface midway up the slopes of Coffin Butte (in bedrock) to less than 1 foot in the flat lowland area southeast of the butte (in alluvium). For wells MW-8S, MW-8D, MW-15, and MW-16 (now decommissioned), which are within or adjacent to the development area, seasonal fluctuations vary, depending on the hydrogeologic position of the monitoring point (see Figure 3 for monitoring well locations). Typically, the lowest groundwater elevations are in late summer to fall and the highest in winter and spring. This is illustrated in Figure 4, which are historical hydrographs for those wells.

The direction of groundwater flow is controlled by the topographic setting of Coffin Butte and Poison Oak Hill and the intervening low areas. Groundwater in the bedrock generally flows downslope from the hills until it reaches a groundwater divide near the southeast corner of Cell 1 and southwest part of Cell 3. At the divide, groundwater flows toward the east and west, generally following the long axes of the valleys (Appendix A, Figure 2-3). Groundwater flow direction in the saturated portion of the alluvium mimics the underlying bedrock (Appendix A, Figure 2-4). In areas dissected by surface drainages, groundwater in the upper part of the alluvial aquifer discharges to surface creeks, such as Soap Creek west of the landfill, or Luckiamute Creek to the east, and during the summer months provides base flow. Near upland areas, groundwater in bedrock also can provide base flow to surface creeks, for instance, in Soap Creek, weathered basalt bedrock is exposed in the stream bed between surface water locations

S-2 and S-4. Groundwater contours for the entire site for the most recent sampling events in April and October 2020 are shown in Appendix A, Figures 3-5 and 3-6.

Estimates of horizontal groundwater velocity (Vh) are typically calculated at the Coffin Butte Landfill for the east side, beneath Cell 4. Beneath this part of the landfill, Vh is calculated at approximately 6.4 ft/yr, given a hydraulic conductivity of 0.22 ft/day for the alluvium, an estimated effective porosity of 25 percent (literature values in Morris and Johnson, 1967), and a hydraulic gradient of 0.02 ft/ft.[1] Current estimates of groundwater flow for other parts of the site can be found in the 2020 annual report (Tuppan, 2021).

3.3 Water Quality

The discussion of water quality focuses on the east side of the landfill, and includes current monitoring and underdrains in the development area. For the east side of the landfill, monitoring is in the detection mode, focusing on characteristics of the natural or baseline water quality and how to recognize impacts from the landfill. Additional water quality information and time-series concentration plots for groundwater and underdrains can be found in the 2020 annual report (Tuppan, 2021).

3.3.1 East Side – North of Coffin Butte Road

Cell 2 and Cell 3 – Detection Well MW-24. Wells near Cell 2 include detection well MW-24 at the southern intersection of Cells 2A and 3, and MW-23 discussed below. Well MW-24 is completed in shallow weathered bedrock (the alluvium is not saturated in this area). Trends for indicator parameters in MW-24 are stable and reflect natural water quality in the area.

Cell 2 – Detection Well MW-23. Early in its history, detection well MW-23 had shown increases for bicarbonate alkalinity, chloride, hardness, total dissolved solids (TDS), for five of the major dissolved metals, and for arsenic. This had been attributed to localized seepage of leachate from the south side of the landfill that was remedied soon thereafter. Since 2000 to 2001, the upward trends for indicator parameters have peaked, and after about 2009 to 2011, most of these constituents declined to within or just above the range of background concentrations. With the exception of chloride, which is a few milligrams per liter higher than background, the concentrations in 2020 were at these lower values near or within background levels.

Cell 4 – Compliance Wells MW-26 and MW-27. These wells were first sampled in November 2011 and accumulated quarterly baseline water quality data throughout 2013.

[1] The mean hydraulic conductivity for alluvium and bedrock was evaluated from pumping and slug test data collected from 1985 to 1993 as reported in the remedial investigation (EMCON, 1994). Geometric means were calculated for each unit after examining boring logs to verify hydrogeologic unit. Values used in annual reports are as follows: alluvium, 0.22 ft/day; bedrock, 2.7 ft/day.

Examination of the trends show relatively lower and stable concentrations at MW-26 than at MW-27, which typically has a wider range of concentrations. Concentrations for several parameters at MW-27 can be quite variable. This is likely caused by two conditions at MW-27. First, the water bearing zone that the well monitors has very low permeability, requiring the well to be purged one day and then sampled the following after it recharges adequately. This does not allow the purge water to stabilize during sampling, so that water samples can be affected unevenly from sampling event to sampling event. The second condition is the mineral composition of the formation opposite the screened interval, which is composed of organic clay with up to 10 percent fine sand. The presence of the organics is likely from an ancient bog that was mapped in the base of the Cell 4 excavation.

3.3.2 Development Area – North Slope of Poison Oak Hill

In wells MW-8S and MW-15, concentrations of inorganic indicators in 2020 continued longer-term trends of past years. At MW-8S, an earlier increasing trend for chloride peaked in 2001 and is now declining gradually, while at MW-15, chloride concentrations have been more variable to upward since 2010; other indicatory parameters have been relatively stable or declining. Trace metals were detected at low to trace concentrations, or were not detected in 2020 and no VOCs were detected. Before it was decommissioned in 2004, concentrations of chloride and sodium at MW-16, which was upgradient of MW-15, were typically lower than at MW-15. This is likely due to naturally occurring saline, connate water in the fine-grained sediments in this area, in which MW-15 is screened. This water quality contrasts with MW-16, which is screened in fresh bedrock, and has naturally lower concentrations for site indicator compounds than the alluvium.

3.3.3 Surface Water and Underdrains

Surface water is not sampled in the development area. However, underdrains that daylight to surface water are sampled in two location: S-U4 that drains from below the East Leachate Pond and S-U5, which drain from below the West Leachate Pond.

Water quality from underdrain S-U4 represents baseline concentrations, with values for inorganic compounds and dissolved metals comparable to or lower than concentrations at MW-16, which was the background well that monitored bedrock in the pond location before it was decommissioned in 2004. Since monitoring began, concentrations for the indictor parameters have been steady and exemplify a condition of no leakage from the overlying pond.

Beginning in October 2010, VLI began sampling S-U5, which drains from below the West Leachate Pond. The drain pipe also connects with another pipe that drains from below the concrete pad of the non-operational Leachate Treatment Plant. It should be noted that minor differences are expected between underdrain S-U5 water quality and

groundwater quality at MW-16, since these two monitoring points are not immediately proximal to each other. Nevertheless, trend plots illustrate that water quality at the two points is very close. Similar to water quality results at S-U4, the steady trends at S-U5 suggest no leakage from the overlying liner system for the West Leachate Pond.

3.4 Existing Monitoring Network

The water quality monitoring network at Coffin Butte Landfill has five components: (1) groundwater monitoring wells, which include compliance and detection wells, (2) water level observation wells and piezometers, (3) the secondary leachate collection system (SLCS), (4) leachate sumps, and (5) surface water monitoring points. In addition to water quality, landfill gas is monitored at probes surrounding the landfill, and in buildings or structures near the landfill. The rationale for the network design and the media monitored was presented in the EMP (Tuppan, 2014b). The water quality monitoring locations are summarized on Table 1. A summary of the well construction, survey information, and lithologic completion intervals is provided in Table 2. Boring logs and construction diagrams for wells in the development and adjacent area are provided in Appendix B.

3.5 Geotechnical Information

Information about geotechnical considerations and landfill liner designs can be found in design or characterization reports for Cell 3 (Thiel, 1999), Cell 4 (Tuppan, 2011), Cell 5A (Thiel, 2012), the west leachate pond (Thiel, 1998), and from site development reports completed in 2000 (Thiel, 2000), 2011 (Ausenco-Vector, 2011), with an amendment to the 2011 plan in 2013 (Thiel, 2013). These reports contain geotechnical data, calculations, stability analyses, groundwater seepage estimates, geotechnical laboratory testing results, logs for test pits and boring logs, and design drawings for the landfill cells or pond. While potentially relevant to the current development project, much of the specific data is for soil or areas outside the planned landfill footprint. Therefore, more site-specific data will be collected as part of the scope of work to be developed in Section 4 of this plan.

As part of locating the test pits and geotechnical borings, we will incorporate information from past site investigations, specifically for boring and test pits from the west leachate pond study which are shown on Figure 5 along with the proposed locations. We will also be using information from monitoring wells drilled within the development area or along Coffin Butte Road to assist with identifying potential depths of borings based on existing knowledge. Finally, surface geologic mapping of the subgrade of the East Leachate Pond will be used as the starting point for extending surface mapping to other areas of the development footprint.

4 DATA GAPS AND PROPOSED CHARACTERIZATION

This section reviews the available hydrogeologic and geotechnical data reported in past investigations and compares it with the elements of DEQ's site characterization guidance to identify data gaps as the basis for the proposed scope of work and approach. We intend to mine the trove of available documents to meet these data needs where possible. In addition, this section discusses goals of the proposed characterization, the types of information to be gathered, and the rationale for the proposed work scope. The intent is to define general tasks that will be described in more detail in Section 5.

4.1 Phase I Data Elements Evaluation

4.1.1 Existing Conditions

Information from earlier documents, Benton County assessors office, and mapping done for previous studies will be consolidated for the development area. Tasks will include:

- Prepare the report sections on the site location, legal description, and the vicinity, including area and site maps, from earlier documents, as available. If information is out of date, then provide current data.

- Aerial photographs of the site are typically taken annually to evaluate amount of fill at the active landfill area. Depending on the year, these images also include areas outside the landfill area. For this task we will find recent aerial views of the site and vicinity, using either custom images or those from readily available sources such as from the University of Oregon or from Google.

4.1.2 Climate and Meteorology

This information has been included in both the Cell 3 report (EMCON, 1999) and West Leachate Pond report (Thiel, 1998). Tasks will include summarizing this earlier information and, if available from the Oregon Climate Service at Oregon State University's webpage, updating it to include data through the year 2020.

4.1.3 Hydrology

Information on surface water drainages at the site and of the surrounding area was included in the Cell 3 report and can be found as Figure 1 in Appendix A. Tasks for this element will be to include a figure similar to Figure 1, and in addition, include larger scale maps (1:24,000) from the U.S. Geological Survey. These topographic quadrangle maps (Airlie South and Lewisburg 7.5 minute quadrangles) show the drainages and topography of the surrounding area. The landfill development area will be indicated on the maps.

4.1.4 Water Balance

Analysis of the site area's water balance presented in the Cell 3 site characterization report (EMCON, 1999). The purpose of the water balance calculated in the report was to evaluate the landfill's predevelopment environment (i.e., if no landfill was present at the site), and to predict the relative amount of recharge to groundwater expected in the area. The Thornwaite and Mather (1957) method was used to estimate the average annual balance between precipitation, evapotranspiration, runoff, and percolation (groundwater recharge). This analysis is still valid for the area and will be used for the development area site characterization report. The task for this element will be to include the water balance as an appendix to the development area report.

4.1.5 Water Use Inventory

As part of the Cell 3 characterization, a door-to-door survey of water wells was performed for residences within a one-mile radius of the Coffin Butte Landfill in May and June 1999. That survey was an update of water well surveys previously submitted, which included the original survey conducted in 1986 by Sweet, Edwards & Associates (SEA, 1986), the Cell 2 site characterization report (EMCON, 1992) the response to review of Cell 2 site characterization report (EMCON, 1993a), and the remedial investigation and additional hydrogeologic report (EMCON, 1994). The 1999 survey consisted of obtaining copies of well logs from the Oregon WRD and interviewing the residences within a one-mile radius of the landfill. Interviews were documented in an appendix to that report.

Given that a door-to-door survey was already completed in 1999, and since then, documentation by drillers for the installation of new water supply wells is required, this new well information is part of the database kept by the WRD. Therefore, no door-to-door survey is proposed for this phase of development. However, the following tasks will be completed to update the older water use inventory:

- Search the WRD website for wells drilled since 1999 within the area of interest, and then download copies of those wells and create a table that lists the wells and information from both the earlier survey and the new well search.

- Develop a drawing that illustrates locations of wells by property within a one-mile radius of the development area. Well identifications will be cross-indexed to the compiled table with the well information.

- Compile an appendix with well logs and survey sheets from the 1999 survey, and well logs from the 2021 WRD database search. Because of its volume, this appendix will be in a portable document format (PDF) only.

4.1.6 Geology, Hydrogeology and Geologic Hazards Summary

Most of the information required for a preliminary geology and hydrogeology investigation is available from past studies at the site. Sections 3.2 and 3.3 briefly summarized some of the available information. Tasks for this part of the development area report will include:

- Describe the regional site setting for the landfill as augmented by available geologic and hydrogeologic maps from technical literature and from site specific studies completed for the site.

- Provide supporting documentation and figures illustrating the relationship between hydrogeologic units at the site and the proposed landfill.

Geologic hazards and earthquake safety have been discussed in site development plans (SDP) and a SDP amendment (Thiel, 2000; Ausenco, 2011; Thiel, 2013) as part of reviewing location criteria for siting municipal solid waste landfills. These reports found that there were no known Holocene faults within 200 feet of the landfill boundary, and that landfill cells have been, and will continue to be, designed for potential seismic events as described in the solid waste rules. In addition, there were no unusual unstable areas or foundation conditions known to exist that would adversely impact landfill development. Moreover, detailed geotechnical evaluations had been routinely conducted as part of each new cell development.

These earlier planning documents will be used to initially support our understanding for the geologic hazards analysis. Tasks for this element as they relate to the development area include:

- Discuss geologic hazards that could potentially be relevant to the site consistent with guidance Section 2.7 and that includes location restrictions under OAR 340-94-030 to address considerations such as Holocene fault zones, seismic impact areas and unstable areas.

- Evaluate the earthquake safety of the site, including relative to its seismotectonic setting and seismic history of the area, the potential for area to be affected by surface rupture, probable response of site to likely earthquakes, including estimated ground motion, maximum ground acceleration, velocity and displacement, the potential for area to be affected by earthquake-induced landslides or soil liquefaction, and the potential for the area to be affected by regional tectonic deformation (subsidence or uplift). This evaluation will be presented as part of the geotechnical investigation for the site.

4.2 Phase II Characterization Goals and Tasks

The Phase II site characterization will combine a compilation of the known data for the development area with a scope of work to acquire and assess new field data. Goals of the field work are to round out our knowledge of the geology and hydrogeology of this area, including stratigraphic units encountered; the depth to the uppermost water-bearing zone, and other potential zones of contaminant transport; and acquiring geotechnical data that will be used to support an engineering analysis for the landfill design. The following sections briefly summarize some the of existing information and then propose tasks to fill data gaps. A detailed scope of work that describes field tasks, including locations and depths of borings and test pits is provided in Section 5.

4.2.1 Distribution of Geologic and Hydrogeologic Units

The surficial soil in the development area is alluvium which is underlain by bedrock that is weathered to varying degrees. The goal of geologic characterization is to supplement existing lithologic information with regard to the horizontal and vertical extent of geologic units in the development area and to characterize their engineering properties. One of the products of this work will be to create an isopach map of the alluvium and identify the horizontal and vertical extent relative to the underlying bedrock. Another goal will be to further characterize the degree of weathering in the basalt bedrock. In areas across the site, the degree of bedrock weathering ranges from clay and silt to sand, gravel, a mix of sand and gravel, or a combination of weathered rock fine-grained rock and unweathered, hard rock.

Office and field tasks will include:

- Review lithologic data from test pits, boreholes, and surface mapping.
- Supplement surface geologic mapping as needed, beginning with existing mapping done for the east leachate pond.
- Log lithology of cores or cuttings from the proposed borings and test pits and test samples as described below.

- Note groundwater and moisture conditions in test pits and borings.

4.2.2 Geotechnical Evaluation

The site is founded on a firm, competent geologic formation comprised of fresh basalt, weathered basalt, and some thin veneers of alluvium in the flatter areas away from Poison Oak Hill. At other areas of landfill development north of Coffin Butte Road, the only geotechnical constraints at the site were global slope stability issues driven by the relative geometries of the bottom liner system, and the height and slope of the final landfill (Ausenco, 2011).

The proposed scope of work was developed to provide design-level data for relevant engineering analyses. The data will be used to assess the suitability of on-site material for facility construction and the integrity of the soil and underlying material for stability in constructing the landfill. Types of data collected during field tasks include mapping the types and distribution of soils at the site, as well as noting the engineering properties of soil structure in test pits and borings. Wallace Group staff will oversee tasks that will include:

- Review and evaluate available geologic, hydrogeologic, and geotechnical data for the Coffin Butte Landfill and surrounding Benton County area.

- Drill borings within the proposed landfill footprint, proposed leachate ponds area, and a new access road. The borings will be drilled to depths of approximately 25 to 150 feet below ground surface (bgs).

- Excavate test pits within the proposed landfill footprint and leachate ponds area. Exploration depth(s) are estimated at 10 to 12 feet bgs.

- Measure and record the depth to groundwater, if encountered, at each exploration location.

- Perform laboratory testing to evaluate and confirm the engineering and index properties of the soil and rock materials encountered. We anticipate laboratory testing will include grain-size analysis, moisture content, Atterberg limits, hydraulic conductivity, consolidation, unconsolidated undrained triaxial testing (TxUU), and consolidated undrained triaxial testing (TxICU).

- Conduct a design-level geotechnical engineering analyses focused on providing site-specific design criteria based on the project design documents.

4.3 Groundwater Characterization Elements

The solid waste guidance provides for characterization of the groundwater aspects of the proposed landfill development. Objectives of tasks typically include determining the direction and rate of groundwater flow beneath the site, as well as testing the water quality. While not included with this workplan, these site characterization elements are planned for future phases as described below.

4.3.1 Monitoring Network Modifications

The scope of work and details for modifying the groundwater monitoring network in the development area are contingent on the design for the landfill and ancillary structures. After these designs are further along and the timing (e.g., for earthwork and construction) has been finalized, we will be able to better determine the phasing and details of the tasks, such as well installation or decommissioning, and water quality sampling.

Having said that, in general we anticipate the following changes to the monitoring network:

- Install upgradient piezometers. Up to four piezometers will be installed along the new access road that is planned south of the landfill footprint. These piezometers will provide piezometric control along the upgradient boundary of the landfill.

- Install one cross/downgradient well along the eastern side of the landfill, approximately 500 feet upslope of existing wells MW-8S/8D.

- Re-designate wells MW-8S/8D, on the northeast perimeter of the development area, as compliance wells.

- Install one downgradient compliance well on the west side of the landfill, at the approximate location of the landfill office.

- Potentially re-designate MW-14S/14D, which are along the northwest edge of the development footprint, as compliance wells.

- Decommission wells along Coffin Butte Road that are within the development area footprint. These include: MW-23 and MW-24, and methane probes GP-5A, and GP-6.

4.3.2 Water Quality Monitoring

As noted earlier, installation of new groundwater monitoring wells is not proposed for this phase of site characterization for several reasons. First, the locations being considered for upgradient wells are along the new access road that will be constructed south of the landfill footprint. The wells can only be installed after the road is constructed because of the amount of excavation (over 100 feet vertical) from the current topography to the proposed road elevation. Second, cross gradient to potentially downgradient locations will be in the way of earthwork activities if they are installed too soon—and could be destroyed. Therefore we advise to install these wells after most of the landfill construction is complete. And last, two wells that we are considering at a downgradient location (MW-8S and MW-8D) will hopefully be preserved during landfill and infrastructure construction. During the interim, we will continue to monitor them consistent with the current monitoring program.

4.3.3 Hydraulic Testing

Hydraulic properties of site hydrogeologic units have been estimated in the past from pumping tests and slug tests. Pumping tests indicate that shallow (weathered) and deeper (unweathered) parts of the bedrock hydrogeologic unit are hydraulically interconnected. During the remedial investigation, slug tests were conducted in seven site wells. Results for horizontal hydraulic conductivity were consistent with those estimated from earlier pumping tests.

The differences in hydraulic properties between units can be accounted for by observing variations in site lithology (EMCON, 1999). In wells completed in alluvial sediments, soils consist of clays and clayey gravels or sands, and the associated hydraulic conductivity is relatively low. The range of values for bedrock can be attributed to the degree of weathering and fracturing in the bedrock. In wells completed in basalt that is intensely fractured with deep to moderate weathering, and where fractures are not filled with clays, the hydraulic conductivity values are higher. In wells completed in rocks that are deeply weathered or decomposed to clay and sand, and that are intensely fractured with clay minerals filling the fractures, the values for hydraulic conductivity are lower.

It is expected that the hydraulic properties from the existing landfill wells will be similar to those proposed for the development area because of the comparable range of rock types. Therefore, on a preliminary basis, values for hydraulic conductivity from the site will be assumed for the development area. However, as part of future scope of work after new upgradient and cross/down gradient wells are installed, we will develop a testing program to verify that this assumption is valid.

5 SCOPE OF WORK

The scope of work outlined in this section describes tasks that will be completed during the 2021 field season in anticipation of site development in subsequent years. Expanding into the area south of Coffin Butte Road is currently planned for summers of 2023 (earthwork) and 2024 (liner construction). The first two sections below provide the rationale and criteria for lateral distribution and depths of geotechnical borings in the investigation areas. Later sections described in more detail the procedures for field activities and laboratory testing. Data collected during field tasks include mapping the types and distribution of soils, as well as noting the presence of soil structure in test pits and borings.

5.1 Distribution of Test Pits and Geotechnical Borings

Objectives of the field work will be to identify thickness of alluvium and soil conditions at depth, provide information on the types of soils in areas of cut or fill, and better understand limits of bedrock weathering and soil stability at depth. Findings will be used to develop geologic cross sections that can then be used to identify what to expect with earthwork excavation, design of the engineered excavation, and road construction phases of development, as well feed into design considerations for the landfill.

The proposed distribution of new borings and test pits balances the need for equally-spaced locations across the development area with existing information from borings, test pits, and mapping. We also considered access and the presence of existing structures or soil stockpile, which occupies an area along Coffin Butte Road in the northeast sector of the landfill footprint. The locations shown in Figure 5 are preliminary, and may be moved depending on access issues such as steepness of existing slopes and forest cover. In addition, the depth of the borings may be adjusted depending on the formation, resistance to drilling, and soil moisture content noted during drilling.

Overall, fourteen geotechnical borings from approximately 20- to 140-feet deep and at least 10 test pits are planned in the following areas:

- **Landfill Footprint Borings.** Seven geotechnical borings are spaced throughout the area consistent with existing information from geotechnical borings and wells previously constructed. Borings are shown for areas with

both saturated and unsaturated alluvium, as well as uphill of the surface contact with alluvium in basalt.

- **Landfill Footprint Test Pits.** Up to seven test pits are planned for this area. The locations focus on defining the thickness of the alluvium and competence of soils below alluvial clay, as well as thickness of colluvium or weathered soil above competent bedrock.

- **Leachate Pond Borings.** Three geotechnical borings are spaced throughout the area, with one of the borings (BH-12) also serving to inform the conditions below the new access road.

- **Leachate Pond Test Pits.** Three test pits are planned for this area, one of which also will be placed along the new access road.

- **Access Road Boring.** Along the new access road located on the south side of the development area, cuts are planned for over 100 feet. To better understand the rock quality at these depths, in addition to other locations along the road, four geotechnical borings are planned.

5.2 Proposed Boring Depths

The anticipated depths are based on existing borehole information that indicates depth to basalt bedrock (i.e., to competent soils or rock) below alluvium within the footprint could be up to 23 feet deep. As needed, the borings will be extended deeper until competent soils, or refusal, are encountered, or to more fully characterize rock conditions potentially associated with cut slopes associated with the new access road.

The borings will be drilled to the approximate depths shown on Table 3, which lists the existing ground elevation and the design elevation, the expected boring depth, as well as coordinates. The table is meant to provide borehole details relative to the landfill liner, but also to assist the field geologist with regard to the depth at which to expect lithologic units. Several criteria were considered in estimating borehole depth. These include:

- For boreholes within areas of cut/excavation, based on our current understanding of site geology, it is likely that the cut will be in bedrock, which could be hard basalt or weathered to varying degrees. The target depth is to drill at least 20 feet below the estimated liner base and penetrate deep enough to encounter competent soil or rock.

- For boreholes in areas of fill, drill through the thickness of alluvium into underlying bedrock until competent soils are encountered or refusal at bedrock, this is estimated at approximately 25 feet. This will allow estimating the

thickness of the underlying hydrogeologic unit (alluvium) below the fill and liner, as well as note groundwater conditions within the underlying unit.

- For the borings along the access road or deepest cut, drill to the elevation of the proposed road or cut, which is estimated at a depth of 140 feet (e.g., BH-5).

5.3 Field Activities

Preliminary locations for test pits and borings may be moved as field conditions dictate on the basis of access or the presence of overhead obstructions. In addition, the depth of the borings may be adjusted depending on the formation and soil moisture content noted during drilling.

5.3.1 Geologic Mapping

The purpose of geologic mapping will be to better understand the lateral continuity of lithologic units, the transition laterally between units, and how geologic material and structural fabric could affect the flow of groundwater in the subsurface. In the development area, exposures of weathered basalt pillow structures are present along southwest embankment of the West Leachate Pond. Mapping of the East Leachate Pond subgrade in 2004 found basalt weathered to varying degrees: from extremely weathered zones consisting of plastic clay with abundant secondary minerals, to less weathered zones that contained fine- to coarse-grained sand with cobbles. The weathered zones transition from clay above sandy and friable soil, which is underlain by fresh basalt that is hard.

A geologist will map the surface geology of the northern side of Poison Oak Hill to identify any features of geologic interest and to help optimize placement of geotechnical borings or test pits. The mapping will extend from existing surface mapping that was completed in 2004. Ultimately, the goal of surface mapping will be integrate this information with subsurface exploration that includes the test pits and borings.

5.3.2 Test Pits

The primary purpose of test pits is to acquire information on the engineering properties of shallow soils in a rapid fashion to assess the distribution, character, and geotechnical properties of shallow soil. For the development project, the test pits will be excavated with three goals: (1) define the upper limit of alluvium against Poison Oak Hill, (2) explore the geotechnical properties of the alluvium in landfill areas that will be founded on alluvium, and (3) explore the area where the new leachate ponds will be constructed.

Up to ten test pits will be excavated with a backhoe within the proposed landfill and leachate pond areas. Total exploration depth(s) are estimated at 10 to 12 feet bgs. The geologist will log the soil and collect bulk samples for geotechnical evaluation and lab testing. Soil and rock conditions logged during excavation will be recorded in the field on test pit logs. If groundwater is encountered during excavation, the level at which the water was first encountered and the water level at the end of excavation activities will be recorded. We will also perform Dynamic Cone Penetrometer (DCP) tests to evaluate relative density or strength of near-surface alluvial soils. An example of a test pit log can be found in Appendix C.

5.3.3 Borehole Drilling and Soil Sampling

Borings will be drilled within the proposed landfill development and proposed leachate pond areas using a track-mounted drilling rig equipped with mud-rotary drilling/rock coring equipment. The field geologist will collect soil samples during drilling using Shelby tube, modified California, and standard penetration testing (SPT). Sampling and SPT testing will be performed at approximate 2.0-foot intervals until auger refusal is encountered.

Boreholes will be abandoned consistent with applicable rules and guidelines described in "Construction, Maintenance and Abandonment of Monitoring Wells and Other Holes in Oregon" (OAR 690-240; 1995) and the DEQ guidelines for Groundwater monitoring well drilling, construction, and decommissioning (DEQ, 1992).

The borings will be drilled with 6-inch-outside diameter solid-flight auger or using rotary wash methods to a minimum depth of 25 feet. This depth should adequately penetrate the alluvium in all areas of proposed exploration. The borings will be sampled at an approximately 2.0-foot interval using one of four sampling techniques, depending on the depth interval, soil type, and requirements of the geotechnical testing program. These include:

- Standard penetration test (SPT) split spoon samples with autohammer: test every 2 feet as conditions allow or until refusal.
- 2.5-inch-diameter modified California sampler: test every 2 feet as conditions allow or until refusal.
- Undisturbed 3-inch-diameter Shelby Tube samples: test as needed where soft to medium stiff silt and clay are encountered.
- HQ-wireline rock coring: advance after auger refusal is encountered to the proposed boring refusal depth.

A geologist or professional engineer, registered in Oregon, will log the soil samples or cores consistent with the procedures of the American Society for Testing and Materials. The logging will describe texture, color, mineralogy, moisture content, degree of weathering, or other relevant characteristics of the sampled material. Field procedures will follow Wallace quality assurance and quality control standards. Drilling and soils information will be recorded in the field on boring-log forms (example of the form can be found in Appendix C). The borehole will be backfilled with bentonite chips and hydrated with clean water.

5.3.4 Laboratory Testing

Table 4 outlines the proposed geotechnical laboratory testing program for test pit soil and borehole core samples. The testing will used to evaluate and confirm the engineering and index properties of the soil and rock materials encountered. We anticipate laboratory testing will include grain-size analysis, moisture content, Atterberg limits, hydraulic conductivity, consolidation, unconsolidated undrained triaxial testing (TxUU), and consolidated undrained triaxial testing (TxICU).

Test Pits. Tests will be assigned by the engineer based on a review of the test pit logs. A typical suite of tests could include grain size (ASTM D422), Atterberg limits (ASTM D4318), and moisture content (ASTM D2216). If the material will be used for fills, then it is possible that moisture-density relations testing will be performed ("proctor" curve, ASTM D1557). If a local deposit of soft soil is encountered, it is possible that the engineer may assign additional testing from test pit samples.

Soil Borings. At a minimum, samples from each lithologic unit from each boring will be tested for the following:

- Particle size distribution by both sieve and hydrometer following ASTM methods D422 and D1140
- Atterberg limits following ASTM method D4318
- Classification by unified soil classification system following ASTM standard D2487.

In the event that soft soils are encountered that may affect foundation settlement and strength, additional sampling may be performed so that samples can be tested for consolidation and shear strength, as deemed appropriate by the geotechnical engineer. This may require deepening borings beyond the prescribed depths.

5.3.5 Surveying

Locations for borings and test pits will initially be laid out as described above on Figure 5. The northing and easting coordinates referenced to the Oregon State Plane Coordinate System will be estimated from the base map and then the locations surveyed and staked in the field for the drilling and test pit exploration. These locations can then be used to create site-specific cross sections that depict the geology of the development area.

6 REPORTING

A report documenting the investigation's findings will be submitted after completing site characterization activities and data interpretation. Hydrogeologic aspects, geotechnical findings, and laboratory testing results of the study will be reported in the following general format:

- Introduction
- Site background
- Investigation methods and procedures
- Discussion of findings
- Summary and conclusion

The report will be supported by necessary tables, figures, and appendices to provide detailed information. This will include boring logs and test pit logs, a geologic map and cross sections, piezometric map of the site as estimated from existing wells, hydrographs for site wells in the area of interest. The Wallace Group will prepare a separate report documenting the field and laboratory testing and providing geotechnical analyses or conclusions. The Wallace report will be an appendix to the site characterization report.

The geotechnical exploration report will include the following elements:

- Report text that characterizes and describes subsurface conditions and engineering properties of overburden deposits and on-site soils.
- Discussion of regional geology and seismicity.
- Vicinity and site maps illustrating development plans and exploration locations.
- Test pit and boring logs.
- Results of the laboratory testing program.
- Seismic site class, and discussion of seismic-induced hazards per 2019 OSSC Section 1803.7.

- Slope stability and settlement analysis.
- Retaining wall and lateral load design criteria.
- Guidelines for earthwork construction including recommendations for engineered excavations, site preparation, fill placement, and compaction.
- Site drainage recommendations.
- Supplemental Phase II Geotechnical Investigation scope recommendations, if warranted.

One bound copy of the report and a PDF version will be submitted to the DEQ.

7 SCHEDULE

The field activities are staged depending on the type of activity. In general, drilling activities are scheduled for drier summer months to avoid saturated surface soil. Tentative schedule is as follows, but will depend on the availability of the driller and constructing road access to the locations on the northern slope of Poison Oak Hill.

- Excavate test pits: mid August 2021
- Drill geotechnical borings: late August – early September 2021
- Laboratory testing: fall and winter of 2021

A report will be submitted to the DEQ within 180 days of completing the 2021 field activities.

REFERENCES

Ausenco Vector. 2011. Valley Landfills, Inc., Year 2011 Site Development Plan. Prepared for Valley Landfills, Inc., by Ausenco Vector, Grass Valley, California. Draft, November.

DEQ. 1992. Groundwater Monitoring Well Drilling, Construction, and Decommissioning. State of Oregon, Department of Environmental Quality. August 24.

DEQ. 1996. Solid Waste Guidance, Municipal Solid Waste Landfills. State of Oregon, Department of Environmental Quality. September 1.

DEQ. 2020. Solid Waste Disposal Site Permit No. 306. Issued by the Oregon Department of Environmental Quality, Western Region. Signed by Brian Fuller, July 28.

EMCON. 1992. Cell 2 Site Characterization Report. Prepared for Valley Landfills, Inc., by EMCON Northwest, Inc., Portland, Oregon. August.

EMCON. 1993. Letter (re: Response to Review of Cell 2 Site Characterization Report for the Coffin Butte Landfill) to A. Eldridge, Oregon Department of Environmental Quality, Portland, from E. Tuppan and D. Atwood, EMCON Northwest, Inc., Portland, Oregon. May 21.

EMCON. 1994. Remedial Investigation and Additional Hydrogeologic Investigation Report, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by EMCON Northwest, Inc., Portland, Oregon. February 4.

EMCON. 1996a. Preliminary Assessment, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by EMCON, Portland, Oregon. February 28.

EMCON. 1996b. Remedial Investigation Addendum, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by EMCON, Portland, Oregon. February 28.

EMCON. 1997. Environmental Monitoring Plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by EMCON, Portland, Oregon. February 25.

EMCON. 1999. Site Characterization – Cell 3, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by EMCON, Portland, Oregon. June 11.

EPA. 1975. Use of the Water Balance Method for Predicting Leachate Generation from Solid Waste Disposal Sites. U.S. Environmental Protection Agency, Office of Solid Waste Management Programs. Report SW-168.

EPA. 1984. The Hydrologic Evaluation of Landfill Performance (HELP) Model. U.S. Environmental Protection Agency, Office of Solid Waste & Emergency Response. EPA/530-SW-84-009. June.

OWRD. 1995. Administrative Rules for Construction, Maintenance and Abandonment of Monitoring Wells and Other Holes in Oregon, Chapter 690, Division 240. July.

SEA. 1986. Coffin Butte Landfill, Geotechnical Investigation. Prepared for Valley Landfills, Inc., by Sweet, Edwards & Associates, Inc., Kelso, Washington. May 19.

Thiel. 1998. Design Report, Leachate Surge Pond, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Thiel Engineering, Oregon House, California. March 16.

Thiel. 1999. Design Report, Cell 3A, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Thiel Engineering, Oregon House, California. March 25.

Thiel. 2000. Year 2000 Site Development Plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Thiel Engineering, Oregon House, California. February 29.

Thiel. 2012. Coffin Butte Landfill Cell 5A Expansion Construction Drawings (Earthworks Only). Prepared for Valley Landfills, Inc., by Thiel Engineering, Oregon House, California. May 10.

Thiel. 2013. Year 2011 Site Development Plan Amendment 1, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Thiel Engineering, Oregon House, California. November.

Tuppan. 2003. Focused risk assessment and feasibility study, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc. Corvallis, by Tuppan Consultants LLC, Lake Oswego, Oregon. September 23.

Tuppan. 2005. Environmental Monitoring Plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. December 16.

Tuppan. 2011a. Letter (re: Site Characterization, Cell 4, Coffin Butte Landfill) to H. Gao, Oregon Department of Environmental Quality, Salem, from E. Tuppan, Tuppan Consultants LLC, Lake Oswego, Oregon. March 22.

Tuppan. 2011b. Environmental Monitoring Plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. March 23.

Tuppan. 2012. Environmental Monitoring Plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. October 26 (Rev. 2).

Tuppan. 2014. Environmental Monitoring Plan, Coffin Butte Landfill, Benton County, Oregon, Revision 3. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. June 27.

Tuppan. 2021. 2020 Annual Environmental Monitoring Report, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Tuppan Consultants LLC, Lake Oswego, Oregon. March 4.

Thornwaite, C. W., and J. R. Mather. 1957. The Water Balance. Centerton, N.J.: Laboratory of Climatology Publication 8.

Vector. 2010. Year 2010 site development plan, Coffin Butte Landfill, Benton County, Oregon. Prepared for Valley Landfills, Inc., by Vector Engineering, Inc., Grass Valley, California. Draft, January.

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

The purpose of a geologic/hydrogeologic study is to reasonably characterize existing site conditions based on the geology/hydrogeology of the area. In performing such a study, it is understood that a balance must be struck between a reasonable inquiry into the site conditions and an exhaustive analysis of each conceivable environmental characteristic. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation is thorough enough to describe all geologic/ hydrogeologic conditions of interest at a given site. If conditions have not been identified during the study, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

We are unable to report on or accurately predict events that may change the site conditions after the described services are performed, whether occurring naturally or caused by external forces. We assume no responsibility for conditions we were not authorized to evaluate, or conditions not generally recognized as predictable when services were performed.

Geologic/hydrogeologic conditions may exist at the site that cannot be identified solely by visual observation. Where subsurface exploratory work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

TABLES

Table 1
Description of Monitoring Network
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill

Monitoring Program	Monitored Area	Position
Landfill Water Quality Monitoring Program		
Compliance Wells		
MW-1D, MW-3D, MW-12S, MW-12D	Cell 1	Downgradient
MW-10S, MW-10D, MW-11S, MW-11D	Cell 1A	Downgradient
MW-20, MW-21	Closed Landfill	Downgradient
MW-26, MW-27	Cells 2/3/4/5	Downgradient
Detection Wells		
MW-8S, MW-15	Former Leachate Irrigation Fields A/B	Downgradient
MW-17, MW-18, MW-19	Cells 1/1A	Downgradient
MW-23	Cell 2	Crossgradient
MW-24	Cells 2/3	Crossgradient
P-8	Cell 1	
Phillips	Domestic Water Quality	—
Other Monitoring Well Sites		
MW-9S	East boundary of property	—
Observation Wells/Piezometers		
MW-1S, MW-3S, MW-8D, MW-14S, MW-14D, PW-2, P-8, P-9, P-10, P-19, P-22, P-23 Duplex, Merril, Berkland	Various	—
Wetland Piezometers		
WP-1, WP-3, WP-5, WP-6, WP-8, WP-9	Fields South of Coffin Butte Road	Various
Quarry Piezometers		
QP-3S, QP-4S, QP-5N, QP-6N, QP-7N	Knife River Quarry and Coffin Butte	Various
Secondary Leachate Collection System		
LDS-2B	Cells 2B, 2C	Underneath
LDS-3	Cell 3	Underneath
LDS-4	Cell 4	Underneath
LDS-5	Cell 5	Underneath
LDS-WLP (formerly LDS-SP)	West Leachate Pond	Underneath
LDS-ELP	East Leachate Pond	Underneath
Leachate		
L-1	Cell 1	—
L-2B	Cells 2A, 2B, 2C, 2D	—
L-3	Cell 3	—
L-4	Cell 4	—
L-5	Cell 5	—
L-Pond	Active Leachate Pond (composite of cells)	
Surface Water		
S-1	Background (Soap Creek)	Upstream
S-2, S-4	Cell 1, 1A, Closed Landfill	Downstream
Underdrains		
S-U2 (end of pipe not accessible for sampling)	Cell 2C/D & Cell 4 (north half)	Underneath
S-U3	Cell 3	Underneath
S-U4	East Leachate Pond	Underneath
S-U5	West Leachate Pond	Underneath
S-U6 (typically dry-disharges to ditch)	Cell 4 (south half)	Underneath
S-U7 (Manhole east of cell-not accessible)	Cell 5A	Underneath
Stormwater Monitoring Program (1200Z Permit)		
Outfall (monitored by rock quarry operator)	Quarry/part of Cell 1A & Closed Landfill	Downstream
Outfall 001 (west end of western bioswale)	Cell 1	Downstream
Outfall 002 (northeast end of eastern bioswale)	Cells 2/3/4/5	Downstream

Table 2
Well Construction Summary
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill

Location	Status	Northing	Easting	Ground Surface Elevation (ft msl)	Surveyed Reference Elevation (ft msl)	Casing Total Depth (ft bgs)	Screened Interval (ft bgs)	Filter Pack Interval (ft bgs)	Seal (ft bgs)	Well Casing Diameter (Inches)	Drilling Method	Date Well Installed	Lithology Screened
MONITORING/OBSERVATION WELLS													
MW-1S[a]		387,416.66	7,491,201.90	288.50	289.87	23.0	18-23	16-23	0-16	2	Air Rotary	1977	Weathered basalt
MW-1D[a]		387,416.66	7,491,201.90	288.50	289.89[b]	40.0	35-40	34-40	23-34	2	Air Rotary	1977	Weathered/fresh basalt
MW-3S[a]		387,396.95	7,490,459.59	284.70	285.86	26.0	21-26	20-26	0-20	2	Air Rotary	1977	Weathered basalt
MW-3D[a]		387,396.95	7,490,459.59	284.70	285.94[b]	54.3	49-54	47-54	26-47	2	Air Rotary	1977	Weathered/fresh basalt
MW-8S		388,038.13	7,493,295.09	240.63	244.01[b]	30.8	21-31	16-31	0-16	2	Air Rotary	07/30/85	Weathered basalt
MW-8D		388,052.73	7,493,306.08	240.50	244.04	75.0	65-75	60-75	0-60	2	Air Rotary	07/30/85	Fresh basalt
MW-9S		388,845.65	7,494,648.37	221.50	223.27	35.0	25-35	20-35	0-20	2	Air Rotary	08/02/85	Clay
MW-10S[c]		387,660.77	7,489,746.08	289.03	291.42[b]	41.1	30.1-40.1	25.8-41.1	0-25.8	2	Air Rotary	08/02/85	Weathered basalt
MW-10D[c]		387,643.53	7,489,746.11	289.02	291.38[b]	82.2	73.0-82.2	60.1-82.2	0-60.1	2	Air Rotary	08/02/85	Fresh basalt
MW-11S		387,680.08	7,489,428.44	274.80	274.71[b]	31.8	22-32	20-32	0-20	2	Air Rotary	08/05/85	Weathered basalt
MW-11D		387,686.42	7,489,409.28	274.80	274.96[b]	75.0	65-75	55-75	0-55	2	Air Rotary	08/05/85	Fresh basalt
MW-12S		387,336.24	7,490,830.96	283.80	285.59[b]	26.1	21-26	18.9-26.2	2-18.9	2	Air Rotary	09/19/91	Weathered/fresh basalt
MW-12D		387,334.96	7,490,848.71	283.80	285.43[b]	60.3	55-60	52.6-61.3	1.5-52.6	2	Air Rotary	09/19/91	Fresh basalt
MW-14S		387,482.52	7,491,484.81	287.50	289.58	30.1	19.5-29.5	16.5-30	1.5-16.5	4	Air Rotary	07/27/92	Weathered basalt
MW-14D		387,479.36	7,491,474.42	287.80	290.27	70.6	60-70	57.5-71	1-57.5	2	Air Rotary	07/24/92	Fresh basalt
MW-15		387,833.16	7,493,923.82	233.45	235.66[b]	28.9	19.0-28.0	16.5-29.0	0-16.5	2	HSA	07/14/93	Silt and gravel
MW-16	Decom. 5/24/04	113.19	2,052.21	281.70	284.03[b]	27.3	17.2-26.6	15.6-27.3	0-15.6	2	HSA	07/19/93	Fresh basalt
MW-17		387,070.74	7,490,136.83	277.45	279.67[b]	26.9	16.7-26.2	15.0-27.0	0-15.0	2	HSA	07/15/93	Weathered basalt and silt
MW-18		387,375.30	7,489,529.13	267.70	269.90[b]	20.9	11.2-20.8	9.0-21.4	0-9.0	2	HSA	07/15/93	Weathered basalt
MW-19		387,488.50	7,489,035.48	261.00	263.29[b]	23.0	13.5-23.0	11.7-24.1	0-11.7	2	HSA	07/16/93	Weathered basalt
MW-20		388,119.00	7,488,673.03	256.81	259.22[b]	21.4	11.3-20.7	9.5-22.5	0-9.5	2	HSA	07/15/93	Clay and gravel
MW-21		388,628.80	7,488,408.71	254.25	256.67[b]	16.9	11.0-16.7	9.0-17.0	0-9.0	2	HSA	07/15/93	Fresh basalt
MW-22	Decom. 5/24/11	1,275.42	2,857.32	232.73	235.30[b]	24.2	14.0-23.6	11.0-24.2	0-11.0	2	HSA	07/22/94	Silt
MW-23		388,063.30	7,493,044.16	242.81	244.76[b]	22.7	12.4-22.1	9.6-22.7	0-9.6	2	HSA	08/02/94	Silt, clay, and gravel
MW-24		387,649.83	7,492,104.33	273.94	276.76[b]	34.9	19.5-34.5	18.0-35.0	0-18.0	2	HSA	08/31/98	Weathered basalt
MW-25	Decom. 5/24/11	1,181.50	2,626.80	240.39	242.79[b]	32.5	13.5-23.5	11.0-24.0	0-11.0	2	HSA	06/04/99	Silt and clayey silt
MW-26		388,531.15	7,493,967.51	235.18	237.91	27.2	17.1-26.9	15.5-28.0	0-15.5	2	Sonic	10/17/11	Silt
MW-27		388,887.59	7,493,881.47	252.12	254.76	35.1	25.0-34.8	23.5-35.5	0-23.5	2	Sonic	10/17/11	Clay with organics
LANDFILL WATER SUPPLY													
PW-2		390,336.45	7,494,030.76	248.90	250.27	199.0	95-199 OH	none	0-95	8	Air Rotary	07/30/92	Fresh basalt
PRIVATE WATER SUPPLY													
Duplex		387,387.70	7,491,474.23	289.01	289.01	74.0	26-74 OH	none	0-20	6	Rotary	07/17/72	Basalt (?)
Berkland		386,460.23	7,491,290.65	327.63	327.63	220.0	20-220 OH	none	0-20	6	Rotary	05/01/78	Basalt and sandstone
Phillips		386,788.95	7,490,951.64	291.00	291.00	—	—	—	—	—	—	—	(?)
PIEZOMETERS													
P-8		387,080.97	7,490,932.94	282.40	284.02	28.4	18.7-27.6	16.4-29.0	0-16.4	2	HSA	07/13/93	Weathered basalt
P-9		388,471.86	7,488,728.28	273.66	276.01	23.3	17.2-23.0	15.0-23.3	0-15.0	2	HSA	07/15/93	Fresh basalt

Table 2
Well Construction Summary
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill

Location	Status	Northing	Easting	Ground Surface Elevation (ft msl)	Surveyed Reference Elevation (ft msl)	Casing Total Depth (ft bgs)	Screened Interval (ft bgs)	Filter Pack Interval (ft bgs)	Seal (ft bgs)	Well Casing Diameter (Inches)	Drilling Method	Date Well Installed	Lithology Screened
P-10		388,460.45	7,488,223.46	243.00	245.12	18.0	7.7-17.2	5.7-18.5	0-5.7	2	HSA	07/20/93	Weath. basalt, gravel, silt
P-19		389,840.33	7,492,921.45	383.15	385.65	106.5	96.3-106.1	94.2-106.5	0-94.2	2	Air Rotary	08/17/12	Fresh basalt
P-22		389,903.79	7,492,050.39	636.87	638.60	77.5	57.5-77.1	53.9-77.5	0-53.9	2	Air Rotary	09/10/15	Fresh basalt
P-23		389,618.74	7,491,365.81	690.96	693.11	183.5	163.5-183.2	160.0-183.5	0-160.0	2	Air Rotary	09/10/15	Fresh basalt
QP-3S		389,271.51	7,489,751.98	601.70	502.02	354.4	333.4-353.8	330.5-354.4	0-330.5	2	Air Rotary	09/09/98	Fresh basalt
QP-4S	Domestic supply	389,331.43	7,490,639.37	717.15	718.95	403.1	363.1-403.1	NA	0-28.4	5	Air Rotary	09/15/98	Fresh basalt
QP-5N		389,743.36	7,490,857.39	601.48	601.53	230.9	200.3-230.3	197.7-230.9	0-197.7	2	Air Rotary	09/16/98	Fresh basalt
QP-6N		390,259.59	7,490,886.35	445.39	445.82	150.0	119.4-149.4	117.3-150.0	0-117.3	2	Air Rotary	09/18/98	Fresh basalt
QP-7N		390,199.84	7,490,195.48	374.43	374.80	119.6	89.0-119.0	85.2-119.6	0-85.2	2	Air Rotary	09/09/98	Fresh basalt
WP-1		387,199.43	7,488,891.35	257.33	259.83	13.8	8.6-13.1	Prepack	0-1	2	Push probe	01/18/08	Clay
WP-3		386,661.80	7,489,643.80	271.01	273.39	9.8	4.6-9.2	Prepack	0-1	2	Push probe	01/18/08	Clay-sandy silt
WP-5		386,542.49	7,488,194.58	258.94	261.55	12.0	6.8-11.3	Prepack	0-2	2	Push probe	01/18/08	Sandy clay - clay
WP-6		385,925.20	7,487,996.18	262.17	264.85	13.0	7.8-12.3	Prepack	0-1	2	Push probe	01/19/08	Silty clay - clay
WP-8		387,861.89	7,487,856.57	253.15	255.80	10.3	5.1-9.7	Prepack	0-1	2	Push probe	01/19/08	Silty clay
WP-9		387,470.03	7,486,845.01	255.21	257.90	10.1	4.9-9.4	Prepack	0-1	2	Push probe	01/19/08	Clay

Notes: msl = mean sea level; bgs = below ground surface; OH= open hole; na = not available.
Drilling methods: HSA = hollow stem auger; SSA = solid stem auger

[a] Multiple well completion in single borehole.

[b] Measuring point is 0.02' higher than surveyed reference elevation shown due to installation of bladder pump enclosure. Groundwater elevations calculated from corrected elevation.

[c] Ground level and casing elevation were raised in June 1996 as part of regrading for truck scale. Wells and ground level elevation were resurveyed by Darryl Harms of Corvallis, OR.

[d] Estimated 20 feet higher than original elevation (added two 10-foot long pieces of 2-inch PVC pipe in 8/12/99 and 10/12/99). Well completion depths relative to original ground surface.

Table 3
Proposed Soil Boring and Test Pit Program
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill

	Current Ground Level Elevation	Design Elevation	Below/ Above GL to Design Ele.[a]	Boring in Cut or Fill	Depth to Bottom of Boring (BGL)	Boring Bottom Depth-Elevation	Northing	Easting
Boring ID								
BH-1	291.7	314.3	-22.6	Fill	50.0	241.7	386,993.30	7,491,228.00
BH-2	244.0	244.6	-0.6	Fill	50.0	194.0	387,994.86	7,493,125.12
BH-3	510.0	502.3	7.7	Cut	110.0	400.0	386,177.39	7,491,884.63
BH-4	343.9	362.5	-18.6	Fill	50.0	293.9	386,458.65	7,492,451.61
BH-5	443.4	324.0	119.4	Cut	140.0	303.4	386,726.13	7,491,792.60
BH-6	291.2	307.4	-16.2	Fill	25.0	266.2	386,966.17	7,492,565.95
BH-7	338.9	321.6	17.3	Cut	25.0	313.9	367,015.13	7,493,175.46
BH-8	309.3	292.6	16.7	Cut	25.0	284.3	387,329.59	7,491,740.75
BH-9	359.1	301.9	57.1	Cut	100.0	259.1	387,151.79	7,491,742.28
BH-10	263.1	279.9	-16.8	Fill	25.0	238.1	387,441.49	7,492,703.58
BH-11	274.8	265.0	9.8	Cut	50.0	224.8	387,429.86	7,493,839.53
BH-12	270.7	278.5	-7.8	Fill	25.0	245.7	387,429.88	7,493,839.53
BH-13	390.2	376.9	13.2	Cut	50.0	340.2	388,760.08	7,493,861.25
BH-14	239.0	253.0	-14.0	Fill	25.0	214.0	387,972.34	7,493,517.97
Total Footage					**750.0**			
Test Pit ID								
TP-1	323.7	331.6	-7.9	Fill	12.0	311.7	386,961.84	7,491,410.53
TP-2	302.0	297.8	4.1	Cut	12.0	290.0	387,254.49	7,491,572.23
TP-3	306.3	311.0	-4.7	Fill	12.0	294.3	386,912.70	7,492,395.46
TP-4	334.2	345.5	-11.4	Fill	12.0	322.2	386,643.02	7,492,745.75
TP-5	297.8	298.6	-0.8	Fill	12.0	285.8	387,100.73	7,492,831.97
TP-6	274.2	289.5	-15.3	Fill	12.0	262.2	387,296.90	7,492,529.39
TP-7	260.0	266.4	-6.4	Fill	12.0	248.0	387,678.75	7,492,637.64
TP-8	247.7	248.6	-0.9	Fill	12.0	235.7	387,926.99	7,492,978.07
TP-9	253.2	265.4	-12.2	Fill	12.0	241.2	387,697.22	7,493,843.05
TP-10	256.3	265.0	-8.7	Fill	12.0	244.3	387,516.53	7,494,061.62
Total Footage					**120.0**			

Notes:

[a] negative number indicates liner above current ground level, boring in area of fill.

All measurements in feet

BGL: below ground level

GL: current ground level

Borings in fill, assume boring depth of 25 ft.

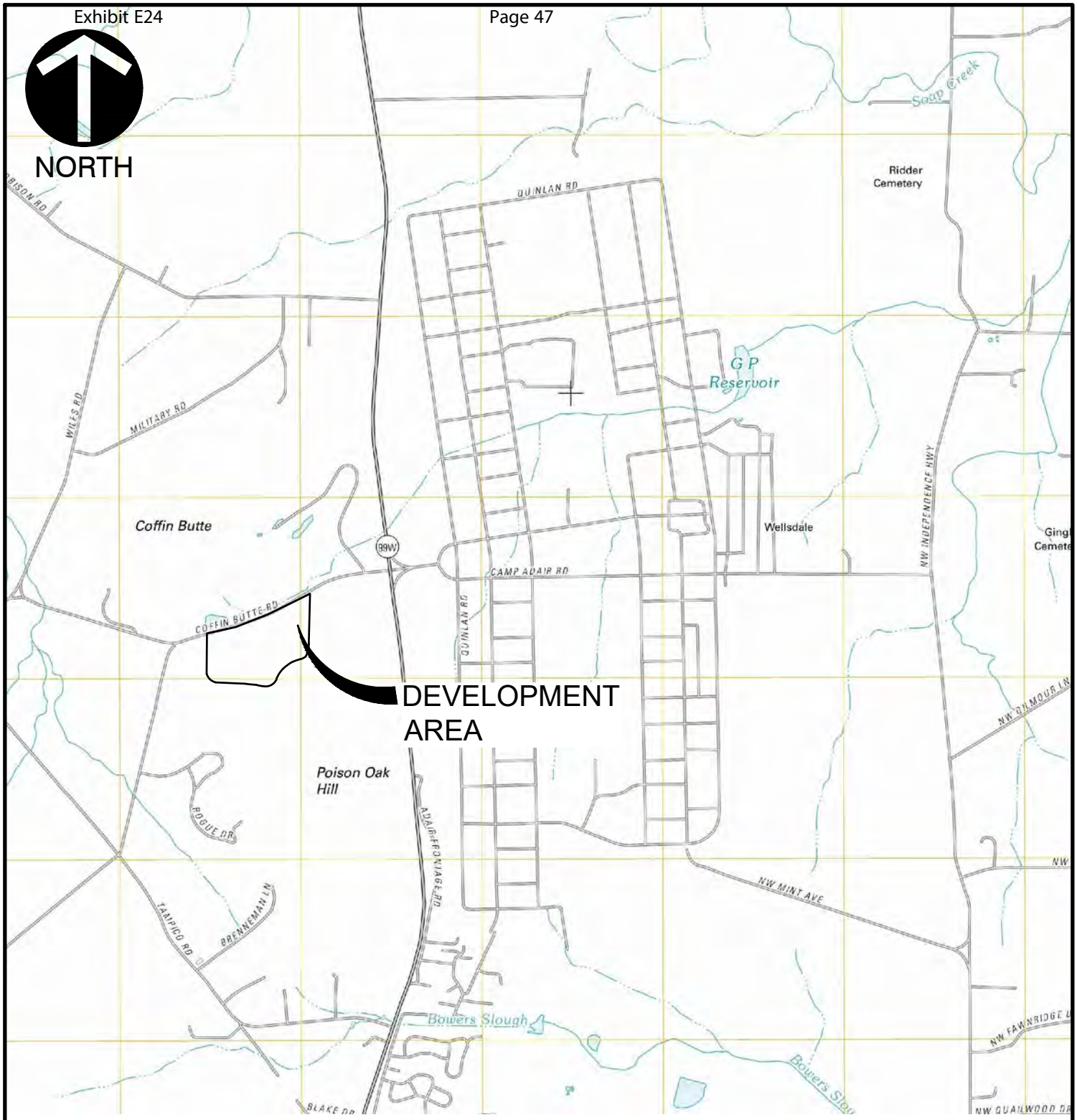
Borings in cut, depth is 20 feet below base of liner

Table 4
Geotechnical Testing Program
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill

ASTM Test Number	Sample Type	Atterburg Limits D4318	Particle Size Distribution D422	Standard Classification D2487	Moisture Content D2216	Ring Shear Testing D6467	Triaxial Shear Testing (CU) D2664	Consolidation Testing D2435	Rock Core Compressive Strength D7012
Geotechnical Boreholes									
Landfill Footprint: BH-4, BH-5, BH-6, BH-7, BH-8, BH-9, BH-10	Core/bulk	X	X	X	X	X	X	X	X
Leachate Ponds: BH-11, BH-12, BH-13		X	X	X	X	X	X	X	X
Access Road: BH-1, BH-2, BH-3, BH-14		X	X	X	X	X	X	X	X
Test Pits									
Landfill Footprint: TP-2 to TP-8	Bulk/ composite	X	X	X	X	—	—	—	—
Leachate Pond: TP-9, TP-10		X	X	X	X	—	—	—	—
Access Road: TP-1, TP-9		X	X	X	X	—	—	—	—

Typical suite of tests; actual testing to be determined by engineer based on review of test pit log.
ED: engineer to determine based on review of log.

FIGURES



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, LEWISBURG QUADRANGLE, OR DATED: 2011.

SCALE IN FEET

0 2500 5000

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

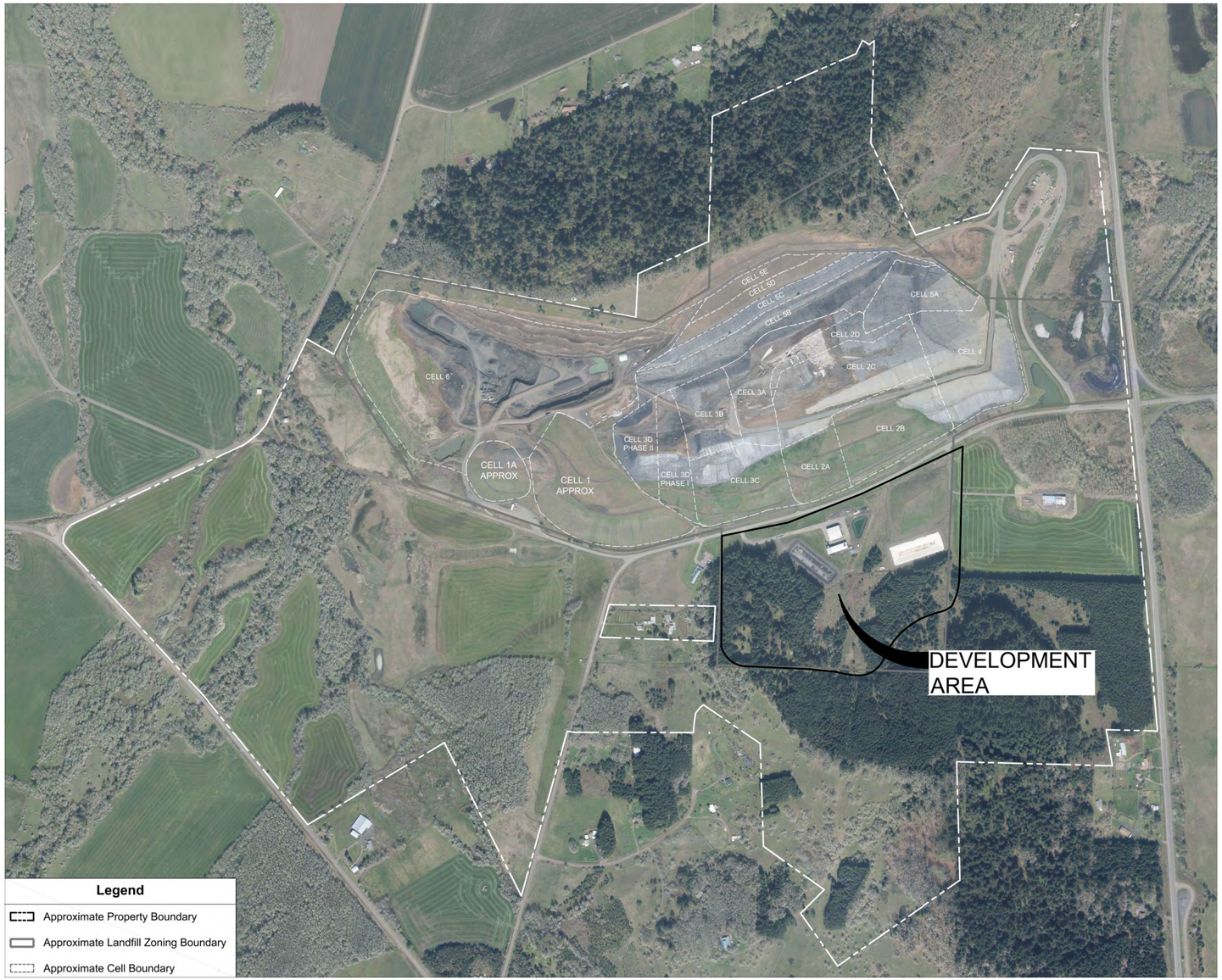
REPUBLIC SERVICES, INC.
COFFIN BUTTE LANDFILL
29175 COFFIN BUTTE ROAD
CORVALIS, OR 97330

SITE LOCATION MAP

DRAWN BY:	LAR	CHECKED BY:	PFB	APPROVED BY:	PFB	FIGURE NO.:	1
DATE:	JUN. 2021	DWG SCALE:	1"=2,500'	PROJECT NO:	310-145		

\\svr-okc\Projects\310-000\310-145\-CADD\Dwg\310145-1-Site Location.dwg LS:(7/1/2021 - Ireforma) - LP: 7/1/2021 8:53 AM

NORTH



SCALE IN FEET
0 1000 2000

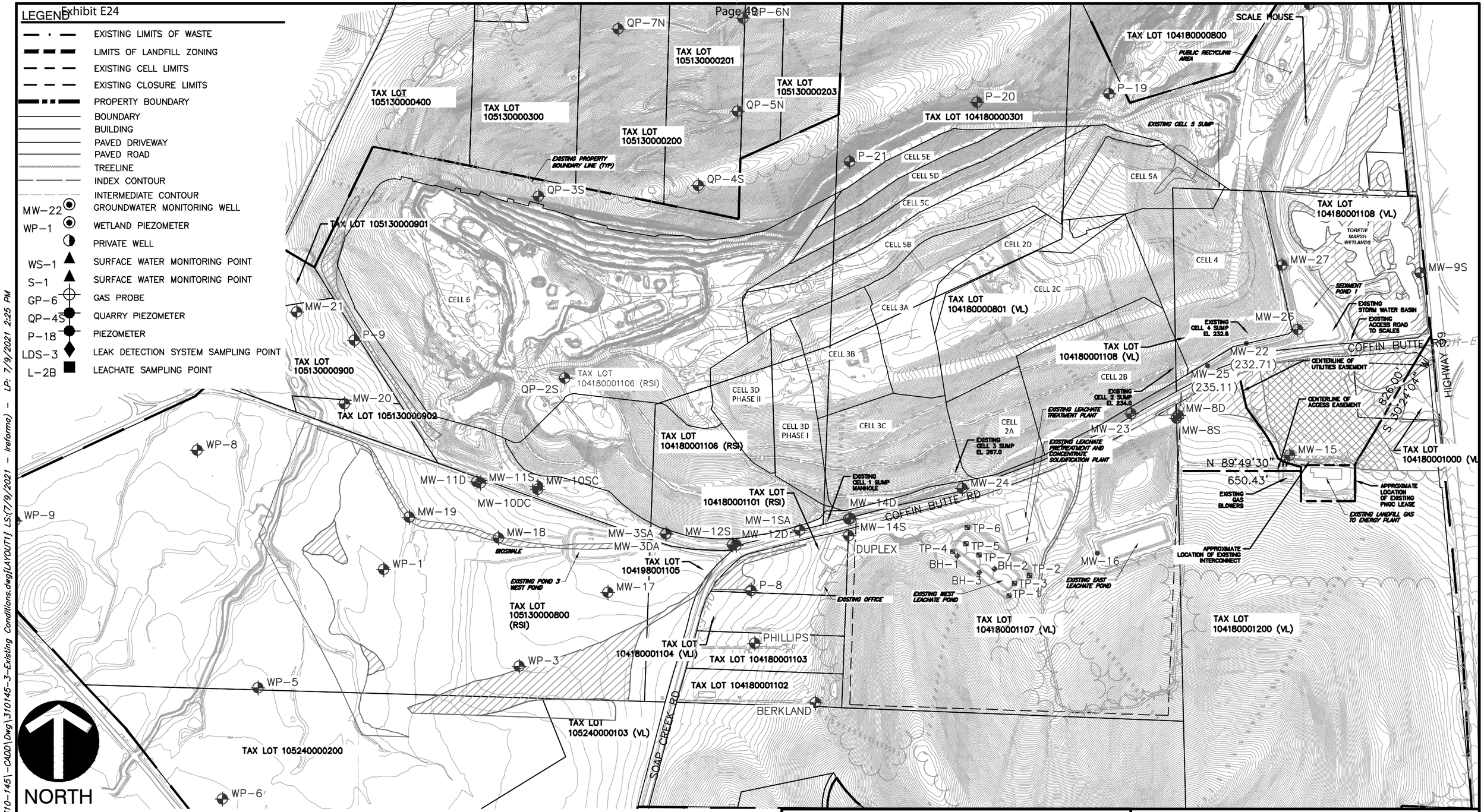
Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

REPUBLIC SERVICES, INC.
COFFIN BUTTE LANDFILL
29175 COFFIN BUTTE ROAD
CORVALIS, OR 97330

LANDFILL CELLS - AERIAL VIEW

DRAWN BY:	LAR	CHECKED BY:	PFB	APPROVED BY:	PFB	FIGURE NO.:	2
DATE:	JUL. 2021	DWG SCALE:	1"=1000'	PROJECT NO:	310-145		

\\svr-okc\Projects\310-000\310-145\-CADD\Dwg\310145-2-Landfill Cells - Aerial View.dwg, LS:(7/1/2021 - Ireforma) - LP: 7/9/2021 2:12 PM



SCALE IN FEET

0 500 1000

REFERENCE

1. EXISTING TOPOGRAPHY FROM AERIAL SURVEY BY COOPER AERIAL SURVEYS CO. ON APRIL 3, 2013, UPDATED WITH GROUND SURVEY BY NORTHSTAR SURVEYING, INC. ON MAY 23, 2013.

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

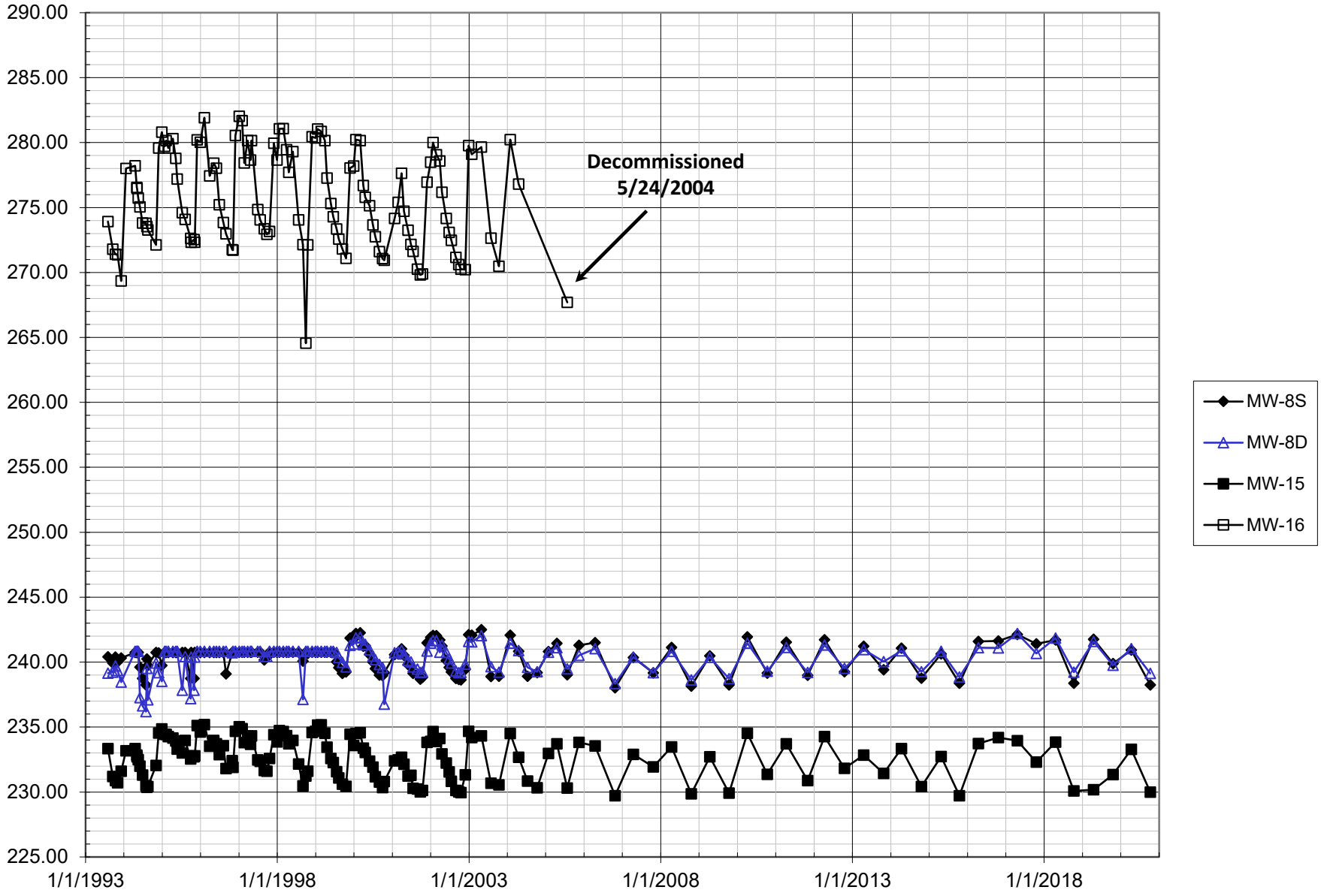
REPUBLIC SERVICES, INC.
COFFIN BUTTE LANDFILL
29175 COFFIN BUTTE ROAD
CORVALIS, OR 97330

DEVELOPMENT AREA
EXISTING CONDITIONS

DRAWN BY:	LAR	CHECKED BY:	PFB	APPROVED BY:	PFB	FIGURE NO.:	3
DATE:	JUL.2021	DWG SCALE:	1" = 500'	PROJECT NO:	310-145		

\\svr-okc\Projects\310-000\310-145\-CADD\Dwg\310145-3-Existing Conditions.dwg{LAYOUT} LS:(7/9/2021 - Ireforma) - LP: 7/9/2021 2:25 PM

Figure 4
Hydrographs for Development Area Wells
Hydrogeologic and Geotechnical Characterization Workplan
Coffin Butte Landfill



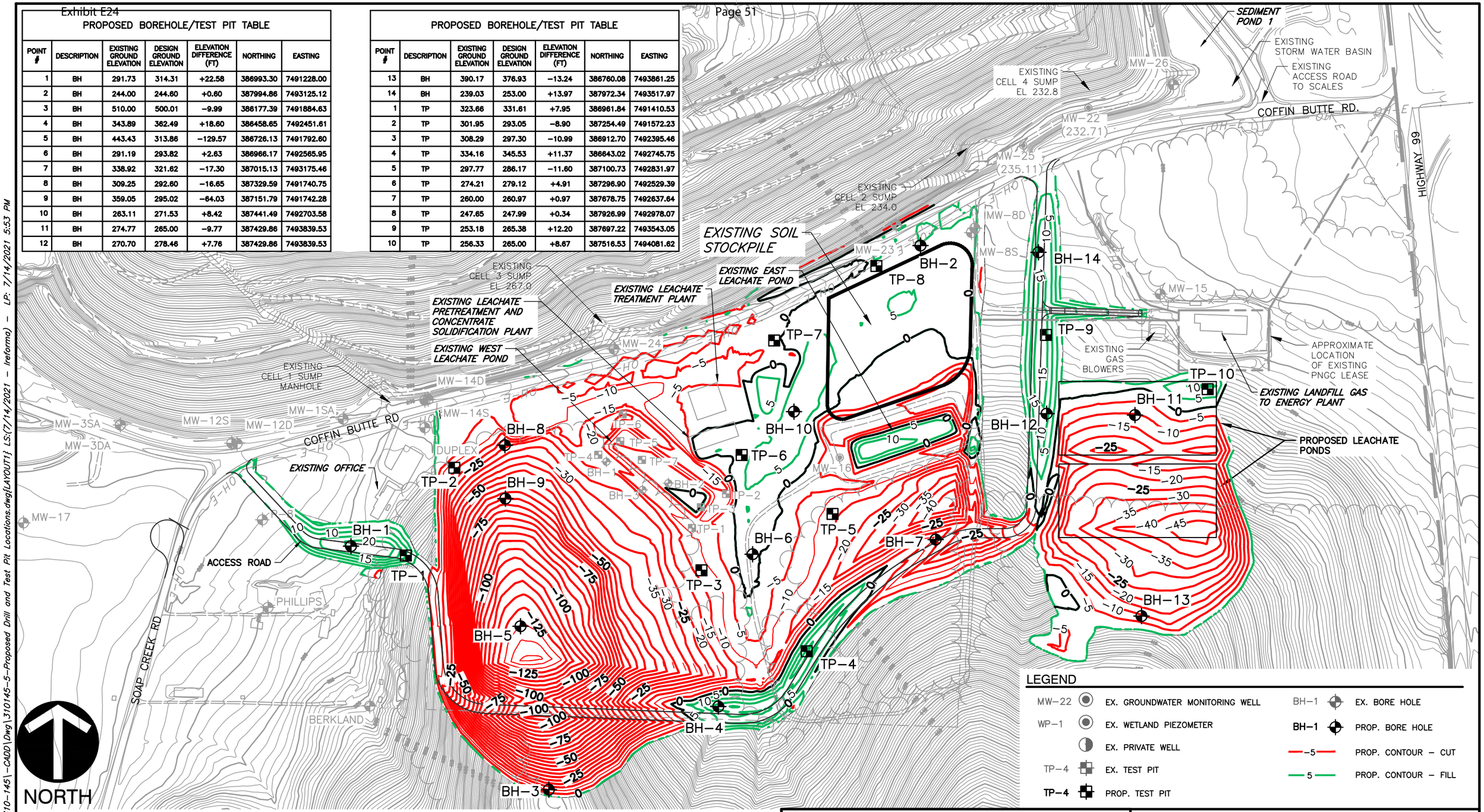
H20MASTER-Dev.xlsx\MW-8S-15-16

PROPOSED BOREHOLE/TEST PIT TABLE

POINT #	DESCRIPTION	EXISTING GROUND ELEVATION	DESIGN GROUND ELEVATION	ELEVATION DIFFERENCE (FT)	NORTHING	EASTING
1	BH	291.73	314.31	+22.58	386993.30	7491228.00
2	BH	244.00	244.60	+0.60	387994.86	7493125.12
3	BH	510.00	500.01	−9.99	386177.39	7491884.63
4	BH	343.89	362.49	+18.60	386458.65	7492451.61
5	BH	443.43	313.86	−129.57	386726.13	7491792.60
6	BH	291.19	293.82	+2.63	386966.17	7492565.95
7	BH	338.92	321.62	−17.30	387015.13	7493175.46
8	BH	309.25	292.60	−16.65	387329.59	7491740.75
9	BH	359.05	295.02	−64.03	387151.79	7491742.28
10	BH	263.11	271.53	+8.42	387441.49	7492703.58
11	BH	274.77	265.00	−9.77	387429.86	7493839.53
12	BH	270.70	278.46	+7.76	387429.86	7493839.53

PROPOSED BOREHOLE/TEST PIT TABLE

POINT #	DESCRIPTION	EXISTING GROUND ELEVATION	DESIGN GROUND ELEVATION	ELEVATION DIFFERENCE (FT)	NORTHING	EASTING
13	BH	390.17	376.93	−13.24	386760.08	7493861.25
14	BH	239.03	253.00	+13.97	387972.34	7493517.97
1	TP	323.66	331.61	+7.95	386961.84	7491410.53
2	TP	301.95	293.05	−8.90	387254.49	7491572.23
3	TP	308.29	297.30	−10.99	386912.70	7492395.46
4	TP	334.16	345.53	+11.37	386643.02	7492745.75
5	TP	297.77	286.17	−11.60	387100.73	7492831.97
6	TP	274.21	279.12	+4.91	387296.90	7492529.39
7	TP	260.00	260.97	+0.97	387678.75	7492637.64
8	TP	247.65	247.99	+0.34	387926.99	7492978.07
9	TP	253.18	265.38	+12.20	387697.22	7493543.05
10	TP	256.33	265.00	+8.67	387516.53	7494081.62



NORTH

SCALE IN FEET
0 300 600

LEGEND

MW−22	EX. GROUNDWATER MONITORING WELL	BH−1	EX. BORE HOLE
WP−1	EX. WETLAND PIEZOMETER	BH−1	PROP. BORE HOLE
	EX. PRIVATE WELL	−5	PROP. CONTOUR − CUT
TP−4	EX. TEST PIT	5	PROP. CONTOUR − FILL
TP−4	PROP. TEST PIT		

REFERENCE

1. EXISTING TOPOGRAPHY FROM AERIAL SURVEY BY COOPER AERIAL SURVEYS CO. ON APRIL 3, 2013, UPDATED WITH GROUND SURVEY BY NORTHSTAR SURVEYING, INC. ON MAY 23, 2013.

Civil & Environmental Consultants, Inc.
11811 N. Tatum Blvd., Suite 3057 - Phoenix, AZ 85028
Ph: 602.760.2324 · 877.231.2324 · Fax: 602.760.2330
www.cecinc.com

REPUBLIC SERVICES, INC.
COFFIN BUTTE LANDFILL
29175 COFFIN BUTTE ROAD
CORVALIS, OR 97330

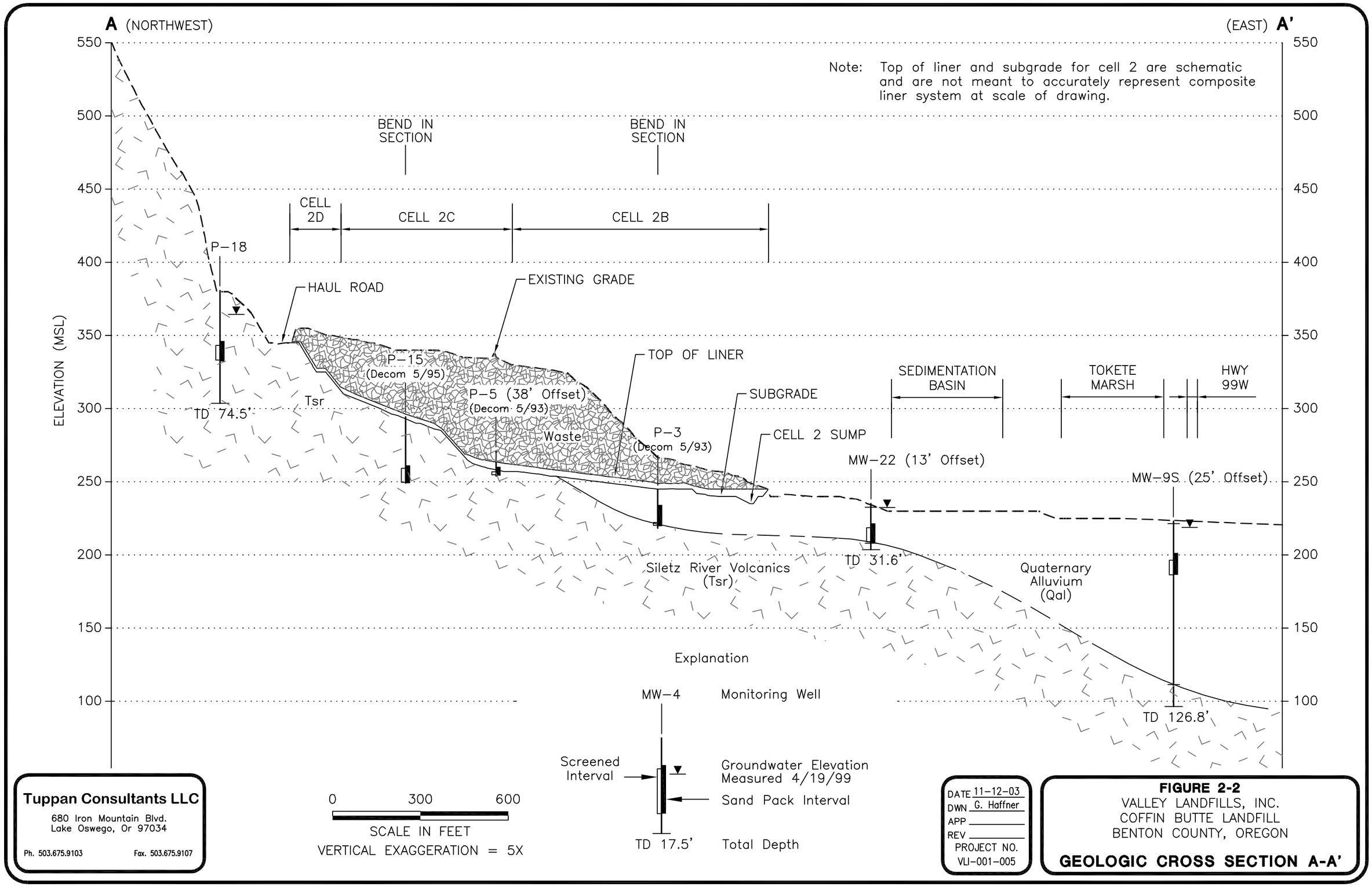
DEVELOPMENT AREA
PROPOSED DRILLING AND TEST PIT LOCATIONS

DRAWN BY:	LAR	CHECKED BY:	PFB	APPROVED BY:	PFB	FIGURE NO.:	5
DATE:	JUL.2021	DWG SCALE:	1"=300'	PROJECT NO:	310-145		

\\svr-okc\Projects\310-000\310-145\-CADD\Dwg\310145-5-Proposed Drill and Test Pit Locations.dwg{LAYOUT1} LS:(7/14/2021 - Reforma) - LP: 7/14/2021 5:53 PM

APPENDIX A

INFORMATION FROM OTHER REPORTS

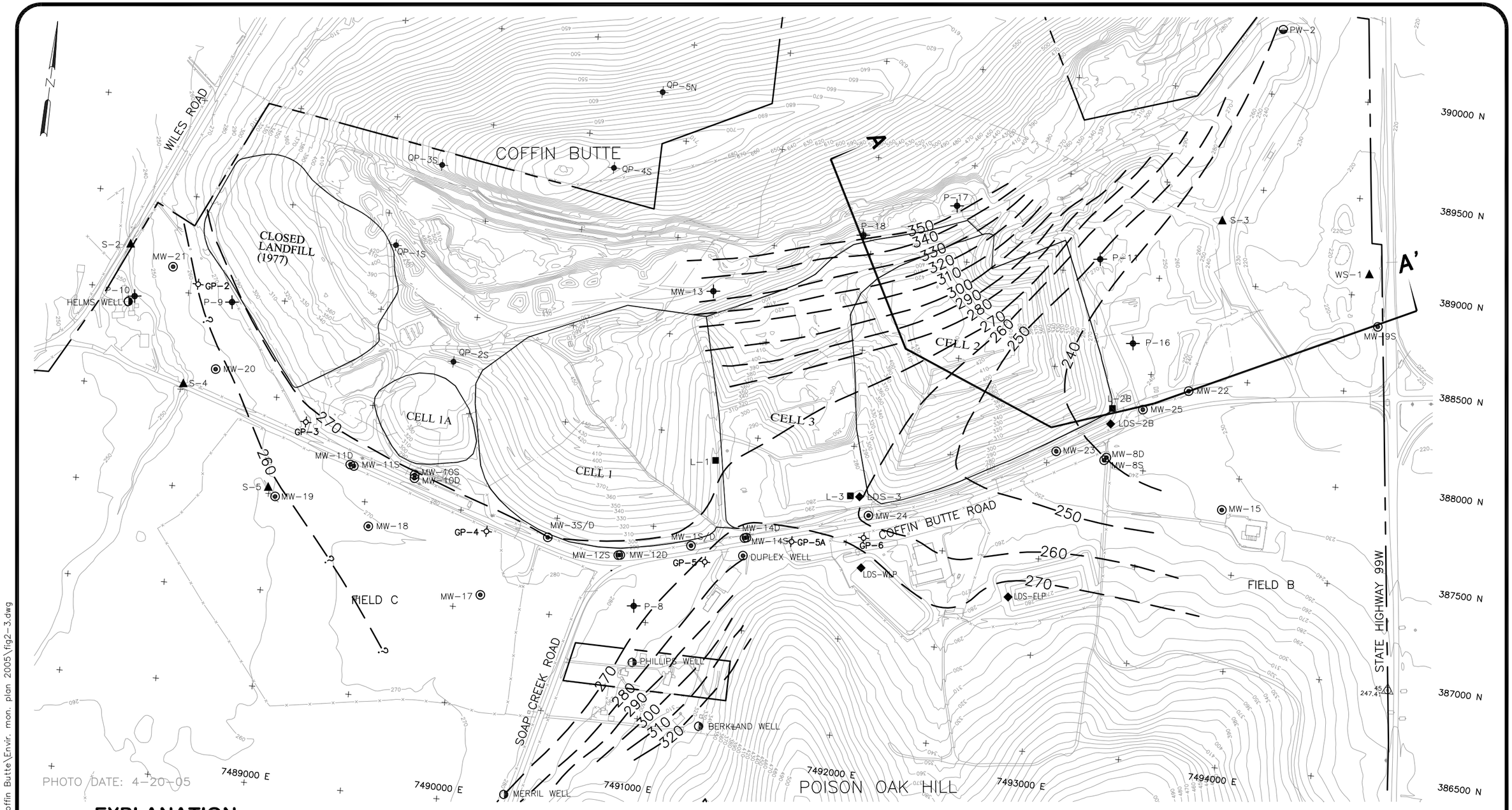


Tuppan Consultants LLC
680 Iron Mountain Blvd.
Lake Oswego, Or 97034
Ph. 503.675.9103 Fax. 503.675.9107

DATE 11-12-03
DWN G. Haffner
APP
REV
PROJECT NO.
VLI-001-005

FIGURE 2-2
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON

GEOLOGIC CROSS SECTION A-A'



EXPLANATION

- MONITORING WELL
- PRIVATE WELL
- OBSERVATION WELL/PIEZOMETER
- LANDFILL WATER SUPPLY WELL
- SURFACE WATER MONITORING STATION
- GAS PROBE
- LEACHATE SUMP
- LEAK DETECTION SYSTEM
- PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (FT-MSL) IN BEDROCK (4-19-99)

0 500 1000

SCALE IN FEET

Tuppan Consultants, LLC

460 Second Street, Suite 103
Lake Oswego, Or 97034

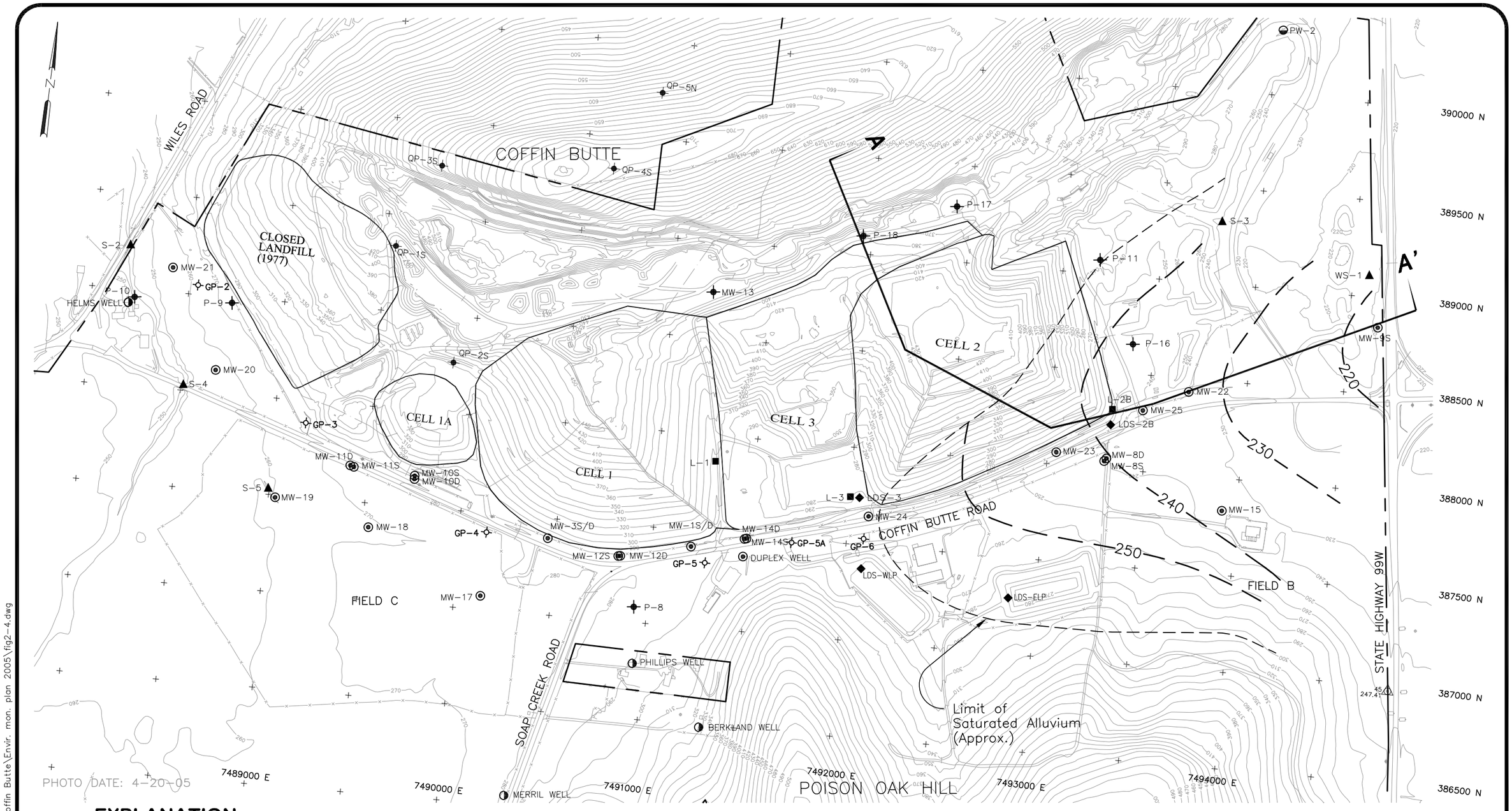
Ph. 503.675.1335 Cell 503.866.2551

DATE 12-14-05
DWN GRH
APP
REV
PROJECT NO. VL1-001-005

FIGURE 2-3
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON

BEDROCK GROUNDWATER CONTOURS

March 17, 2011
C:\000Projects\00Tuppan\Coffin Butte\Envir. mon. plan 2005\fig2-3.dwg



EXPLANATION

- MONITORING WELL
- PRIVATE WELL
- OBSERVATION WELL/PIEZOMETER
- LANDFILL WATER SUPPLY WELL
- SURFACE WATER MONITORING STATION
- GAS PROBE
- LEACHATE SUMP
- LEAK DETECTION SYSTEM
- PROPERTY LINE
- GROUNDWATER ELEVATION CONTOUR (FT-MSL) IN ALLUVIUM (4-19-99)

0 500 1000

SCALE IN FEET

Tuppan Consultants, LLC

460 Second Street, Suite 103
Lake Oswego, Or 97034

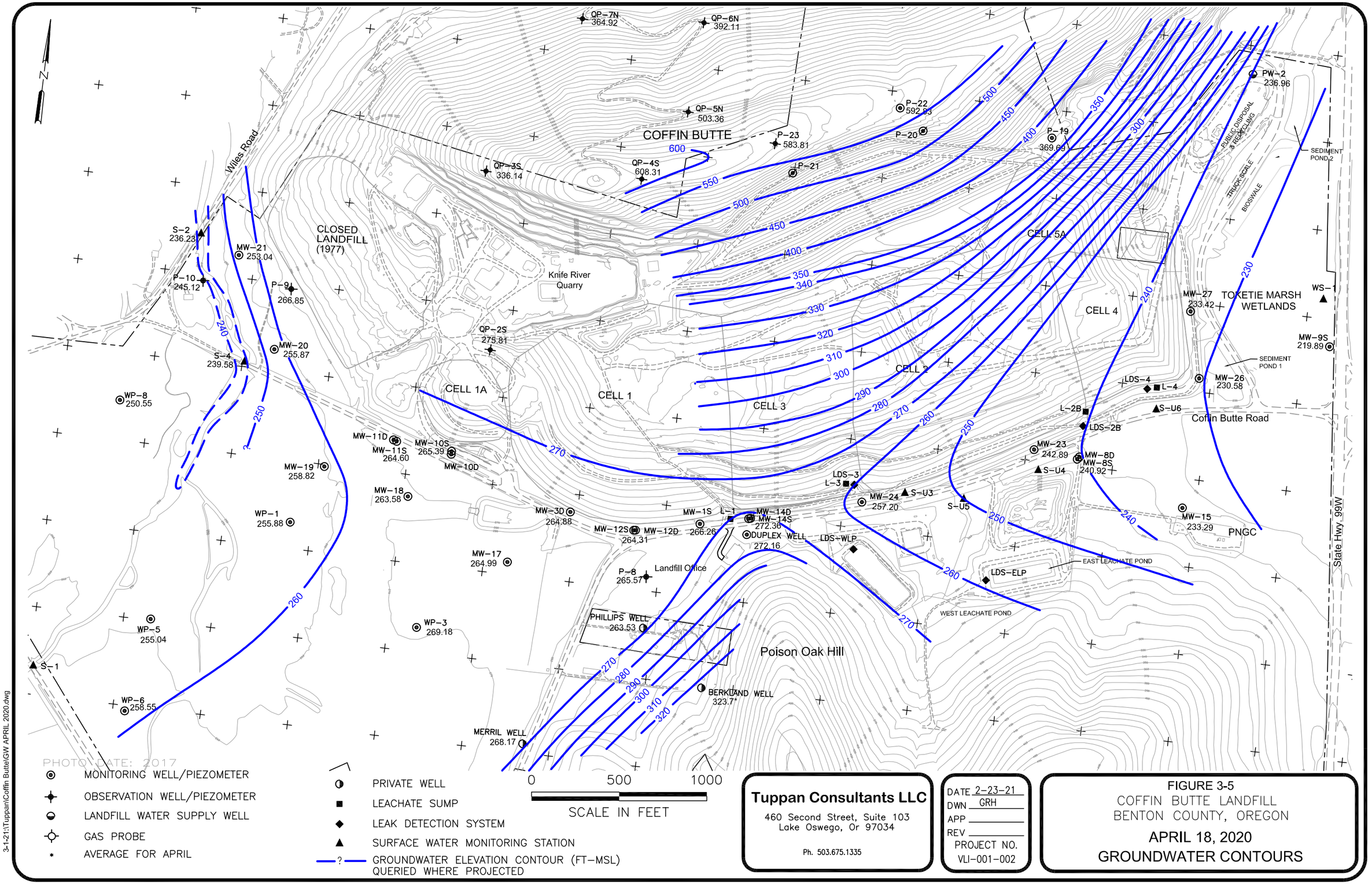
Ph. 503.675.1335 Cell 503.866.2551

DATE 12-14-05
DWN GRH
APP
REV
PROJECT NO. VL1-001-005

FIGURE 2-4
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON

ALLUVIUM GROUNDWATER CONTOURS

March 17, 2011
C:\000Projects\00Tuppan\Coffin Butte\Envir. mon. plan 2005\fig2-4.dwg

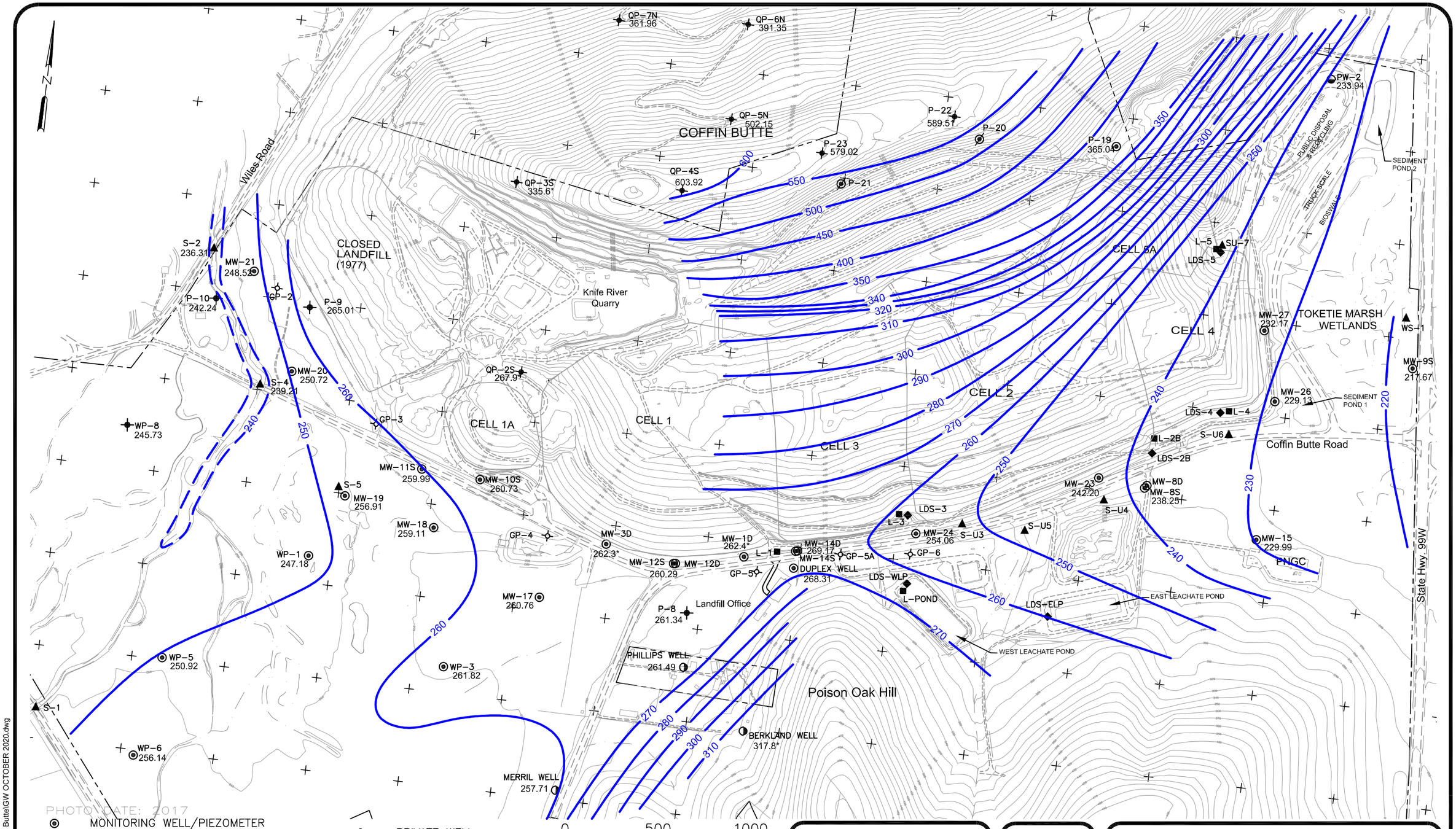


3-1-21:\Tuppan\Coffin Butte\GW APRIL 2020.dwg

Tuppan Consultants LLC
460 Second Street, Suite 103
Lake Oswego, Or 97034
Ph. 503.675.1335

DATE 2-23-21
DWN GRH
APP
REV
PROJECT NO.
VLI-001-002

FIGURE 3-5
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON
APRIL 18, 2020
GROUNDWATER CONTOURS

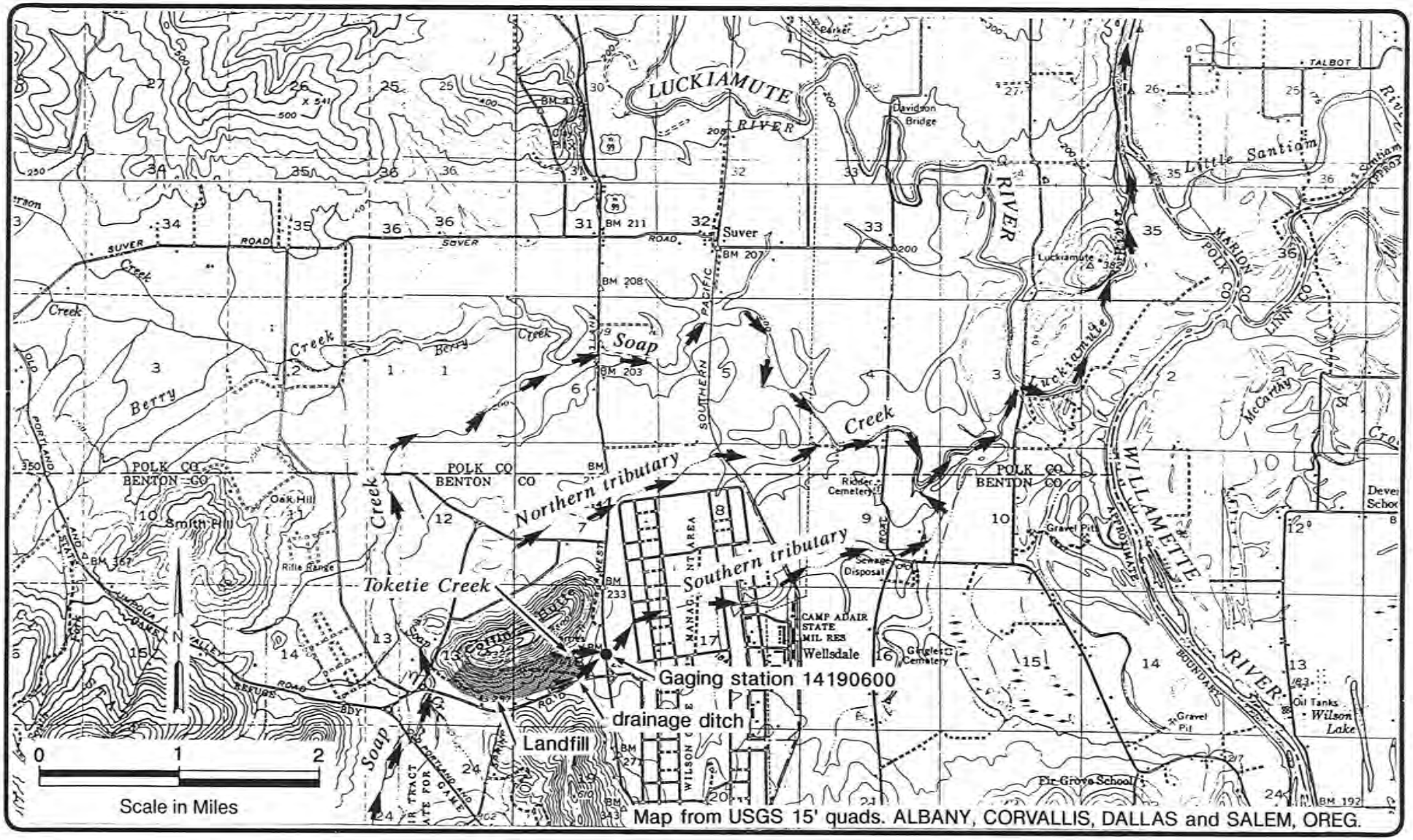


3-1-21:\Tuppan\Coffin Butte\GW OCTOBER 2020.dwg

Tuppan Consultants LLC
460 Second Street, Suite 103
Lake Oswego, Or 97034
Ph. 503.675.1335

DATE 2-21-21
DWN GRH
APP
REV
PROJECT NO. VLI-001-002

FIGURE 3-6
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON
OCTOBER 8, 2020
GROUNDWATER CONTOURS



EMCON Northwest, Inc.

DATE 5/93
DWN. mk
APPR.
REVIS.
PROJECT NO. 0139001.12

Figure 1
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON

SURFACE WATER FEATURES

APPENDIX B

BORNG LOGS – DEVELOPMENT AND ADJACENT AREAS

Appendix B
Boring Logs, Test Pit Logs, and Well Construction Diagrams
Coffin Butte Landfill
Development and Adjacent Areas

MW-8S, MW-8D
MW-9S, MW-9D
MW-14S, MW-14D
MW-15
MW-16
MW-22
MW-23
MW-24
MW-25
Berkland Domestic Well (2 wells)
Duplex Well
West Leachate Pond Borings and Test Pits
- **BH-1**
- **BH-2**
- **BH-3**
- **TP-1**
- **TP-2**
- **TP-3**
- **TP-4**
- **TP-5**
- **TP-6**

Sweet, Edwards & Associates, Inc.

BORING LOG

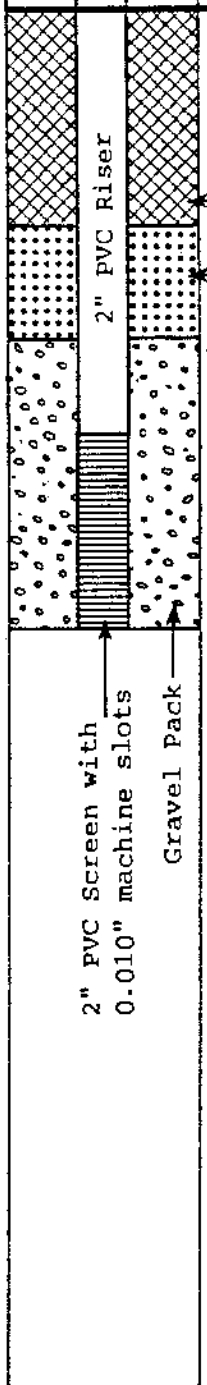
PROJECT COFFIN BUTTE LANDFILL **Page** 1 **of** 1

Location SE of Landfill **Boring No.** MW-8S

Surface Elevation _____ **Drilling Method** Air Rotary

Total Depth 32 feet **Drilled By** Jones Drilling Co.

Date Completed 7/30/85 **Logged By** S.R. Henshaw

WELL DETAILS	PENE-TRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
		0					See boring log MW-8D for lithologic details.	
		10						
		20						
		30						
		40						

SEA-300-02a

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT COFFIN BUTTE LANDFILL

Location SE of Landfill

Boring No. MW-8D

Surface Elevation

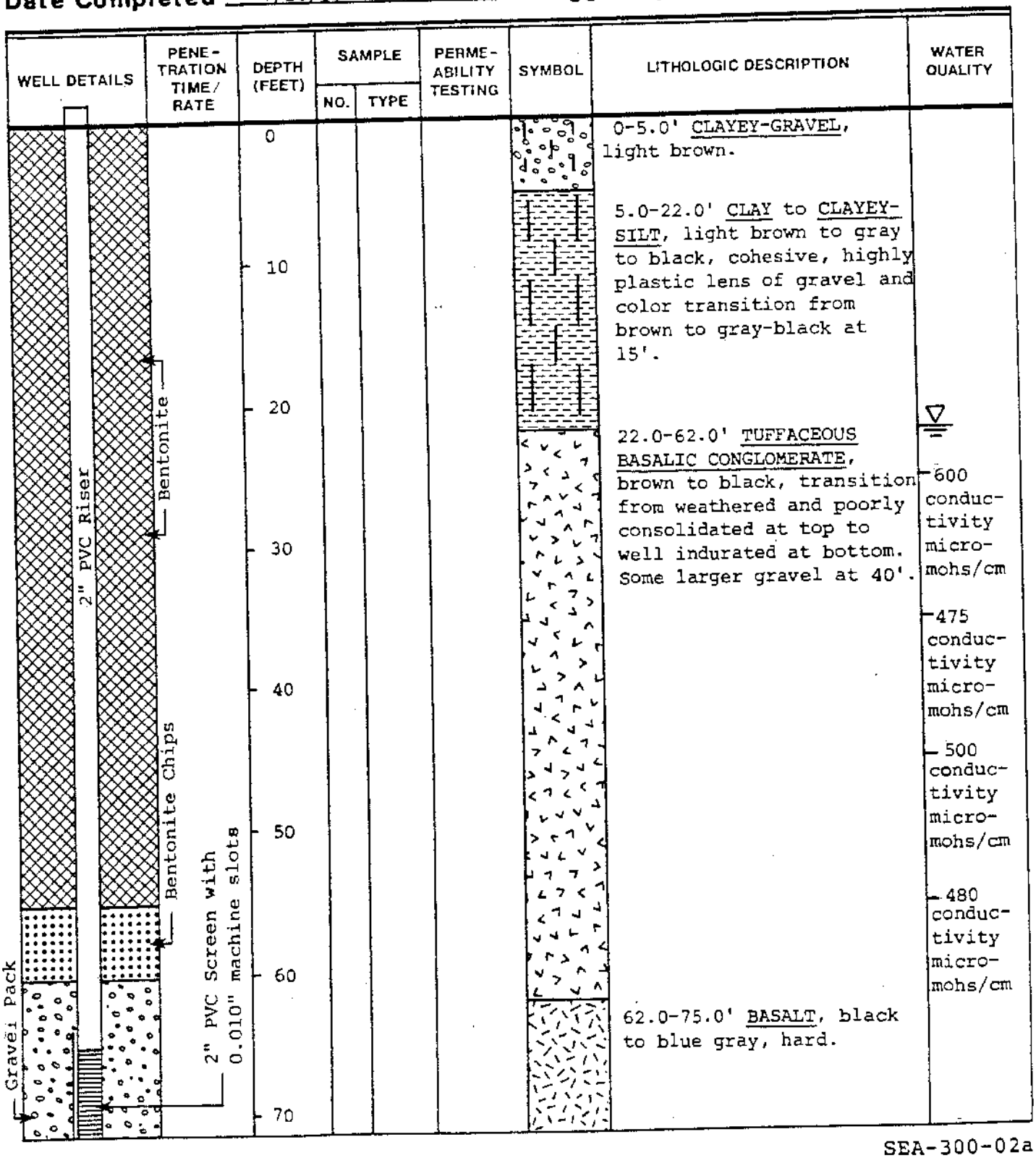
Drilling Method Air Rotary

Total Depth 75 feet

Drilled By Jones Drilling Co.

Date Completed 7/30/85

Logged By S.R. Henshaw



Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT COFFIN BUTTE LANDFILL **Page** 2 **of** 2

Boring No. MW-8D

WELL DETAILS	PENE-TRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERME-ABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
Gravel Pack PVC Cap 2" PVC Screen with 0.010" machine slots		70					62.0-75.0' See previous page for lithology description.	500 conductivity micromohs/cm

Sweet, Edwards & Associates, Inc.

BORING LOG

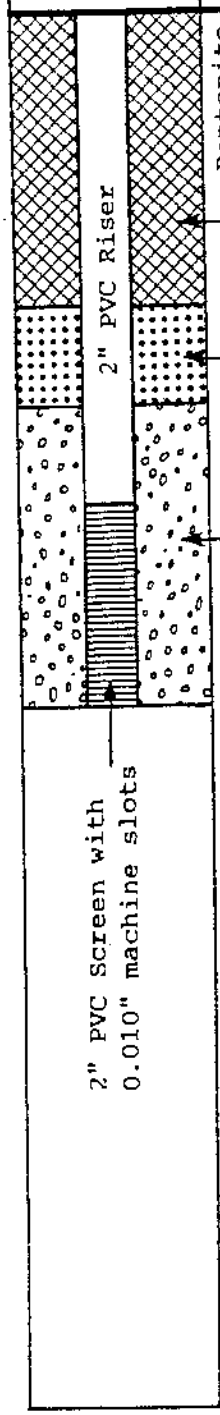
PROJECT COFFIN BUTTE LANDFILL **Page** 1 **of** 1

Location East of Landfill **Boring No.** MW-9S

Surface Elevation _____ **Drilling Method** Air Rotary

Total Depth 35 feet **Drilled By** Jones Drilling Co.

Date Completed 8/2/85 **Logged By** S.R. Henshaw

WELL DETAILS	PENETRATION TIME/ RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
		0					See boring log MW-9D for lithologic details.	
		10						
		20						
		30						
		40						

SEA-300-02a

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT COFFIN BUTTE LANDFILL **Page** 1 **of** 2

Location East of Landfill **Boring No.** MW-9D

Surface Elevation _____ **Drilling Method** Air Rotary

Total Depth 125 Feet **Drilled By** Jones Drilling Co.

Date Completed 8/1/85 **Logged By** S.R. Henshaw

WELL DETAILS	PENETRATION TIME/RATE	DEPTH (FEET)	SAMPLE NO.	SAMPLE TYPE	PERMEABILITY TESTING	SYMBOL	LITHOLOGIC DESCRIPTION	WATER QUALITY
ABANDONED RISER Cement slurry backfilled from 115' to 0'. Settled to ___ and backfilled with bentonite chips.		0 10 20 30 40 50 60 70					0-5.0' FILL, brown, soil and gravel. 5.0-19.0' CLAYEY SILT to CLAY, light brown, cohesive, hard, very plastic, sticky, some gravel. 19.0-36.0' CLAY, blue gray, hard, very plastic, sticky. 36.0-110.0' CLAYEY-SILT to SILTY-CLAY, light gray to light brown and red, firm, exhibits shale properties as observed from cuttings, moderately plastic, some small rock fragments 1-2 mm. Little sample recovered due to mixing.	1000 conductivity micromohs/cm 1000 conductivity micromohs/cm 1075 conductivity micromohs/cm 1050 conductivity micromohs/cm

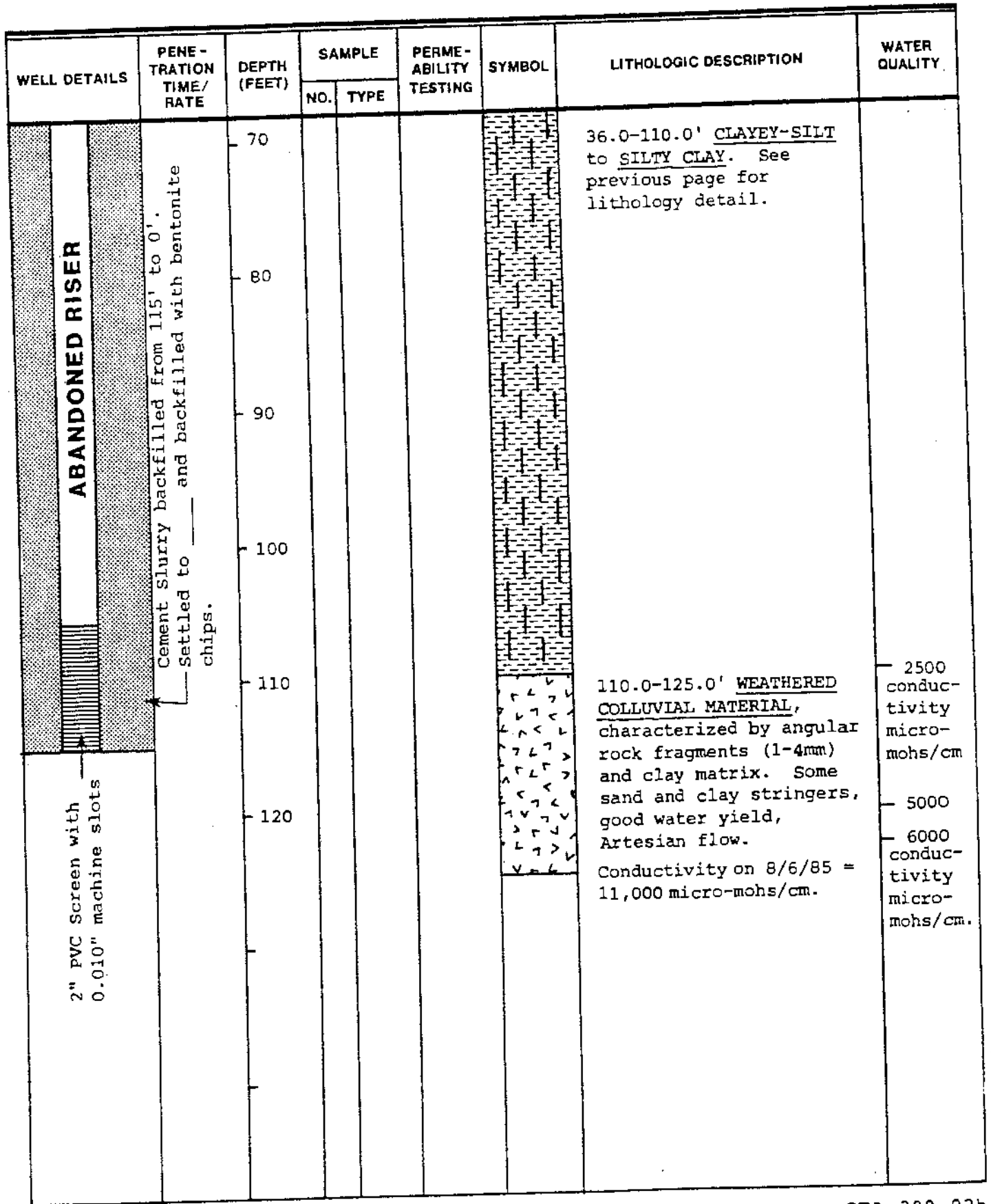
SEA-300-02a

Sweet, Edwards & Associates, Inc.

BORING LOG

PROJECT COFFIN BUTTE LANDFILL

Boring No. MW-9D



LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	MW- 14S
LOCATION	Benton County, Oregon	PAGE	1 OF 3
DRILLED BY	Staco Well Services	REFERENCE ELEV.	287.50'
DRILL METHOD	Air Rotary	TOTAL DEPTH	35.50'
LOGGED BY	Creig Fanshier	DATE COMPLETED	7/27/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
				5				0-10 feet: SILTY CLAY (CL), yellowish brown, soft, damp, trace (<5%) 3/8-inch angular gravel. (COLLUVIUM)
S-1 GRAB				10				10-27 feet: BASALT, brown to orange brown, slightly fractured, strongly weathered on fractures, carbona.. veinlets. (Siletz River Volcanics)
S-2 GRAB				15				
S-3 GRAB			22.2' 7/27/92 ▽ 23.79' 8/5/92 ▼	20				
				25				

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-9.7 feet; continuously diamond cored from 9.7-70 feet. Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14S drilled approx. 20 feet east of B-14 by air rotary with 8-inch downhole hammer from surface to 35.5 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	MW- 14S
LOCATION	Benton County, Oregon	PAGE	2 OF 3
DRILLED BY	Staco Well Services	REFERENCE ELEV.	287.50'
DRILL METHOD	Air Rotary	TOTAL DEPTH	35.50'
LOGGED BY	Craig Fanshier	DATE COMPLETED	7/27/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
S-4 GRAB								10-27 feet: BASALT, brown to orange brown, slightly fractured, strongly weathered on fractures, carbonate veinlets. (Siletz River Volcanics)
								27-35.5 feet: BASALT, greenish gray to dark green, highly fracture, propylitic alteration, fine carbonates, (quartz) veinlets, trace pyrite.
S-5 GRAB				30				
S-6 GRAB				35				Bottom of boring at 35.5 feet below ground surface.
				40				
				45				
				50				

WELL COMPLETION DETAILS:

+2.08-19.5 feet: 4-inch dia. schedule 40 PVC flush threaded blank casing with "O" rings.

19.5-29.5 feet: 4-inch dia. schedule 40 PVC screen with 0.020-inch machine slots.

29.5-30.1 feet: 4-inch dia. schedule 40 PVC end cap.

0-1.5 feet: Concrete.

1.5-16.5 feet: 4.5 - 50 pound bags of 3/4-inch bentonite chips.

16.5-30.5 feet: 4.5 - 100 bags of 8x12 graded silica sand. (FILTER PACK)

30.5-35.5 feet: 2.25 - 50 pound bags of 3/4-inch bentonite chips.

SURFACE COMPLETION DETAILS:

6-inch steel locking protective casing, surrounded by 3 - 5-foot long, 3-inch dia. protective posts.

Ground surface elevation: 287.5 feet MSL.

Top of casing elevation: 289.58 feet MSL.

Coffin Butte base map coordinates:

Eastings: 674.78 feet.

Northings: 251.74 feet.

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-9.7 feet; continuously diamond cored from 9.7-70 feet. Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14S drilled approx. 20 feet east of B-14 by air rotary with 8-inch downhole hammer from surface to 35.5 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	MW-14S
LOCATION	Benton County, Oregon	PAGE	3 OF 3
DRILLED BY	Staco Well Services	REFERENCE ELEV.	287.50'
DRILL METHOD	Air Rotary	TOTAL DEPTH	35.50'
LOGGED BY	Craig Fanshier	DATE COMPLETED	7/27/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
				55				Sample depth indicates where a discrete interval sample was collected and archived. Air rotary cuttings were semi-continuously monitored at the discharge during the drilling process.
				60				
				65				
				70				
				75				

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-8.7 feet; continuously diamond cored from 8.7-70 fee Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14S drilled approx. 20 feet east of B-14 by air rotary with 6-inch downhole hammer from surface to 35.5 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	MW- 14D
LOCATION	Benton County, Oregon	PAGE	1 OF 4
DRILLED BY	Staco Well Services	REFERENCE ELEV.	287.80'
DRILL METHOD	Air Rotary	TOTAL DEPTH	75.00'
LOGGED BY	Craig Fenshier	DATE COMPLETED	7/24/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
S-1 GRAB				5				**0-10 feet:** SILTY CLAY (CL), brown, soft, damp, trace (5%) 3/8-inch angular gravel. (COLLUVIUM)
S-2 GRAB				10				**10-27 feet:** BASALT, brown to orange brown, slightly fractured, strongly weathered on fractures, carbonate veinlets. (Siletz River Volcanics)
S-3 GRAB				15				
S-4 GRAB				20				
			23.27' 7/29/92	25				

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-8.7 feet; continuously diamond cored from 9.7-70 feet. Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14D drilled approx. 10 feet east of B-14 by air rotary with 6-inch downhole hammer from surface to 75 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME COFFIN BUTTE LANDFILL
LOCATION Benton County, Oregon
DRILLED BY Staco Well Services
DRILL METHOD Air Rotary
LOGGED BY Craig Fanshier

BORING NO. MW- 14D
PAGE 2 OF 4
REFERENCE ELEV. 287.80'
TOTAL DEPTH 75.00'
DATE COMPLETED 7/24/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
S-5 GRAB								**10-27 feet:** BASALT, brown to orange brown, slightly fractured, strongly weathered on fractures, carbonate veinlets. (Siletz River Volcanics)
S-6 GRAB								**27-71 feet:** BASALT, greenish gray to dark green, intensely fractured, propylitic alteration, fine-grained carbonates, (quartz) veinlets, trace pyrite.
S-7 GRAB	–	–		30				
S-8 GRAB				35				@ 36 feet: 5% gray ash, tuff.
								@ 37 feet: 5% gray ash, tuff.
S-9 GRAB								
S-10 GRAB				40				
S-11 GRAB				45				
				50				

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-9.7 feet; continuously diamond cored from 9.7-70 feet. Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14D drilled approx. 10 feet east of B-14 by air rotary with 6-inch downhole hammer from surface to 75 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME COFFIN BUTTE LANDFILL
LOCATION Benton County, Oregon
DRILLED BY Staco Well Services
DRILL METHOD Air Rotary
LOGGED BY Craig Fanshier

BORING NO. MW-14D
PAGE 3 OF 4
REFERENCE ELEV. 287.80'
TOTAL DEPTH 75.00'
DATE COMPLETED 7/24/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
S-12 GRAB								27-71 feet: BASALT, greenish gray to dark green, intensely fractured, propylitic alteration, fine-grained carbonates, (quartz) veinlets, trace pyrite.
								@ 51-60 feet: Harder drilling.
				55				
S-13 GRAB								@ 56-71 feet: Trace (5%) white calcite filling small fractures.
				60				
S-14 GRAB								@ 60-64 feet: Easier drilling.
			▽ 64.0' 7/24/92	65				@ 64 feet: Minor water produced at surface cuttings discharge pipe.
S-15 GRAB								
				70				@ 69-71 feet: Easier drilling, produces approx. 0.2 gpm.
S-16 GRAB								71-75 feet: TUFFACEOUS BASALT, fine grain, greenish gray, 20% light gray ash-tuff, discharge water turns gray.
				75				

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-9.7 feet; continuously diamond cored from 9.7-70 feet. Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14D drilled approx. 10 feet east of B-14 by air rotary with 6-inch downhole hammer from surface to 75 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME	COFFIN BUTTE LANDFILL	BORING NO.	MW-14D
LOCATION	Benton County, Oregon	PAGE	4 OF 4
DRILLED BY	Staco Well Services	REFERENCE ELEV.	287.80'
DRILL METHOD	Air Rotary	TOTAL DEPTH	75.00'
LOGGED BY	Craig Fanshier	DATE COMPLETED	7/24/92

SAMPLE NUMBER SAMPLE TYPE	RECOVERY PERCENT	BLOW COUNTS (N COMP)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
S-17 GRAB				80				Bottom of boring at 75.0 feet below ground surface. WELL COMPLETION DETAILS: +2.47-60 feet: 2-inch dia. schedule 40 PVC flush threaded blank casing with "O" rings. 60-70 feet: 2-inch dia. schedule 40 PVC screen with 0.020-inch machine slots. 70-70.6 feet: 2-inch dia. schedule 40 PVC end cap. 0-3 feet: Concrete. 3-57.5 feet: 13.5 - 50 pound bags of 3/4-inch bentonite chips. 57.5-71 feet: 2.6 - 100 bags of 8x12 graded silica sand. (FILTER PACK) 71-75 feet: 0.8 50 pound bag of 3/4-inch bentonite chips. SURFACE COMPLETION DETAILS: 6-inch steel locking protective casing, surrounded by 3 - 5-foot long, 3-inch dia. protective posts. Ground surface elevation: 287.8 feet MSL. Top of casing elevation: 290.27 feet MSL. Coffin Butte base map coordinates: Eastings: 664.50 feet. Northings: 248.23 feet. Notes: Sample depth indicates where a discrete interval sample was collected and archived. Air rotary cuttings were semi-continuously monitored at the discharge during the drilling process.
				85				
				90				
				95				
				100				

REMARKS

Exploratory boring B-14 drilled by 8-inch dia. hollow stem auger from 0-9.7 feet; continuously diamond cored from 9.7-70 feet. Boring backfilled with cement-bentonite grout. Monitoring well boring MW-14D drilled approx. 10 feet east of B-14 by air rotary with 6-inch downhole hammer from surface to 75 feet.

LOG OF EXPLORATORY BORING

PROJECT NAME Coffin Butte Landfill
LOCATION Coffin Butte, Benton County, Oregon
DRILLED BY GeoTech Explorations
DRILL METHOD H.S.A. with C.C.B.
LOGGED BY Mike Free

BORING NO. MW-15
PAGE 1 OF 2
GROUND ELEV.
TOTAL DEPTH 29.00'
DATE COMPLETED 07/14/93

SAMPLE TYPE	RECOVERY PERCENT	POCKET PENE-TROMETER (T/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
CCB	100	1						**0 to 13.0 feet:** CLAYEY SILT (MH), very dark gray to black (0 to 1.5 feet), dark grayish brown (1.5 to 2.6 feet), mottled brown and orange (2.6 to 13.0 feet), 75 percent silt, 25 percent clay, trace fine sand, soft to firm, moist, roots to 3.0 feet, micaceous, pore wetness at 13.0 feet. (ALLUVIUM)
		0.8						
		2						
CCB	102	1.3						
		1.5		5				
		2						
		1.3						
		1.2						
CCB	102	0.8						
		1.6		10				
		1.8						
		1.5	▽					
		1.8						**13.0 to 20.4 feet:** CLAYEY SILT (MH), dark grayish brown (13.0 to 15.9 feet), gray to dark reddish brown (15.9 to 18.0 feet), strong brown (18,0 to 20.4 feet), 75 percent silt, 20 percent clay, 5 percent fine to coarse gravel, soft to firm (overall somewhat crumbly), moist to wet. (ALLUVIUM)
CCB	98			15				
		2						
		2.5						
		3.8						
CCB	102	3						
				20				

REMARKS

LOG OF EXPLORATORY BORING

PROJECT NAME Coffin Butte Landfill
LOCATION Coffin Butte, Benton County, Oregon
DRILLED BY GeoTech Explorations
DRILL METHOD H.S.A. with C.C.B.
LOGGED BY Mike Free

BORING NO. MW-15
PAGE 2 OF 2
GROUND ELEV.
TOTAL DEPTH 29.00'
DATE COMPLETED 07/14/93

SAMPLE TYPE	RECOVERY PERCENT	POCKET PENE-TROMETER (T/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
CCB	94	2 1 2		25 30 35 40				13.0 to 20.4 feet: CLAYEY SILT (MH), continued. 20.4 to 21.8 feet: SANDY GRAVEL (GP), strong brown, 60 percent fine to coarse decomposed well-rounded gravel, occasional cobbles, 30 percent fine to coarse sand, 10 percent clay and silt. (ALLUVIUM) 21.8 to 29.0 feet: SANDY GRAVELLY SILT (ML), reddish brown to brown, 50 percent silt, 30 percent decomposed fine to medium gravel, 20 percent fine to coarse sand, mostly crumbly, soft to firm, moist. (ALLUVIUM)

Total depth drilled = 29.0 feet.
Total depth sampled = 29.0 feet.

WELL COMPLETION DETAILS:
0 to 19.0 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC blank riser pipe.
19.0 to 28.0 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC well screen with 0.010-inch machined slots.
28.0 to 29.0 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC blank sump pipe.

0 to 3.0 feet: Concrete.
3.0 to 16.5 feet: Bentonite chips hydrated with potable water.
16.5 to 29.0 feet: 20 - 40 Colorado Silica Sand.

REMARKS

LOG OF EXPLORATORY BORING

PROJECT NAME Coffin Butte Landfill
LOCATION Coffin Butte, Benton County, Oregon
DRILLED BY GeoTech Explorations
DRILL METHOD H.S.A. with C.C.B.
LOGGED BY Mike Free

BORING NO. MW-16
PAGE 1 OF 2
GROUND ELEV.
TOTAL DEPTH 27.30'
DATE COMPLETED 07/19/93

SAMPLE TYPE	RECOVERY PERCENT	POCKET PENE-TROMETER (T/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
CCB	98							**0 to 3.0 feet:** CLAYEY SILT (MH), very dark grayish brown, 70 percent silt, 30 percent clay, trace fine sand, stiff to very stiff, dry to damp, crumbly dry from 0 to 1.0 foot. (ALLUVIUM)
CCB	104			5				**3.0 to 9.0 feet:** CLAYEY SILT (ML), dark yellowish brown, 60 percent silt, 25 percent clay, 10 percent fine to medium gravel, 5 percent fine to coarse sand, stiff (crumbly from 7.0 to 9.0 feet), moist. (COLLUVIUM)
CCB	50			10				**9.0 to 15.2 feet:** CLAYEY GRAVELLY SILT (ML), dark yellowish brown, 50 percent silt, 30 percent fine to coarse, fresh to slightly weathered, subangular basalt gravel, 20 percent clay, stiff, moist. (COLLUVIUM)
CCB	100			15				**15.2 to 16.2 feet:** SANDY SILTY GRAVEL (GP), orangy brown, 60 percent fine to coarse angular weathered basalt gravel, 20 percent basalt sand, 20 percent silt and clay. (COLLUVIUM)
CCB	68		▽					**16.2 to 27.3 feet:** BASALT, black to very dark bluish gray, aphanitic, equigranular, crushed to intensely fractured, hard, fresh. (BEDROCK)
CCB	100			20				

REMARKS

Augered with center bit from 20.8 to 27.3 feet; hard drilling.

LOG OF EXPLORATORY BORING

PROJECT NAME Coffin Butte Landfill
LOCATION Coffin Butte, Benton County, Oregon
DRILLED BY GeoTech Explorations
DRILL METHOD H.S.A. with C.C.B.
LOGGED BY Mike Free

BORING NO. MW-16
PAGE 2 OF 2
GROUND ELEV.
TOTAL DEPTH 27.30'
DATE COMPLETED 07/19/93

SAMPLE TYPE	RECOVERY PERCENT	POCKET PENE-TROMETER (T/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
CCB	100			25				16.2 to 27.3 feet: BASALT, continued.
				30				Total depth drilled = 27.3 feet. Total depth sampled = 27.3 feet. **WELL COMPLETION DETAILS:** 0 to 17.2 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC blank riser pipe. 17.2 to 26.6 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC well screen with 0.020-inch machined slots. 26.6 to 27.3 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC blank sump pipe. 0 to 3.0 feet: Concrete. 3.0 to 15.6 feet: Bentonite chips hydrated with potable water. 15.6 to 27.3 feet: 10 - 20 Colorado Silica Sand.
				35				
				40				

REMARKS

Augered with center bit from 20.8 to 27.3 feet; hard drilling.

LOG OF EXPLORATORY BORING

PROJECT NAME	Coffin Butte Landfill
LOCATION	Benton County, Oregon
DRILLED BY	Geo-Tech Explorations, Inc.
DRILL METHOD	Hollow Stem Auger
LOGGED BY	Eric Tuppan

BORING NO.	MW-22
PAGE	1 OF 2
GROUND ELEV.	232.73'
TOTAL DEPTH	29.00'
DATE COMPLETED	07/22/94

SAMPLE TYPE	RECOVERY PERCENT	POCKET PENETRO-METER	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
CCB	75%	3.3						0 to 1.0 foot: GRAVEL FILL, grass at surface.
CCB	100%	1.75	7/22/94 ▼	5				1.0 to 9.3 feet: SILTY CLAY (CL), very dark grayish brown (10YR 3/2), some mottling with dark gray brown (10YR 2/6); medium plasticity fines; silty, minor fine to medium sand; root hairs; very stiff to stiff; damp. (ALLUVIUM) @ 5.5 feet: dark brown (10YR 3/3) with oxidized medium sand grains. @ 6.0 feet: root holes; moist to wet.
CCB	100%	2.5		10				@ 9 to 9.3 feet: basal layer of sandy clay. 9.3 to 14.0 feet: CLAYEY SILT (ML), dark olive gray (5Y 3/2); very clayey; medium plasticity; trace fine to medium sand; very stiff; root hairs and root holes are wet to moist; crumbly texture. (ALLUVIUM)
CCB	100%	0.75	7/22/94 ▽	15				14.0 to 24.7 feet: SILT (MH), dark olive gray (5Y 3/2); minor clay; high plasticity; roots and organic matter common; root holes are wet. (ALLUVIUM) @ 17.0 feet: zones of very dark grayish brown (2.5Y 3/2); twigs horizontal to core axis; roots and root holes abundant; firm to very stiff; wet in root holes.
CCB	100%	3.25		20				

REMARKS

Boring drilled with 3.75-inch I.D. hollow-stem augers to 29 feet and sampled with continuous core barrel. Backfilled hole from 24 to 29 feet with bentonite chips and pulled augers. Reamed out hole with 6.25-inch hollow-stem auger to 24.2 feet and installed well.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	**Coffin Butte Landfill**	BORING NO.	**MW-22**
LOCATION	**Benton County, Oregon**	PAGE	**2 OF 2**
DRILLED BY	**Geo-Tech Explorations, Inc.**	GROUND ELEV.	**232.73'**
DRILL METHOD	**Hollow Stem Auger**	TOTAL DEPTH	**29.00'**
LOGGED BY	**Eric Tuppan**	DATE COMPLETED	**07/22/94**

SAMPLE TYPE	RECOVERY PERCENT	POCKET PENETRO-METER	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
								14.0 to 24.7 feet: SILT (MH), continued.
		3.0						@ 20.0 feet: dark gray (5Y 4/1); uniform silt with abundant roots; very stiff; damp to moist.
CCB	100%							
				25				**24.7 to 29.0 feet: CLAY (CL)**, dark olive gray (5Y 3/2); low plasticity clay with minor silt; trace fine to medium sand; relict intergranular basalt texture; few roots; crumbly and breaks apart along what appear to be relict fractures(?); very stiff; moist. (WEATHERED BEDROCK)
		2.0						
				30				Boring terminated at 29.0 feet; sufficient data.
				35				
				40				

REMARKS

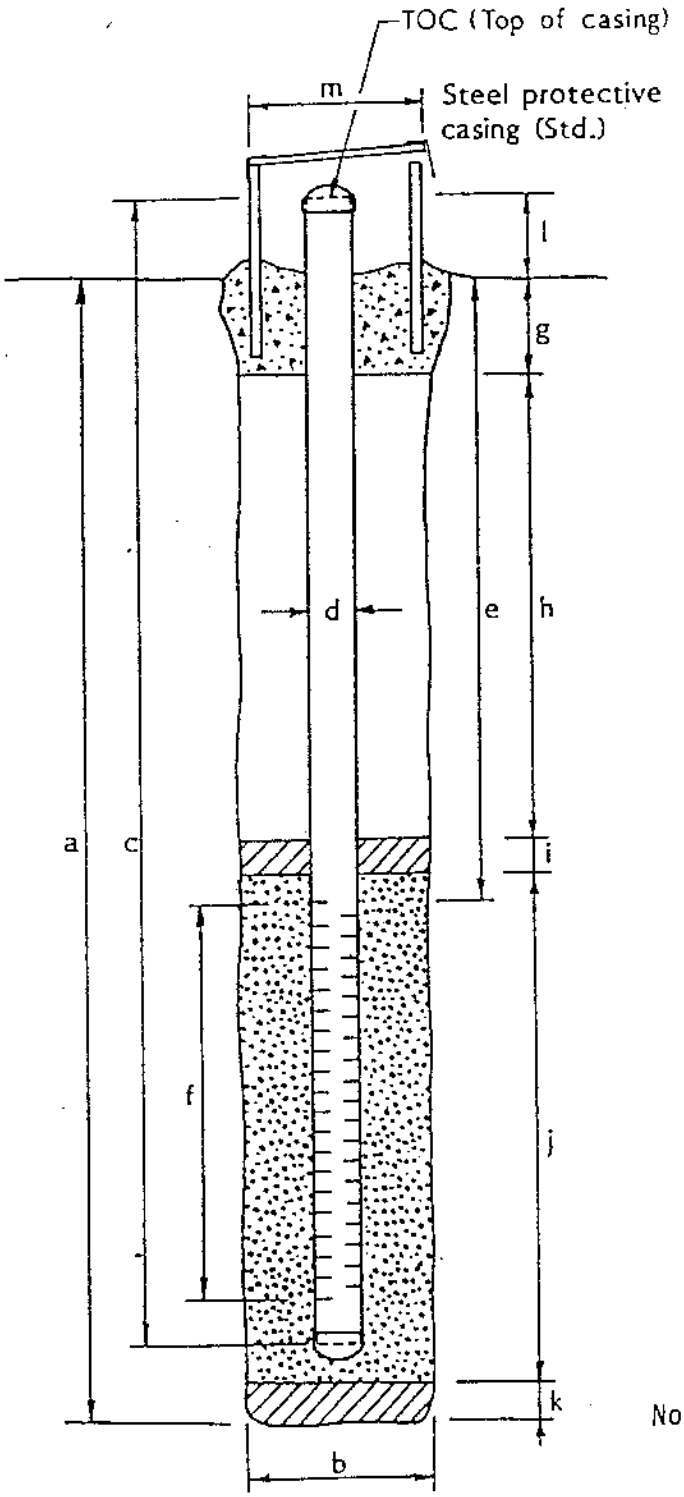
Boring drilled with 3.75-inch I.D. hollow-stem augers to 29 feet and sampled with continuous core barrel. Backfilled hole from 24 to 29 feet with bentonite chips and pulled augers. Reamed out hole with 6.25-inch hollow-stem auger to 24.2 feet and installed well.

EMCON

WELL DETAILS

PROJECT NUMBER 0139-001.47
PROJECT NAME Coffin Butte Landfill
LOCATION Benton County , Or
WELL PERMIT NO. 67395

BORING / WELL NO. MW-22
TOP OF CASING ELEV. 235.30
GROUND SURFACE ELEV. 232.73
DATUM Mean Sea level
INSTALLATION DATE 7-22-94



EXPLORATORY BORING

a. Total depth 29.0 ft.
b. Diameter 10 1/4 in.
Drilling method Hollow-stem auger

WELL CONSTRUCTION

c. Total casing length 26.7 ft.
Material Sch. 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 14.0 ft.
f. Perforated length 9.6 ft.
Perforated interval from 14.0 to 23.6 ft.
Perforation type Machine Slotted
Perforation size 0.010 inch
g. Surface seal (0-2.0) 2.0 ft.
Seal material Concrete
h. Backfill ft.
Backfill material NA
i. Seal (2.0 - 11.0) 9.0 ft.
Seal material Bentonite Chips
j. Gravel pack (11.0-24.2) 13.2 ft.
Pack material 20X40 Silica Sand
k. Bottom seal (24.2 - 29.0) 4.8 ft.
Seal material Bentonite Chips
l. Casing stickup 2.46 ft.
m. Protective casing diameter 6.5 in.

Note: SS Centralizers at 8.7' and 24.0'

Prepared by: Eric Tuppan

Reviewed by: [signature] Date: 8/12/94

Form F-11 Rev. 12/90

LOG OF EXPLORATORY BORING

PROJECT NAME	**Coffin Butte Landfill**	BORING NO.	**MW-23**
LOCATION	**Coffin Butte, Benton County, Oregon**	PAGE	**1 OF 2**
DRILLED BY	**Geo-Tech Explorations, Inc.**	GROUND ELEV.	**242.81'**
DRILL METHOD	**Hollow Stem Auger**	TOTAL DEPTH	**24.30'**
LOGGED BY	**Mike Free**	DATE COMPLETED	**08/02/94**

SAMPLE TYPE	RECOVERY PERCENT	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
CCB	45	▽ 8/2/94					**0 to 3.0 feet: CLAYEY SILT (ML)**, very dark grayish brown, some black; medium plasticity fines; 10 percent fine to coarse sand; 10 percent medium gravel; firm, moist, few roots. (FILL) @ 1.0 foot: soft. @ 2.0 feet: wet.
CCB	100		5				**3.0 to 10.5 feet: SANDY CLAYEY SILT (ML)**, very dark grayish brown; medium plasticity fines; 15 percent fine to coarse sand, mostly medium; few roots; firm, wet (root holes wet). (ALLUVIUM) @ 4.8 feet: grayish brown and orange mottling.
CCB	90						@ 7.0 to 8.0 feet: crumbly, low plasticity.
CCB	100		10				**10.5 to 16.2 feet: CLAYEY SILT (ML)**, dark gray to dark greenish gray; breaks with massive, fine grained texture; trace fine rootlets; micaceous; stiff to firm; wet. (ALLUVIUM) @ 12.0 feet: core barrel wet on outside.
CCB	100		15				@ 15.5 to 16.5 feet: few fine rootlets.
CCB	100		20				**16.2 to 20.4 feet: SANDY SILTY CLAY (CL)**, very dark greenish gray; medium plasticity fines; 20 percent fine to coarse sand; trace fine gravel; breaks with massive, textured surface; trace fine rootlets; stiff; wet. (ALLUVIUM) @ 17.0 feet: low plasticity.

REMARKS

Drilled to 24.3 feet with 3 3/4-inch I.D. augers and sampled with continuous core barrel. Backfilled with bentonite chips from 21.0 to 24.3 feet. Reamed with 6 1/4-inch I.D. auger with PVC plug to 22.8 feet and installed well. Added 30 gallons of potable water during well installation.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	**Coffin Butte Landfill**	BORING NO.	**MW-23**
LOCATION	**Coffin Butte, Benton County, Oregon**	PAGE	**2 OF 2**
DRILLED BY	**Geo-Tech Explorations, Inc.**	GROUND ELEV.	**242.81'**
DRILL METHOD	**Hollow Stem Auger**	TOTAL DEPTH	**24.30'**
LOGGED BY	**Mike Free**	DATE COMPLETED	**08/02/94**

SAMPLE TYPE	RECOVERY PERCENT		GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION

16.2 to 20.4 feet: SANDY SILTY CLAY (CL), continued.

20.4 to 23.2 feet: CLAYEY SANDY GRAVEL (GC), dark greenish gray; 30 percent fines; 10 percent fine to coarse sand; 60 percent well graded fine to coarse gravel; sand and gravel subangular to well rounded; loose; wet. (ALLUVIUM)

23.2 to 24.3 feet: BASALT, light to very dark brown, some yellow; crushed; 50 percent friable, 50 percent low to moderate hardness; weakly to deeply weathered; wet. (BEDROCK)

Boring terminated at 24.3 feet; sufficient data.

25

30

35

40

WELL COMPLETION DETAILS:

0 to 12.4 feet: 2-inch-diameter, flush-threaded, Schedule 40 PVC blank riser pipe.

12.4 to 22.1 feet: 2-inch-diameter, flush-threaded, Schedule 40 PVC well screen with 0.010-inch machined slots.

22.1 to 22.7 feet: 2-inch-diameter flush-threaded end cap.

0 to 2.0 feet: Concrete.

2.0 to 9.6 feet: Bentonite chips hydrated with potable water.

9.6 to 22.7 feet: 20 - 40 Colorado Silica Sand.

22.7 to 22.8 feet: Slough

22.8 to 24.2 feet: Bentonite chips.

24.2 to 24.3 feet: Slough.

REMARKS

Drilled to 24.3 feet with 3 3/4-inch I.D. augers and sampled with continuous core barrel. Backfilled with bentonite chips from 21.0 to 24.3 feet. Reamed with 6 1/4-inch I.D. auger with PVC plug to 22.8 feet and installed well. Added 30 gallons of potable water during well installation.

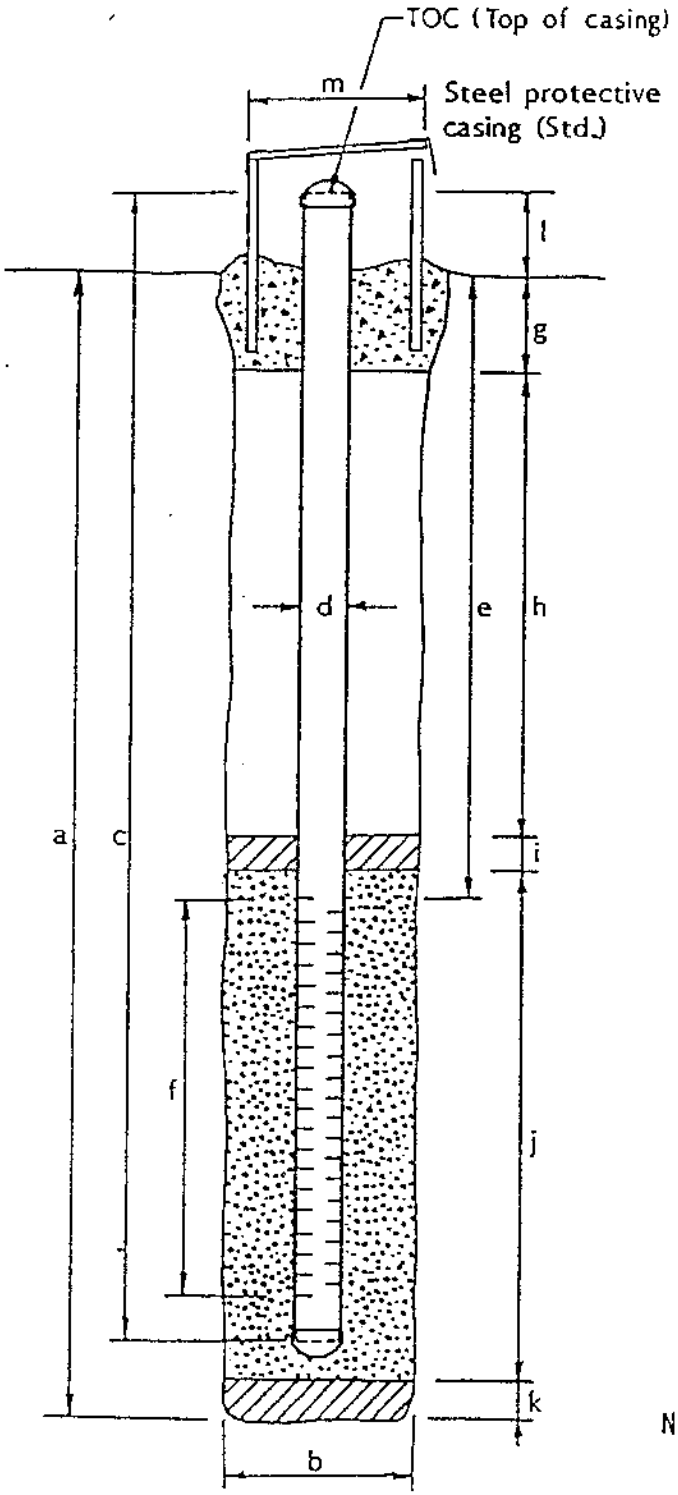
EMCON

WELL DETAILS

EMCON ASSOCIATES

PROJECT NUMBER 0139-001.47
PROJECT NAME Coffin Butte Landfill
LOCATION Benton County, Or
WELL PERMIT NO. 67396

BORING / WELL NO. MW 23
TOP OF CASING ELEV. 244.71
GROUND SURFACE ELEV. 242.81
DATUM Mean Sea Level
INSTALLATION DATE 8-2-94



EXPLORATORY BORING

a. Total depth 24.3 ft.
b. Diameter 10 1/4 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Total casing length 24.7 ft.
Material Sch 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 12.4 ft.
f. Perforated length 9.7 ft.
Perforated interval from 12.4 to 22.1 ft.
Perforation type Machine Slotted
Perforation size 0.010 inch
g. Surface seal (0-2.0) 2.0 ft.
Seal material Concrete
h. Backfill ft.
Backfill material NA
i. Seal (2.0- 9.6) 7.6 ft.
Seal material Bentonite Chips
j. Gravel pack (9.6-22.7) 13.1 ft.
Pack material 20-40 Silica Sand
k. Bottom seal 1.5 ft.
Seal material Bentonite Chips
l. Casing stickup 2.0 ft.
m. Protective casing diameter 6.5 in.
Note: SS Centralizers at 7.2' and 21.2'.

Prepared by: Mike Free

Reviewed by: EQ Date: 8/12/94

LOG OF EXPLORATORY BORING

PROJECT NAME	Coffin Butte/Valley Landfills		
LOCATION	Benton County, Oregon	PAGE	1 OF 2
DRILLED BY	GeoTech Explorations, Inc.	BORING NO.	MW-24
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	35'
LOGGED BY	John Renda	DATE COMPLETED	8/31/98

SAMPLE NUMBER AND TYPE	RECOVERY (%)	BLOWS/6"	GROUND WATER LEVEL	DEPTH IN FT.	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
1 SS	67	6-11-16						**0.0 to 13.5 feet: SILTY CLAY (CL);** yellowish-brown (10 YR, 6/6); 95% medium to high plasticity fines, trace coarse sand; 5% organics (roots); very stiff; dry. (ALLUVIUM)
2 SS	33	10-7-5						
3 SS	100	3-6-8		5				
4 SS	20	3-3-6						
5 SS	100	3-5-8						
6 SS	100	3-3-7		10				
7 SS	100	3-8-11						
8 SS	100	3-9-24						@ 12.0 feet: sand content increases to 5%.
9 SS	100	24-23-17						**13.5 to 35.0 feet: BASALT WEATHERED TO SILTY CLAY (CL) WITH SAND (SW) AND GRAVEL (GC);** brown (7.5 YR, 4/6); 50% medium to high plasticity fines, 40% deeply weathered basaltic gravel; friable; 10% fine to medium sand; dense. (WEATHERED BASALT)
10 SS	33	16-24-50/0.4'		15				
11 SS	100	8-25-36						
12 SS	100	19-22-44	8/31/98 ▼	20				@ 18.0 feet: moist.

REMARKS

EMCON®

LOG OF EXPLORATORY BORING

PROJECT NAME	Coffin Butte/Valley Landfills	PAGE	2 OF 2
LOCATION	Benton County, Oregon	BORING NO.	MW-24
DRILLED BY	GeoTech Explorations, Inc.	TOTAL DEPTH	35'
DRILL METHOD	Hollow Stem Auger	DATE COMPLETED	8/31/98
LOGGED BY	John Renda		

SAMPLE NUMBER AND TYPE	RECOVERY (%)	BLOWS/6"	LITHOLOGIC DESCRIPTION
13 SS	100	12-50/0.4'	
14 SS	67	21-24-50/0.4'	
15 SS	100	19-50/0.4'	
16 SS	40	50/0.4'	@ 24.0 feet: wet.
17 SS	40	50/0.4'	@ 25.0 feet: split spoon refusal.
18 SS	100	50/0.4'	@ 35.0 feet: fractured basalt; auger refusal. @ 35.0 feet: boring terminated.

GROUND WATER LEVEL ▽

DEPTH IN FT. 25 30 35 40

SAMPLES

WELL DETAILS

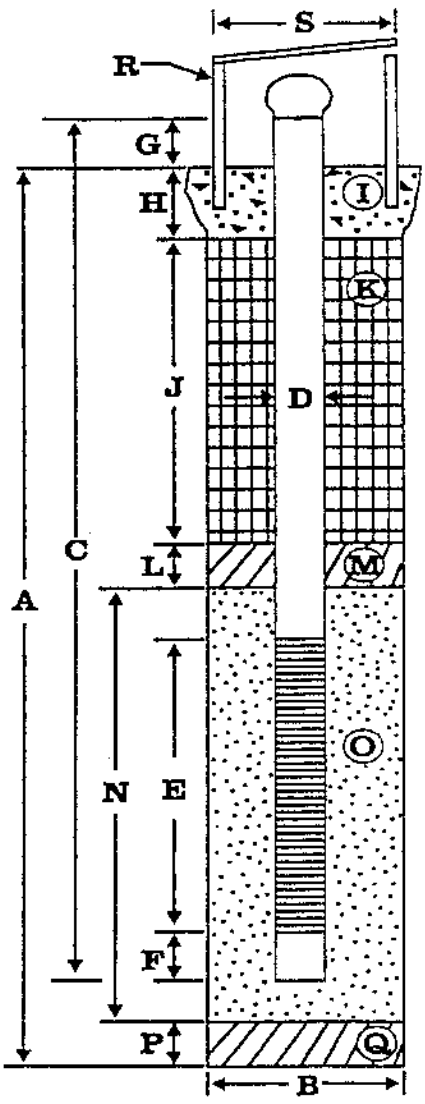
LITHOLOGIC COLUMN

REMARKS

EMCON®

WELL DETAILS

Project Number:	40139-001.065	Boring/Well No.:	MW-24
Client Name:	Valley Landfills, Inc	Top of Casing Elev.:	276.76
Project Name:	Coffin Butte Landfill	Ground Surface Elev.:	273.94
Location:	Benton County, Oregon	Installation Date:	8/31/98
Driller:	Geo-Tech Explorations, Inc.	Permit/Start Card No.:	112462



	Depth (feet)	Elev. (ft, msl)
	3.0	276.94
	2.8	276.76
	0.0	273.94
	1.0	272.94
	1.0	272.94
	18.0	255.94
	19.5	254.44
	34.5	239.44
	35.0	238.94
	35.0	238.94

EXPLORATORY BORING

A. Total depth:	35.0 ft.
B. Diameter	10 in.
Drilling method:	Hollow Stem Auger

WELL CONSTRUCTION

C. Well casing length:	37.7 ft.
Well casing material:	Sched 40 PVC
D. Well casing diameter:	2.0 in.
E. Well screen length:	15.0 ft.
Well screen type:	Machine Slotted
Well screen slot size:	0.020 in.
F. Well sump/end cap length:	0.5 ft.
G. Well casing height (stickup):	2.7 ft.
H. Surface seal thickness:	1.0 ft.
I. Surface seal material:	Concrete
J. Annular seal thickness:	NA ft.
K. Annular seal material:	NA
L. Filter pack seal thickness:	18.0 ft.
M. Filter pack seal material:	Bentonite Chips
N. Sand pack thickness:	17.0 ft.
O. Sand pack material:	8X12 Silica Sand
P. Bottom material thickness:	NA ft.
Q. Bottom material:	NA
R. Protective casing material:	Steel
Well centralizer depths:	20 and 34 ft.
S. Protective casing diameter:	6.5 in.

NOTES:

Installed by: John J. Renda

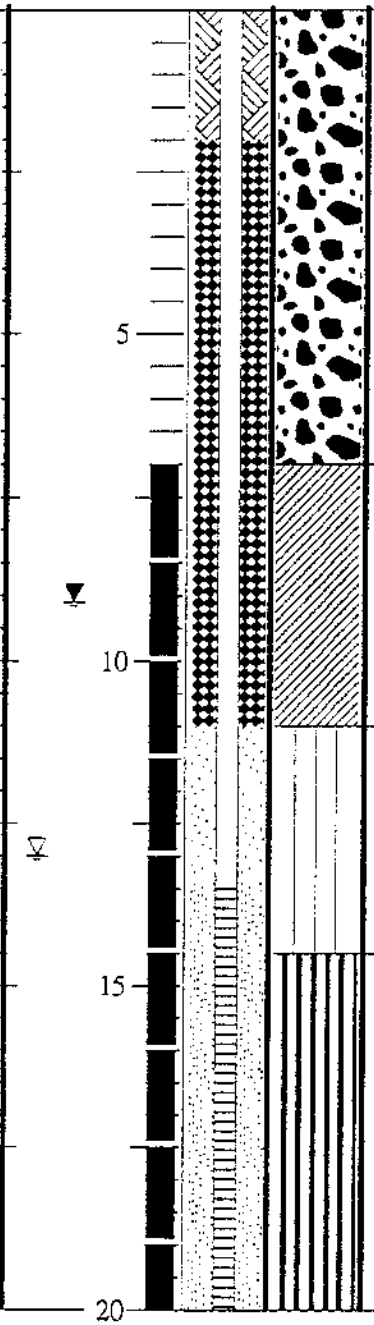
Reviewed by: [signature]

Date: 2/8/99

LOG OF EXPLORATORY BORING

PROJECT NAME	Coffin Butte Landfill	BORING NO.	MW-25
LOCATION	Benton County, Oregon	PAGE	1 OF 2
DRILLED BY	Geo-Tech Explorations, Inc.	REFERENCE ELEV.	242.79
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	32.5 feet
LOGGED BY	John Renda	DATE COMPLETED	6/4/99

SAMPLE NUMBER	BLOWS PER FOOT	LITHOLOGIC DESCRIPTION
		0.0 to 7.0 feet: GRAVEL FILL.
SS-1	3-4-6 (10)	**7.0 to 11.0 feet:** SILTY CLAY (CL); very dark grayish brown (2.5YR 3/2); medium plasticity fines; silty; trace fine to medium sand; root hairs; firm to stiff; damp. (ALLUVIUM)
SS-2	2-3-4 (7)	
SS-3	1-2-3 (5)	
SS-4	4-6-10 (16)	**11.0 to 14.5 feet:** CLAYEY SILT (ML); dark gray (2.5YR 4/1); medium plasticity fines; trace fine to medium sand; root hairs; stiff, crumbly texture. (ALLUVIUM)
SS-5	4-6-8 (14)	@ 13.0 feet: wet.
SS-6	4-7-10 (17)	**14.5 to 24.0 feet:** SILT (MH); dark greenish gray (10GY 4/1); medium to high plasticity fines; root hairs; moist. (ALLUVIUM)
SS-7	3-5-5 (10)	
SS-8	5-11-11 (22)	
SS-9	3-4-6	



REMARKS

SS = samples collected with a split-spoon stainless steel sampler.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Coffin Butte Landfill	BORING NO.	MW-25
LOCATION	Benton County, Oregon	PAGE	2 OF 2
DRILLED BY	Geo-Tech Explorations, Inc.	REFERENCE ELEV.	242.79
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	32.5 feet
LOGGED BY	John Renda	DATE COMPLETED	6/4/99

SAMPLE NUMBER	BLOWS PER FOOT	GROUND WATER LEVEL	DEPTH IN FEET	SOIL SAMPLES	WELL DETAILS	LITHO-LOGIC COLUMN	LITHOLOGIC DESCRIPTION
	(10)						**14.5 to 24.0 feet: SILT (MH)**; continued.
SS-10	3-6-8 (14)						
SS-11	4-8-7 (15)						
SS-12	2-3-5 (8)						**24.0 to 32.5 feet: CLAY (CL)**; dark greenish gray (10Y 3/1); medium to high plasticity clay; trace fine to coarse, subrounded to well-rounded sand; relict basalt texture visible; root hairs; stiff; moist. (WEATHERED BASALT)
SS-13	3-4-6 (10)		25				
SS-14	4-8-12 (20)						
SS-15	5-10-13 (23)						
SS-16	8-13-15 (28)		30				
SS-17	4-6-7 (13)						
							Boring terminated at 29.5 feet. Split-spoon sampler advanced to 32.5 feet.
			35				
			40				

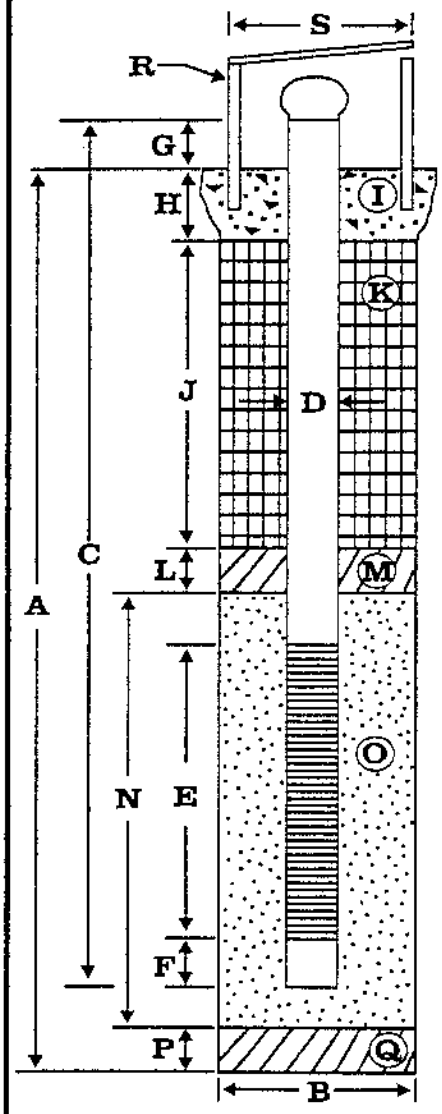
REMARKS

SS = samples collected with a split-spoon stainless steel sampler.

EMCON®

WELL DETAILS

Project Number:	40139-001.071	Boring/Well No.:	MW-25
Client Name:	Valley Landfills, Inc.	Top of Casing Elev.:	242.79
Project Name:	Coffin Butte Landfill	Ground Surface Elev.:	240.39
Location:	Benton County, Oregon	Installation Date:	6/4/99
Driller:	Geo-Tech Explorations	Permit/Start Card No.:	122965



	Depth (feet)	Elev. (ft, msl)
	2.6	243.0
	2.4	242.8
	0.0	240.4
	2.0	238.4
	11.0	229.4
	13.5	226.9
	23.5	216.9
	24.0	216.4
	24.0	216.4
	32.5	207.9

Installed by: J. Renda

Reviewed by: ET

Date: 7/20/99

EXPLORATORY BORING

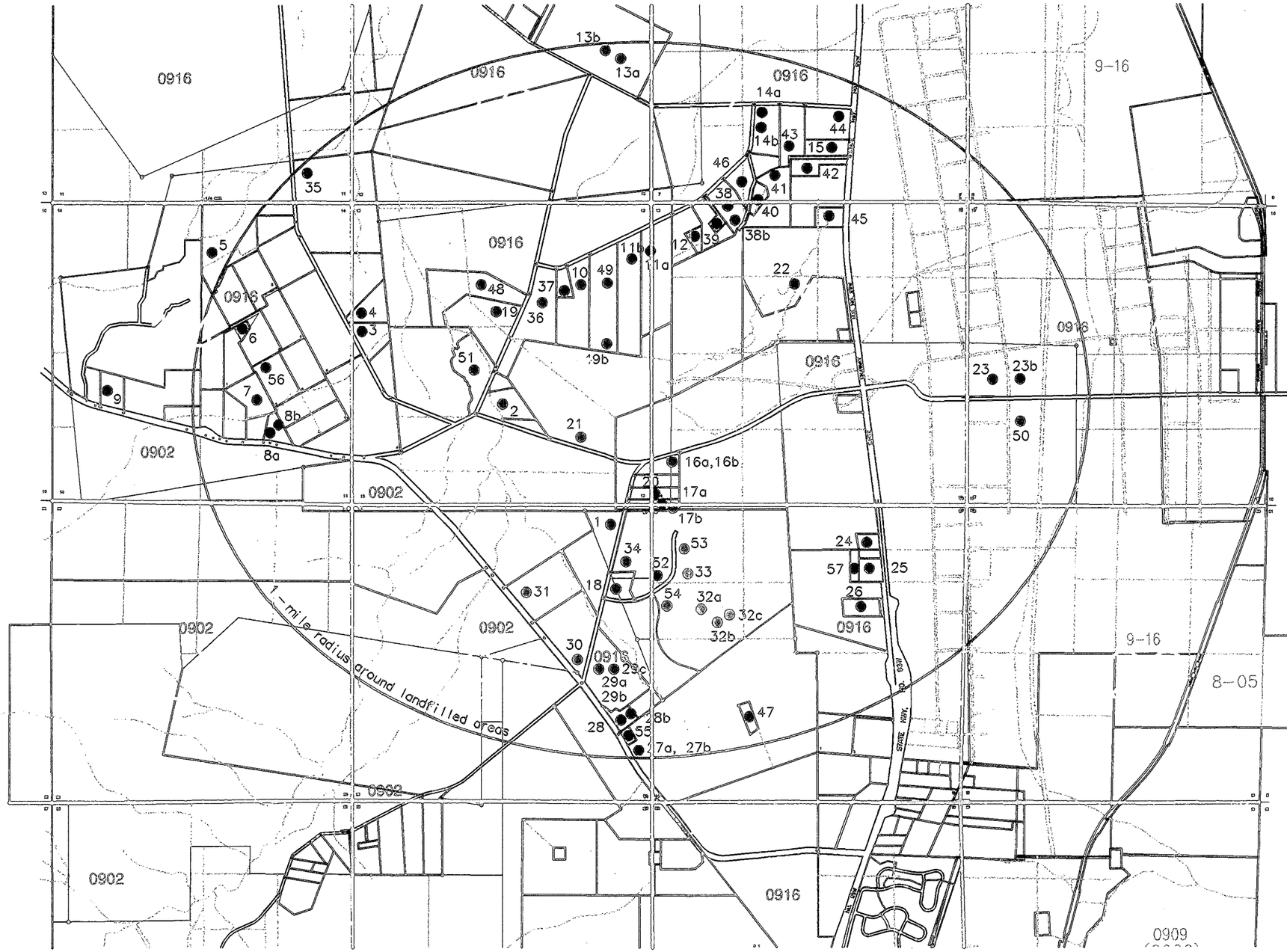
A.	Total depth:	32.5 ft.
B.	Diameter	10 in.
	Drilling method:	Hollow Stem Auger

WELL CONSTRUCTION

C.	Well casing length:	26.7 ft.
	Well casing material:	Schedule 40 PVC
D.	Well casing diameter:	2 in.
E.	Well screen length:	10 ft.
	Well screen type:	Machine Slotted
	Well screen slot size:	0.020 in.
F.	Well sump/end cap length:	0.5 ft.
G.	Well casing height (stickup):	1.5 ft.
H.	Surface seal thickness:	2.0 ft.
I.	Surface seal material:	Cement
J.	Annular seal thickness:	9 ft.
K.	Annular seal material:	Bentonite Chips
L.	Filter pack seal thickness:	NA ft.
M.	Filter pack seal material:	NA
N.	Sand pack thickness:	13 ft.
O.	Sand pack material:	10 x 20 Silica Sand
P.	Bottom material thickness:	8.5 ft.
Q.	Bottom material:	Bentonite Chips
R.	Protective casing material:	Steel
	Well centralizer depths:	13.0 ft.
		23.5 ft.
S.	Protective casing diameter:	6.5 in.

NOTES:

Well coordinates: Northing: 1181.5 Easting: 2626.8



NUMBER OF WELLS NOT REFERENCED TO FIELD LOCATIONS

TOWNSHIP 10S

RANGE 4W

SECTION 7 = 6 WELLS
SECTION 8 = 0 WELLS
SECTION 17 = 3 WELLS
SECTION 18 = 13 WELLS
SECTION 19 = 16 WELLS
SECTION 20 = 2 WELLS

RANGE 5W

SECTION 11 = 0 WELLS
SECTION 12 = 3 WELLS
SECTION 13 = 16 WELLS
SECTION 14 = 19 WELLS
SECTION 23 = 0 WELLS
SECTION 24 = 11 WELLS

0 2000 4000

SCALE IN FEET

DATE 5/15/00
DWN JAC
APP KT 5/15/00
REV
PROJECT NO.
793036

Figure 2-3b
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
BENTON COUNTY, OREGON

BENEFICIAL USE MAP

IMAGE 1. . <No Images>
Dimscale: 1 Liscale: 2000 Psltscale: 1 XREF Files: <No Xrefs>
N:\Cad\Drawings\401.39001.070\070f2-5.dwg 15/May/00 jclugston
1" 1/2" 0" 1"

NOTICE TO WATER WELL CONTRACTOR

Exhibit 12 Page 91

The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED
OCT 4 1972
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

Bent 1760 EMCON 16a

State Well No. 10S/4W-1?

State Permit No.

(1) OWNER:
Name Robert Westfall
Address Rt 1 Box 303E
Corvallis, Oregon

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☑ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☑
6 " Diam. from 0 ft. to 26 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
AIR " " "
Bailer test 20 gal./min. with 47 ft. drawdown after 2 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 9 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 1 sacks
Number of sacks of bentonite used in well seal — sacks
Brand name of bentonite —
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☐ Yes ☑ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Benton Driller's well number
SW ¼SW¼ Section 18 T. 10S R. 4W W
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 48
Static level 17 ft. below land surface. Date 9/15
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 74 ft. Depth of completed well 74

Formation: Describe color, texture, grain size and structure of materi and show thickness and nature of each stratum and aquifer penetra with at least one entry for each change of formation. *Report each chang position of Static Water Level and indicate principal water-bearing str*

MATERIAL	From	To	SW
Soil	0	2	
Clay, yellow	2	16	
Broken Sandrock in clay yellow	16	20	
Sandrock, hard, blue	20	48	
Sandrock, blue, broken water stratum	48	56	
Sandrock, blue.	56	74	

Work started Sept 14 19 72 Completed Sept 14 19
Date well drilling machine moved off of well Sept 15 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervisi Materials used and information reported above are true to best knowledge and belief.
[Signed] Leroy W. Mutschler Date 9/15, 19
(Drilling Machine Operator)
Drilling Machine Operator's License No. 80

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report true to the best of my knowledge and belief.
Name L.W. Mutschler well Drilling
(Person, firm or corporation) (Type or print)
Address 7555 N.W. Oak Creek Dr. Corvallis Ore 97330
[Signed] Leroy W. Mutschler
(Water Well Contractor)
Contractor's License No. 237 Date Sept 15, 19

NOTICE TO WATER WELL CONTRACTOR: The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED AUG 28 1972 STATE ENGINEER SALEM, OR.

WATER WELL REPORT
STATE OF OREGON
(Please type or print) (Do not write above this line)

Bent EMCON 166 1773

State Well No. 10S/4W-18

State Permit No. .....

(1) OWNER:
Name Robert Westfall
Address Rt 1 Box 303E Corvallis, Oregon

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☑ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☑
6 " Diam. from 0 ft. to 36 ft. Gage .250
..... " Diam. from ..... ft. to ..... ft. Gage .....
..... " Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☑ No.
Type of perforator used
Size of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☑ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " "
" " "
Bailer test 22 gal./min. with Full ft. drawdown after 1 hrs.
Artesian flow ..... g.p.m.
Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 20 ft.
Diameter of well bore to bottom of seal 9 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 1 sacks
Number of sacks of bentonite used in well seal ..... sacks
Brand name of bentonite .....
Number of pounds of bentonite per 100 gallons of water ..... lbs./100 gals.
Was a drive shoe used? ☐ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? ..... depth of strata .....
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
County Benton Driller's well number .....
¼ ¼ Section 18 T. 10S R. 4W W.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 43
Static level 15 ft. below land surface. Date 8/17/
Artesian pressure ..... lbs. per square inch. Date .....

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 74 ft. Depth of completed well 74

Formation: Describe color, texture, grain size and structure of materia and show thickness and nature of each stratum and aquifer penetrat with at least one entry for each change of formation. *Report each change position of Static Water Level and indicate principal water-bearing stra*

MATERIAL	From	To	SWI
Soil	0	2	
Clay, yellow	2	30	
Sandrock, blue	30	43	
Sandrock, blue, broken WATER STRATUM	43	74	

Work started Aug 17 1972 Completed Aug 17 19
Date well drilling machine moved off of well Aug 17 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervisi Materials used and information reported above are true to best knowledge and belief.
[Signed] Leroy A. Mutschler (Drilling Machine Operator) Date 8/18, 19
Drilling Machine Operator's License No. 80

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report true to the best of my knowledge and belief.
Name LA Mutschler well Drilling (Person, firm or corporation) (Type or print)
Address 7555 N.W. Oak Creek Dr. Corvallis Oregon
[Signed] Leroy A. Mutschler (Water Well Contractor)
Contractor's License No. 237 Date Aug 18, 19

Exhibit E21

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED
OCT - 7 1971
STATE ENGINEER
SALEM OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

Ben & Encon 17a
2146

State Well No. 10/5W-24
State Permit No.

(1) OWNER:
Name Don Helm
Address 966 N. W. Sequoia St Corvallis, Oregon

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 41 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS: Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
Tested with air estimated 300 GPH "could fluctuate
~~Bailer test~~ gal./min. with 347 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement Grout
Well sealed from land surface to 39 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 6 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Benton Driller's well number
¼ ¼ Section 24 T. 10S5W R. W.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 76
Static level 43 ft. below land surface. Date 9-18-71
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6
Depth drilled 400 ft. Depth of completed well 400

Formation: Describe color, texture, grain size and structure of materi and show thickness and nature of each stratum and aquifer penetrat with at least one entry for each change of formation. *Report each change position of Static Water Level and indicate principal water-bearing stra*

MATERIAL	From	To	SWI
Top Soil	0	3	
Yellow Clay	3	11	
Clay & Boulders	11	24	
Brown Sandstone soft	24	33	
Blue Sandstone	33	37	
Black Basalt	37	109	
Blue Black Cong.	109	163	
Black Basalt (Broken)	163	171	
Black Basalt	171	296	
Bleu Black Sandstone Cong	296	400	

Work started 9-16-71 19 Completed 9-18-71 19
Date well drilling machine moved off of well 9-18-71 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervisic Materials used and information reported above are true to r best knowledge and belief.
[Signed] Clarence A. Kinsey (Drilling Machine Operator) Date 9-30-71, 19
Drilling Machine Operator's License No. 160

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report true to the best of my knowledge and belief.
Name Casey Jones Well Drilling Co Inc (Person, firm or corporation) (Type or print)
Address R 8 Box 695 Pleasant Hill, Oregon
[Signed] Delbert L Jones (Water Well Contractor)
Contractor's License No. 103 Date 9-30-71, 19

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT.
SALEM, OREGON 97310
within 30 days from the date of well completion.

Exhibit 12 Page 94

Bert 244

EMCON 176

WATER WELL REPORT

STATE OF OREGON
(Please type or print)
(Do not write above this line)

RECEIVED
MAY 24 1978
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 10S/5W-2
State Permit No.

(1) OWNER:
Name John Wilkenson
Address 27469 Fern Ridge Rd.
Sweet Home Ore.

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED:
Threaded ☐ Welded ☒
6 " Diam. from 0 ft. to 20 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
"Tested w/Air 15 gpm " "
Bailer test gal./min. with 189 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 12 sacks
How was cement grout placed? poured
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Benton Driller's well number
¼ ¼ Section 24 T. 10S R. 5W W
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 196
Static level 31 ft. below land surface. Date 5/1/78
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6"
Depth drilled ft. Depth of completed well
Formation: Describe color, texture, grain size and structure of materi and show thickness and nature of each stratum and aquifer penetra with at least one entry for each change of formation. Report each chang position of Static Water Level and indicate principal water-bearing str

MATERIAL	From	To	SW
Topsoil	0	5	
Brown Broken Basalt	5	18	
Blue basalt	18	114	
Blue sandstone	114	138	
Blue basalt	138	158	
Blue sandstone	158	220	

Work started 4/27/78 19 Completed 5/1/78 19
Date well drilling machine moved off of well 5/1/78 19

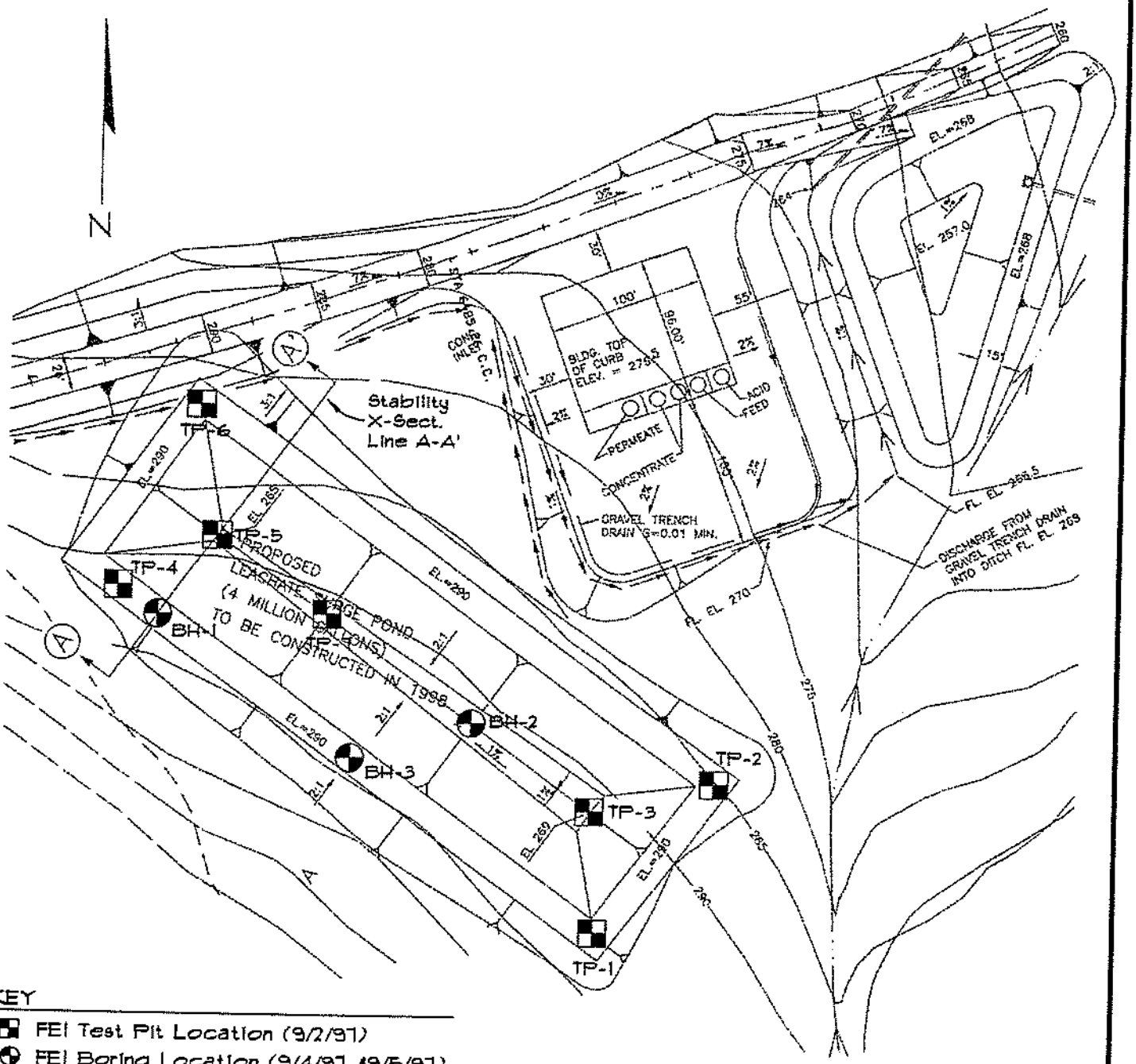
Drilling Machine Operator's Certification:
This well was constructed under my direct supervisi Materials used and information reported above are true to best knowledge and belief.
[Signed] Claude Irby (Drilling Machine Operator) Date 5/8, 19
Drilling Machine Operator's License No. 1133

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report true to the best of my knowledge and belief.
Name Bert Jones (Person, firm or corporation) (Type or print)
Address 29400 Santiam Hwy Lebanon
[Signed] Bert Jones (Water Well Contractor)
Contractor's License No. 514 Date 5/8/78, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

Appendix A

Figures



KEY

- FEI Test Pit Location (9/2/97)
- FEI Boring Location (9/4/97 &9/5/97)

Notes:
1. Site Plan Provided by Thiel Engineering
2. Test Pit and Boring Locations are Approximate

Scale: 1" = 100'

DATE 10/2/97
DWN. WLN
APPR. _____
REVIS. _____
PROJECT NO.
97100184

FOUNDATION ENGINEERING INC.
PROFESSIONAL GEOTECHNICAL SERVICES
5030 SW PHILOMATH BLVD.
CORVALLIS, OR 97333-1044
BUS. (541) 757-7646 FAX (541) 757-7650

SITE PLAN
COFFIN BUTTE LEACHATE POND

BENTON COUNTY, OREGON

FIGURE NO.
1

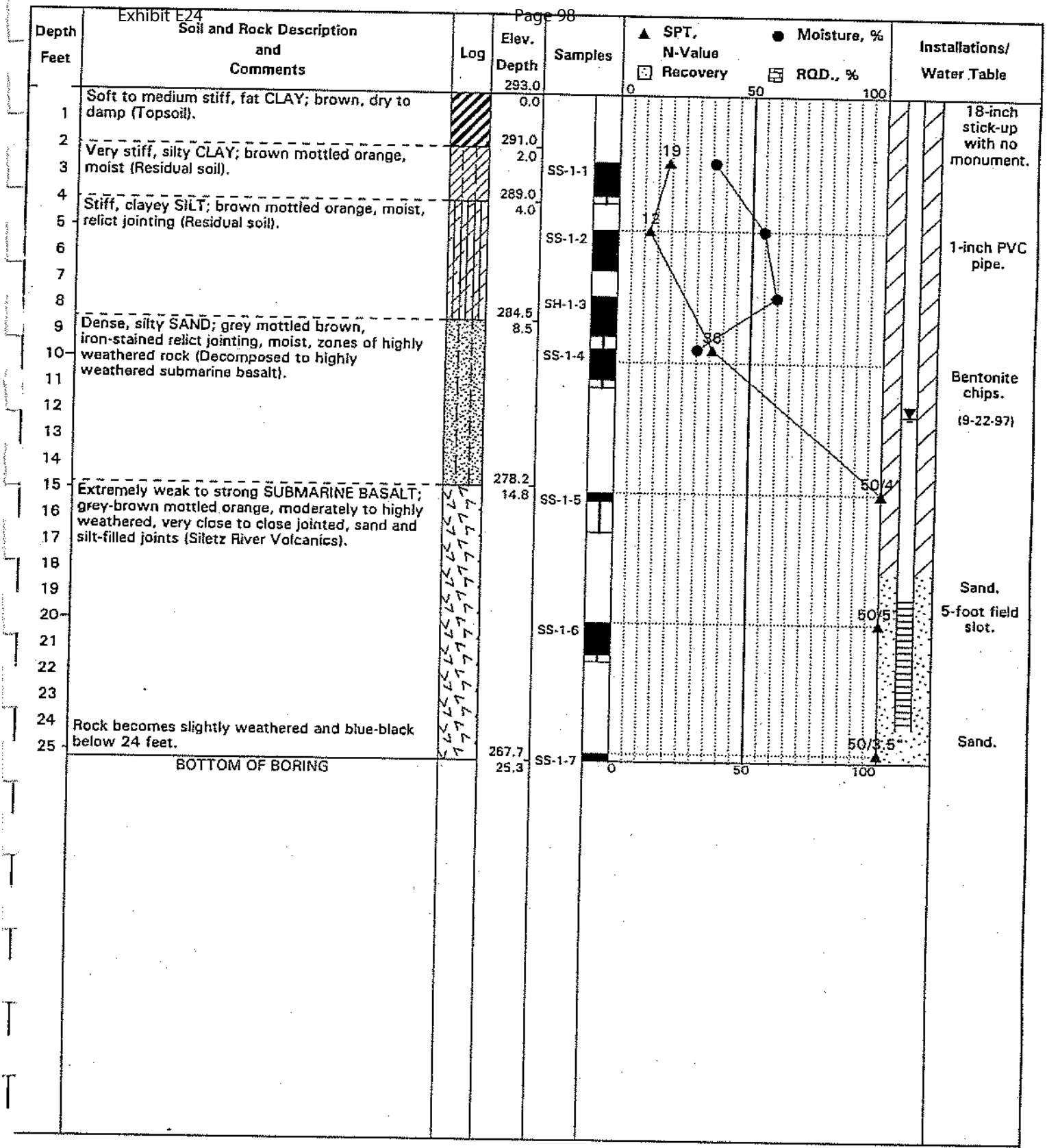
NAME: COFFIN

Appendix B

Boring & Test Pit Logs

Professional Geotechnical Services

Foundation Engineering, Inc.



Project No.: 97100184

Surface Elevation: 293 feet (Approx.)

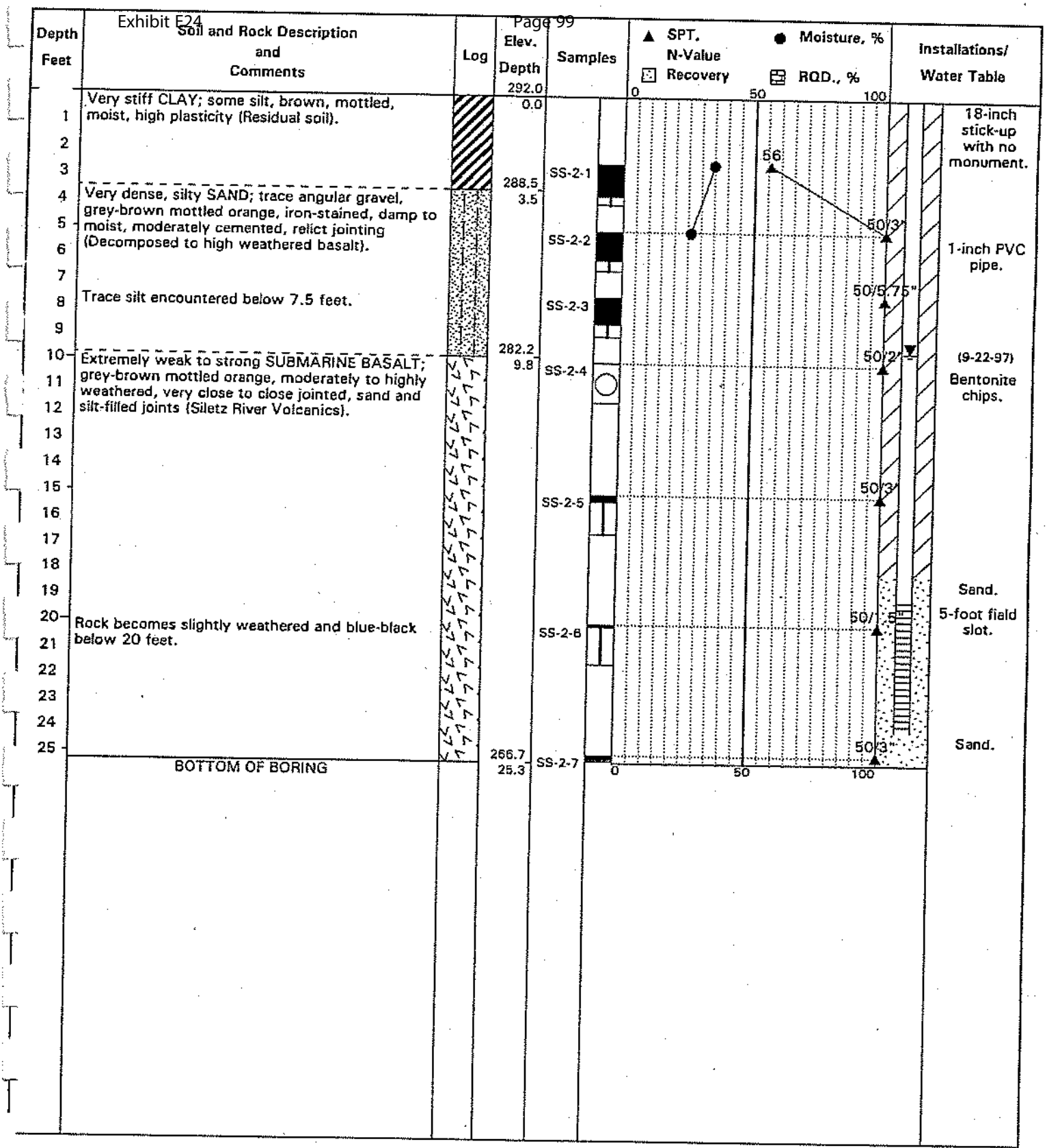
Date of Boring: September 4, 1997

Boring Log: BH-1

Coffin Butte Leachate Pond

Corvallis, Oregon

Foundation Engineering, Inc.



Project No.: 97100184

Surface Elevation: 292 feet (Approx.)

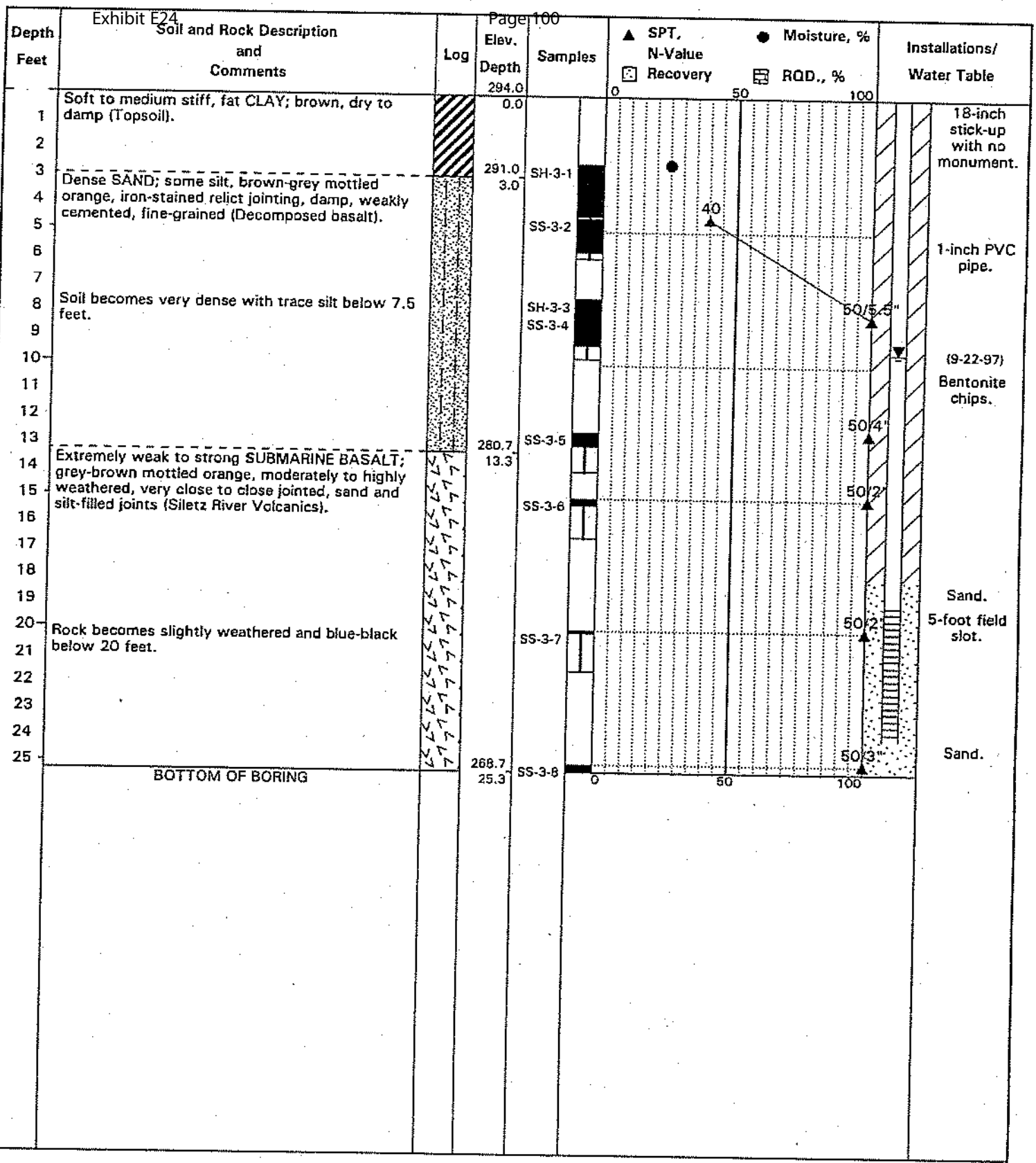
Date of Boring: September 4, 1997

Boring Log: BH-2

Coffin Butte Leachate Pond

Corvallis, Oregon

Foundation Engineering, Inc.



Project No.: 97100184

Surface Elevation: 294 feet (Approx.)

Date of Boring: September 5, 1997

Boring Log: BH-3

Coffin Butte Leachate Pond

Corvallis, Oregon

Foundation Engineering, Inc.

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
6 inches of ground water infiltration after 4 hours.	1-							Very stiff CLAY; some silt, dark brown, dry to damp, high plasticity, numerous roots, fissured (Residual soil).
	2-	S-1-1						
Small to medium-sized roots extend to 3 feet.	3-	WC = 19.4						
	4-	S-1-2						Dense SAND; some cobbles, trace silt and boulders, light orange-brown, iron-stained, dry to damp, weakly cemented, seams of high plasticity clay. Soil is composed of spheroidally weathered corestones in matrix of decomposed basalt.
	5-							
Hard digging encountered below 6 feet. 2-foot diameter boulder encountered at 6.5 feet.	6-							
	7-							
	8-							Very dense COBBLES and BOULDERS; some sand and gravel, orange-brown, dry to damp, relict volcanic texture, rock is rounded to angular (Slight to highly weathered basalt in a decomposed matrix).
	9-							
	10–							
	11-							
	12-							Weak to strong SUBMARINE BASALT; dark grey mottled orange, slightly to highly weathered, very close to close jointed, stained and sand filled joints (Siletz River Volcanics).
Test pit sidewalls remained vertical.	13-							
	14-							
Encountered digging refusal at 15 feet.	15-							
	16-							BOTTOM OF TEST PIT
	17-							
	18-							
	19-							

Project No.: 97100184

Surface Elevation: 293 feet (Approx.)

Date of Test Pit: September 2, 1997

Test Pit Log: TP-1

Coffin Butte Leachate Pond

Corvallis, Oregon

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
12 inches of ground water infiltration after 4 hours.	1-							Very stiff CLAY; some silt, dark brown, damp, fissured, slickensides, high plasticity (Residual soil).
Fine roots encountered to 2 feet.	2-	S-2-1						
	3-	WC = 26.9						
	4-	S-2-2						Dense SAND; some cobbles, trace silt, orange brown, iron-stained, damp, weakly cemented, seams of high plasticity clay to 4.5 feet. Soil is composed of spheroidally weathered corestones in a matrix of decomposed basalt.
	5-							
	6-							
	7-							
	8-							
	9-							
	10–							
Hard digging encountered at 10.5 feet.	11-							Weak to strong SUBMARINE BASALT; dark grey mottled orange, slightly to highly weathered, very close to close jointed, stained and sand-filled joints (Siletz River Volcanics).
	12-							
Test pit sidewalls remained vertical. Encountered digging refusal at 14 feet.	13-							
	14-							
	15-							BOTTOM OF TEST PIT
	16-							
	17-							
	18-							
	19-							

Project No.: 97100184

Surface Elevation: 285 feet (Approx.)

Date of Test Pit: September 2, 1997

Test Pit Log: TP-2

Coffin Butte Leachate Pond

Corvallis, Oregon

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
No ground water infiltration encountered.	1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19-	S-3-1 WC = 25.1 S-3-2				+/-1.6		Very stiff CLAY; some silt, dark brown, damp, fissured, slickensides, high plasticity (Residual soil). Dense SAND; some cobbles, trace silt, orange-brown, iron-stained, damp, weakly cemented, seams of high plasticity clay. Soil is composed of spheroidally weathered corestones in a matrix of decomposed basalt. Weak to strong SUBMARINE BASALT; dark grey mottled orange, slightly to highly weathered, close to very close jointed, stained and sand-filled joints (Siletz River Volcanics). BOTTOM OF TEST PIT
Test pit sidewalls remained vertical. Encountered digging refusal at 15 feet.								

Project No.: 97100184
Surface Elevation: 291 feet (Approx.)
Date of Test Pit: September 2, 1997

Test Pit Log: TP-3
Coffin Butte Leachate Pond
Corvallis, Oregon

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
No ground water infiltration encountered. Fine roots encountered to 2 feet.	1- 2- 3- 4- 5- 6- 7- 8- 9- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19-	S-4-1 WC = 18.3 S-4-2 WC = 33.5 S-4-3 S-4-4				+/-1.3		Soft to medium stiff SILT; brown, dry to damp (Topsoil). Very stiff CLAY; some silt, brown, damp, high plasticity, fissured, slickensides (Residual soil). Medium stiff SILT; orange-brown, moist, relict jointing, blocky (Residual soil). Extremely weak to very weak SUBMARINE BASALT; brown, highly weathered, close to very close jointed, joints are wet and stained (Siletz River Volcanics). BOTTOM OF TEST PIT
Test pit sidewalls remained vertical. Digging terminated at 17 feet due to excavator limitations.								

Project No.: 97100184
Surface Elevation: 292 feet (Approx.)
Date of Test Pit: September 2, 1997

Test Pit Log: TP-4
Coffin Butte Leachate Pond
Corvallis, Oregon

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
No ground water infiltration encountered.	1-	S-5-1 WC = 19.7						Medium stiff to stiff SILT; brown, dry to damp (Topsoil).
Fine roots encountered to 3 feet.	2-3-4-5-	S-5-2				0.48		Dense, silty SAND; orange-brown, damp, fine-grained (Decomposed basalt).
Test pit sidewalls remained vertical.	6-7-8-9-							
Encountered digging refusal at 11 feet on rock shelf.	10-11-							Very dense, sandy COBBLES and GRAVEL; brown, moist, angular to rounded clasts. Soil is composed of spheroidally weathered corestones in a matrix of decomposed basalt.
	12-13-14-15-16-17-18-19-							BOTTOM OF TEST PIT

Project No.: 97100184

Surface Elevation: 289 feet (Approx.)

Date of Test Pit: September 2, 1997

Test Pit Log: TP-5

Coffin Butte Leachate Pond

Corvallis, Oregon

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
No ground water infiltration encountered.	1-					0.2		Soft to medium stiff SILT; brown, dry to damp (Topsoil).
	2-					0.4		
Fine roots encountered to 3 feet.	3-4-							Very stiff CLAY; some silt, moist, brown, high plasticity, fissured, slickensides (Residual soil).
	5-					1.3		
	6-	S-6-1 WC = 36.1						
	7-8-9-							Medium stiff SILT; trace to some clay, orange-brown, residual volcanic texture (Decomposed basalt).
Test pit sidewalls remained vertical.	10-11-							
	12-13-14-							Hard SILT; grey-brown, damp, relict jointing (Decomposed basalt). Soil breaks into angular, gravel-sized chunks.
	15-	WC = 27.7						
	16-	S-6-2						
Digging terminated at 17 feet due to excavator limitations.	17-18-19-							BOTTOM OF TEST PIT

Project No.: 97100184

Surface Elevation: 282 feet (Approx.)

Date of Test Pit: September 2, 1997

Test Pit Log: TP-6

Coffin Butte Leachate Pond

Corvallis, Oregon

Comments	Depth, Inches	Sample #	Location	Class Symbol	Water Table	C, TSF	Symbol	Soil and Rock Description
No ground water infiltration encountered.	1- 2- 3- 4-							Soft to medium stiff SILT; brown, dry to damp (Topsoil and residual soil).
	5- 6- 7-							Medium dense to dense SAND; some cobbles, orange-brown, damp. Soil is composed of spheroidally weathered corestones in a matrix of decomposed basalt.
Hard digging encountered below 8 feet. Test pit sidewalls remained vertical.	8- 9- 10- 11- 12-							Dense to very dense, sandy COBBLES and GRAVEL; orange-brown, moist (Moderately to highly weathered basalt in a decomposed matrix). Medium strong to strong SUBMARINE BASALT; dark brown mottled orange, moderately to highly weathered, close to very close jointed (Siletz River Volcanics).
	13- 14- 15- 16- 17- 18- 19-							BOTTOM OF TEST PIT

Project No.: 97100184

Surface Elevation: 291 feet (Approx.)

Date of Test Pit: September 2, 1997

Test Pit Log: TP-7

Coffin Butte Leachate Pond

Corvallis, Oregon

APPENDIX C

FIELD FORMS

The Wallace Group
62915 NE 18th Street, Suite 1
Bend, OR 97701
(541) 382-4707

BORING NUMBER B-01

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED _____ **COMPLETED** _____
GROUND ELEVATION _____
DRILLING CONTRACTOR _____
GROUND WATER LEVELS:
DRILLING METHOD _____
AT TIME OF DRILLING ---
LOGGED BY _____ **CHECKED BY** _____
24HRS AFTER DRILLING ---
NOTES _____

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
0			
5			
10			
15			
20			

TWG-BORING LOGS - WALLACE GROUP DATA TEMPLATE.GDT - 6/24/21 11:22 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

The Wallace Group
62915 NE 18th Street, Suite 1
Bend, OR 97701
(541) 382-4707

TEST PIT NUMBER TP-01

CLIENT CEC, Inc.
PROJECT NAME Coffin Butte Landfill
PROJECT NUMBER 21129-1
PROJECT LOCATION Corvallis, OR
DATE STARTED _____ **COMPLETED** _____
GROUND ELEVATION _____
EXCAVATION CONTRACTOR _____
GROUND WATER LEVELS:
EXCAVATION METHOD _____
AT TIME OF EXCAVATION ---
LOGGED BY _____ **CHECKED BY** _____
24HRS AFTER EXCAVATION ---
NOTES _____

DEPTH (ft)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION
0			
5			
10			
15			
20			

TWG-TEST PITS - WALLACE GROUP DATA TEMPLATE.GDT - 6/24/21 11:24 - W:\GINT PRO - FILES\BENTLEY\GINT\PROJECTS\21129-1 COFFIN BUTTE LANDFILL.GPJ

Figure: A - 1

EXHIBIT 25
OREGON DEQ APPROVAL OF WORK PLAN

From: SADOFSKY Seth * DEQ <seth.sadofsky@deq.state.or.us>
Sent: Monday, August 9, 2021 3:56 PM
To: Eric Tuppan <eric@tuppanconsultants.com>; GAO Hugh * DEQ <hugh.gao@deq.state.or.us>
Subject: RE: Coffin Butte Expansion Area workplan

Hi Eric,
DEQ agrees with and approves this work plan for site characterization.
I'm out the rest of this week, but let me know when you get the field work scheduled and I will try and get out there.
Seth

Seth Sadofsky, PhD, RG
Hydrogeologist, Materials Management
Oregon Department of Environmental Quality
165 E. 7th Avenue, Suite 100
Eugene, Oregon 97405
Seth.Sadofsky@deq.state.or.us
541-687-7329 office - Forwards to cell during work hours
He/Him

From: Eric Tuppan <eric@tuppanconsultants.com>
Sent: Wednesday, August 4, 2021 3:27 PM
To: SADOFSKY Seth * DEQ <seth.sadofsky@deq.state.or.us>
Subject: Coffin Butte Expansion Area workplan

Seth,

Just checking in to see where you/DEQ is with review of the workplan. At the moment, we are tentatively scheduled for starting the test pits on August 16 for several days and then the borings will begin after Labor Day.

Hope you're doing well.

Eric

Eric J. Tuppan, R.G.
TUPPAN CONSULTANTS LLC
460 Second Street, Suite 103, Lake Oswego, OR 97034
t 503 675 1335 | c 503 866 2551
eric@tuppanconsultants.com | www.tuppanconsultants.com

This message is intended only for the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If you are not the intended recipient, or the agent responsible for delivering the message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited, and you are requested to please notify Tuppan Consultants LLC immediately by telephone, and return the original message to us at the above address. Opinions, conclusions and other information in this message that do not relate to the official business of Tuppan Consultants LLC shall be understood as neither given nor endorsed by it. Although this message and any attachments are believed to be free of any virus or other defect that might affect any computer system into which it is received and opened, it is the responsibility of the recipient to ensure that it is virus free, and no responsibility is accepted by Tuppan Consultants LLC for any loss or damage arising in any way from its use.

EXHIBIT 26
ARCHAEOLOGICAL REPORT

Archaeological Investigations Northwest, Inc.

3510 N.E. 122nd Ave. • Portland, Oregon 97230
Phone (503) 761-6605 • Fax (503) 761-6620

Vancouver Phone (360) 696-7473
E-mail: ainw@ainw.com
Web: www.ainw.com

MEMO

Date: December 19, 2023

To: Jeff Shepherd, P.E., Civil & Environmental Consultants, Inc.

From: Eva Hulse, Ph.D., R.P.A., Senior PM/Senior Geoarchaeologist
Kristen Heasley, Ph.D., R.P.A., Assistant PM/Supervising Archaeologist

Re: Coffin Butte Landfill Expansion Project
Benton County, Oregon
Cultural Resource Survey and Archaeological Testing and Evaluation
AINW Report No. 5127

Archaeological Investigations Northwest, Inc. (AINW), has conducted a cultural resource survey and archaeological testing and evaluation of 85 acres on behalf of Valley Landfills, Inc., for proposed landfill expansion. The Coffin Butte Landfill Expansion project study involved background review, pedestrian survey, excavation of 76 shovel tests, and excavation of five quarter test units. The survey was conducted to comply with the Oregon State Historic Preservation Office (SHPO) standards, with Benton County land use conditions, and with Section 106, as amended, for the portion of the project that will be subject to review by the U.S. Army Corps of Engineers. A portion of the archaeological shovel testing and all of the quarter test unit excavations were conducted under SHPO permit AP-3341.

As a result of the survey, AINW identified and recorded twelve archaeological resources.

- The project area does not overlap any recorded elements of the former 1941 Camp Adair/Adair Air Force Station, and no archaeological deposits pertaining to the Camp Adair site were encountered. No historic-period buildings or structures are within the project area.
- There are eight pre-contact (Native American) isolates consisting of between one and nine artifacts.
- There are two multi-component isolates with both historic-period and pre-contact artifacts. The sparse historic-age artifacts are from casual debris disposal, as well as from municipal compost spread in portions of the project area.
- There are two pre-contact archaeological sites composed primarily of stone fragments that were left behind when Native people made stone tools.

AINW excavated quarter test units at the two archaeological sites to evaluate their significance and integrity. The archaeological findings suggest that the area was used as long as 3,000 years ago by Native people, for making stone tools and possibly for plant gathering.

Project Recommendations

AINW recommends a finding of No Adverse Effect on Historic Properties as long as conditions are met.

- AINW recommends that the 10 isolates identified during survey are not eligible for listing in the National Register of Historic Places (NRHP), and no further work is needed at those locations.
- AINW's excavations found that one of the archaeological sites is disturbed and lacks integrity, and AINW recommends that it is not eligible for listing in the NRHP. Inadvertent discoveries are likely at this location, and AINW recommends construction monitoring to the depth of the archaeological deposit, which is up to 20 inches (in) below the surface.
- AINW's excavations found that the other archaeological site is disturbed to a depth of 12 in, below which are artifacts in intact soil. The portion of the archaeological site below 12 in is eligible for listing in the NRHP due to its potential to retain important information about the past. AINW recommends that the project avoid grading below a depth of 12 in below the surface at this location. AINW recommends monitoring of organic topsoil grading at this location to the depth of project impacts, which is anticipated to a depth of 12 in below the current surface.
- AINW recommends that a monitoring plan and Inadvertent Discovery Plan be developed for the project.
- AINW recommends that graded archaeological soils not be taken offsite for disposal, to avoid creation of a new archaeological deposit at another location.

LEACHATE MANAGEMENT SUMMARY
March 2024
Updated January 15, 2025

Leachate is a liquid generated when water comes into contact with waste placed in a landfill. Leachate flows down though the waste and is collected in a series of drainage layers and piping installed within the landfill as part of the lining system.

The proposed expansion area will not be open to waste placement at the same time that the existing landfill is accepting waste. When the expansion area is open, the leachate generation from waste disposal operations will most likely be less as it is smaller in size than the existing landfill area. Leachate generation from the existing landfill will decrease as waste placement operations cease. Furthermore, detailed calculations regarding leachate generation will be developed and submitted to the Oregon Department of Environmental Quality (ODEQ) during the solid waste permitting process.

When Coffin Butte Landfill (CBL) is ready to construct the expansion area, the new leachate storage ponds will be constructed and new leachate discharge piping will be installed and connected to the existing piping on the north side of Coffin Butte Road. Once the new leachate storage ponds are installed and operating correctly, the existing leachate ponds will be decommissioned and removed. Decommissioning might include, but will not be limited too, the removal of some sediments that would be disposed of in the existing landfill and the liner system will be removed and disposed of in the existing landfill. The design details for this will be submitted to the ODEQ during the solid waste permitting process.

Currently, 50% of the leachate is disposed of at the City of Corvallis wastewater treatment plant and the permit for that operation expires December 31, 2025. The remaining 50% is disposed of at the City of Salem wastewater treatment plant and the permit for that operation expires December 31, 2027.

At CBL, leachate is collected in the leachate collection sumps and is pumped via pipelines to the existing leachate storage ponds. CBL has an agreement with the Corvallis wastewater treatment plant (CWWTP) to dispose of its leachate at their plant. CBL also has an agreement with the City of Salem wastewater treatment plant (SWWTP) to dispose of its leachate at their plant.

CBL is focused on minimizing water entering the landfill and thus reducing leachate generation. CBL uses multiple methodologies to minimize inflow:

- Grading of landfill surfaces to promote runoff and minimize water entering the landfill;
- Grading areas surrounding the landfill to divert water before it enters the landfill;
- Installation of a synthetic covers over areas of the landfill to significantly reduce infiltration of stormwater into the landfill. The synthetic covers are held in place using both anchor trenches and a sand bag/rope ballast system.

Stormwater runoff at the facility is captured in multiple on-site stormwater management ponds.

The current methodology of filling areas in the landfill to grade, covering with soil (for short term inactive areas) or synthetic covers (for longer term inactive areas) will continue with the new cell. In addition, CBL

will formally close portions of the existing Coffin Butte Landfill that have reached final approved grades. By installing the ODEQ approved final cover system, stormwater infiltration will be negligible in those areas. In the short term, the leachate quantity will increase slightly with the additional liner system installed. However, CBL is currently evaluating potential closure activities on portions of the landfill and that will reduce the leachate quantity. Furthermore, as CBL continues to add final cover materials over the older parts of the landfill the leachate generation will continue to decrease.

Leachate from the new cell will be managed using similar collection systems (drainage layers and piping) as now implemented in the existing landfill. Leachate will be pumped to and stored in the new leachate storage ponds. The leachate will be transported by tanker truck to the CWWTP or SWWTP. It should be noted that CBL is limited to the amount of leachate that can be transported to the CWWTP and once that amount is reached, the remaining amount of leachate is transported to the SWWTP. Furthermore, if the CWWTP is phased out, the leachate will be transported to the SWWTP or other approved facility. Applicant must and will comply with all EPA and ODEQ regulations related to leachate management.

The US Environmental Protection Agency (EPA) defines hazardous waste as a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. The leachate produced by CBL is not a hazardous waste since the landfill does not accept hazardous waste and the leachate does not meet either of the two criteria used to classify a hazardous waste. A waste is determined to be a listed hazardous waste if it is specifically listed on one of four lists, the F, K, P and U lists found in Title 40 of the Code of Federal Regulations (CFR) part 261. Municipal Solid Waste (MSW) leachate is not found on any of the four lists. Since MSW leachate is not found on any of the four lists, it would not have to be characterized as a listed hazardous waste.

Currently, CBL does not test their leachate for the PFAS contaminates as they are currently not regulated by State of Oregon or the US EPA. However, once the State of Oregon and the US EPA establish the requirements for testing and reporting of the PFAS contaminates then CBL will comply with those requirements.

The federal regulation 40 CFR 261.24 defines the toxicity levels of characteristic hazardous waste. It specifies the test method and the contaminate levels that determine if a waste is toxic. Table 1 is the Maximum Concentration of Contaminates for the Toxicity Characteristic, from 40 CFR 261.24. If the leachate from CBL contains any of the contaminates listed in Table 1 at the concentration equal to or greater than the respective value given in Table 1, then it becomes a characteristic hazardous waste. The column titled VLF.L1 are the actual results from leachate sampled from the existing leachate storage pond dated August 30, 2023. As you can see, the results show that the leachate is not hazardous as none of the contaminates tested equaled or exceeded the regulatory level as shown in Table 1.

EXPIRES: 06/30/2026

Civil & Environmental Consultants, Inc.

TABLE 1
MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC
From CFR 261.24

EPA HW No.*	Contaminant	Regulatory Level (mg/L)	VLF.L-1 (mg/L)
D004	Arsenic	5	0.13
D018	Benzene	0.5	ND
D006	Cadmium	1	0.00026
D019	Carbon tetrachloride	0.5	ND
D020	Chlordane	0.03	ND
D021	Chlorobenzene	100	ND
D022	Chloroform	6	ND
D007	Chromium	5	0.19
D027	1,4-Dichlorobenzene	7.5	ND
D028	1,2-Dichloroethane	0.5	ND
D030	2,4-Dinitrotoluene	0.13**	ND
D012	Endrin	0.02	ND
D031	Heptachlor (and its epoxide)	0.008	ND
D032	Hexachlorobenzene	0.13**	ND
D033	Hexachlorobutadiene	0.5	ND
D034	Hexachloroethane	3	ND
D008	Lead	5	ND
D013	Lindane	0.4	ND
D009	Mercury	0.2	ND
D036	Nitrobenzene	2	ND
D037	Pentachlorophenol	100	ND
D010	Selenium	1	ND
D011	Silver	5	ND
D015	Toxaphene	0.5	ND
D042	2,4,6-Trichlorophenol	2	ND
D043	Vinyl chloride	0.2	ND

VLF.L1 = Analytical test results from sampling leachate on August 29, 2023

ND = Non Detect

* Hazardous Waste Number

** Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

EXHIBIT 28
REPUBLIC SERVICES LETTER TO THE BENTON COUNTY BOARD OF COMMISSIONERS REGARDING METHANE EMISSIONS

REPUBLIC SERVICES

Sustainability in Action

To: Benton County Board of Commissioners

Date: 2/23/2024

Re: Follow-up to Methane Emissions Discussion

Dear Commissioners & Staff,

Thank you for the opportunity to provide additional insights about methane emissions and differing perspectives at Coffin Butte Landfill, which was part of a broader discussion during the February 6 Board meeting. Also, please know that we heard your stated preference for timely communication and more transparency on substantive matters at Coffin Butte going forward. We are more than pleased to keep you updated and look forward to working with County Staff on both the details and process for future communications.

First, I respectfully offer these important facts about methane management at the Landfill:

- Coffin Butte has 3X more gas collection wells in operation today than industry best practices (typically 1 gas well per acre);
- We have invested more than $7m to upgrade and expand the gas collection system (57 new wells and 22k feet of piping) since 2019, which also exceeds industry standards;
- We are continually optimizing the gas collection system and plan to invest an additional $1.5m to add 14 new gas collection wells and 4,500 feet of piping this year;
- Our site team and consultants utilize a comprehensive maintenance regime, ensuring consistent and highly reliable system performance; and
- The PRC (Pacific Region Compost) is a nationally recognized diversion facility, processing 140k tons of organics annually, which has a direct correlation to methane emissions reductions locally.

In addition, you have a long-standing partner in Republic Services, and we are leading the industry in sustainability action. I am proud to share that we are the first U.S. environmental services provider with an emissions reduction goal approved by the Science Based Targets initiative. In addition, we have set an ambitious goal to reduce our absolute Scope 1 and Scope 2 greenhouse emissions by 35 percent by 2030. Finally, we are an active participant in methane policy conversations at federal and state levels as well as with industry peers and environmental NGOs, with the goal of helping stakeholders find common understandings, share best practices, address differing perspectives, and identify solutions. We are proud to be putting sustainability into action and believe our leadership in this area directly benefits the customers and communities we serve nationwide, to include here in Benton County.

During our February 6 discussion, you asked for more explanation on the EPA's June 2022 inspection and subsequent report on methane exceedances at Coffin Butte, as well as the differing perspectives on that inspection and methane modeling in general. These topics are further addressed below.

REPUBLIC SERVICES

Sustainability in Action

June 2022 EPA Inspection

This one-day inspection was not unique to Coffin Butte, but rather similar in nature to other EPA methane inspections in recent years at landfills across the country. What was unique about our experience, however, is that the inspection occurred during a planned landfill gas collection enhancement project, which is reflective of the major investments outlined above.

At the time of the inspection, Coffin Butte was in the early stages of a weeks-long construction project to install six new vertical collection wells and nine new horizontal collection wells. While one primary purpose of those enhancements was to increase the amount of methane and other biogas captured on site, the work itself involved activities that temporarily increased surface exceedances, such as trench digging.

The EPA inspector did ask if the landfill's gas collection system was operational and running normally, and our engineers responded it was. However, it is also true that at various times during the construction, the overall efficiency and capacity of the gas collection was impacted by the site team needing to turn down the vacuum in certain collection wells, not to mention adjusting landfill cover layers and digging through locations where waste had been disposed.

In many respects, surface exceedances of the type documented by EPA during their inspection would be expected, given the work necessary to make these gas collection system enhancements.

That aside, it is important to note that EPA uses a different investigative practice for identifying landfill emissions. And this correlates directly to the differences you commented on during our February 6 discussion.

Typically, a landfill operator will employ specially trained consultants to conduct regular "surface monitoring" along a consistent pathway to determine, locate, and remediate any points where methane exceeds 500 parts per million. Under EPA protocols, the monitoring device is to be held five to 10 centimeters above ground. The data from these routine practices are submitted to regulators as part of regular reporting.

In general, and at Coffin Butte during their June 2022 inspection, the EPA's environmental technicians take a different approach. They do not walk a consistent pathway, but rather seek out individual points with potential exceedances, probing into cracks, moving rocks, or lifting tarps and cover. In addition, inspectors do not consistently hold their measuring probe at the prescribed height of five to 10 centimeters above ground.

Another salient point about the June 2022 inspection is that the Coffin Butte team was not provided details from EPA technicians with respect to the calibration of equipment used. Typical regulator best practices involve calibrating equipment onsite, following specific protocols. Unfortunately, that did not happen in this case; instead, the inspector calibrated the equipment before arriving at the Landfill.

Ultimately, the EPA reported that their technicians documented 61 exceedances of 500 parts per million, and 21 of those were considered in their estimation to be more significant in scope.

REPUBLIC SERVICES

Sustainability in Action

Finally, it is appropriate to state that we believe that regulations, in general, and inspections of this nature, are important and necessary for all. We respect the EPA and its oversight role, and we collaborate with regulators at all levels whenever appropriate and possible. With respect to the June 2022 inspection, Coffin Butte responded to EPA's findings with corrective actions that included completing the ongoing gas collection enhancement project and adjusting soil cover. To the best of our knowledge, the EPA remains satisfied with those corrective actions and to date no notices of violation have been issued.

Differing Perspectives

Without question, the topic of landfill emissions is one of the more poignant issues in climate conversations today, involving not just landfill operators and regulators, but environmental NGOs and communities large and small nationwide. Beyond the differences in measurement practices noted above, one issue that continues to be debated is how best to model and quantify emissions.

For example, there is considerable discussion among stakeholders about the role of satellite and drone technology in comparison with the more traditional practices involving handheld probing devices. For our part, we have worked (and expect to continue to work) with NGOs and regulators on the application of various advanced technologies, to include fly-over technologies.

While there is a lot of promise with such technologies, there is also ongoing debate about the true accuracy of point in time data captured at dynamic operating environments like municipal solid waste landfills. That's because emissions can fluctuate considerably, often over the course of a day. This can occur for a variety of reasons, including the age and type of waste deposited at the landfill, cover and soil make-up, weather conditions, and the efficiency of a site's gas collection system.

Further, these variables have spurred another policy discussion among stakeholders – what is the appropriate way to model and determine a site's actual, consistent emissions levels if using point in time data collection.

We are optimistic that one day there will be more alignment among the many stakeholders on these issues, as well as continued technological advancements. But for now, please know that the issues you raise are not unique to Benton County. And, if anything, we hope that you will appreciate the fact that Coffin Butte has been proactive in emissions management and reductions and in many respects is a model for industry best practices.

I trust this provides you with the information you were seeking. But, as always, please do not hesitate to contact us with additional questions.

Sincerely,

Ginger Rough
Sr. Manager for Public Affairs

REPUBLIC SERVICES
28972 Coffin Butte Rd Corvallis, OR 97330
o 541.745.5792 f 541.230.5534 republicservices.com

January 15, 2025

To: Petra Schuetz, Benton County Community Development Department

Re: Methane Memo Addendum

Dear Director Schuetz:

As you're aware, Coffin Butte Landfill was inspected by the Environmental Protection Agency in June of 2022. During that inspection, the agency noted 61 exceedances during its surface emissions monitoring for methane.

Benton County's consultant, Maul Foster Alongi, requested that Coffin Butte Landfill provide additional information about how ongoing improvements to the Landfill's gas collection system may have impacted the methane emissions monitoring. Specifically, Maul Foster asked if we could provide detailed information about which of the 61 exceedances were in the construction zone.

During the 2022 inspection, DEQ walked two separate "loops" – one on the western side of the landfill, and a broader, wider loop that encompassed the eastern border and central sections of the landfill.

After the inspection and during a meeting with DEQ, Republic Services' personnel noted that the construction work would have impacted the areas that included flags #48 through #58.

Further review of that area, which includes wells 3V74, 2H86, and 2H94 in the central part of the landfill, indicates that there were at least 22 exceedance points in the general vicinity, or about 36 percent of the total.

It is important to note that during GCCS construction, portions of the system outside of the construction area can be temporarily impacted. This typically occurs when we have to isolate portions of landfill gas header and lateral piping to allow tie-ins and commissioning of new vertical and horizontal gas extraction wells.

As noted in our attached memo to Benton County, Republic Services took immediate corrective action following the 2022 EPA inspection, including adding cover soil and additional soil around the edges of tarps.

We also strengthened seals around the gas collection piping and completed work on an expansion of the Landfill's gas collection and control system, adding 6 new vertical wells and 9 horizontal well collectors.

In June 2024, Coffin Butte was the subject of a no-notice inspection by the EPA. Once again, inspectors conducted surface emissions monitoring at the landfill. While we have not received a formal report from the EPA, at the time of the June 2024 emissions monitoring, EPA inspectors said Coffin Butte was not the subject of an enforcement action. In addition, the landfill has made additional improvements since the inspection, including patching tears in the cover tarps and, once again, expanding the Landfill's gas collection and control system.

At this time, we have not received notification from the EPA that our corrective actions were insufficient, nor have we received notification from the agency that Coffin Butte is the subject of any pending enforcement action.

We continue to invest in the gas collection and control system and have another $1 million enhancement project scheduled for later this year. That project will add 14 new vertical wells, seven new horizontal wells and approximately 12,000 new feet of header, force, and air lines.

Meanwhile, Coffin Butte continues to partner with PNGC power to generate electricity from gas produced at the site – enough to power 4,000 homes. Discussions with PNGC to draw additional gas from the Landfill are ongoing.

Coffin Butte has also updated its flare system, installing a closed flare in October, to comply with DEQ's latest regulations.

Respectfully submitted,

Ginger D. Richardson
Director, Public Affairs
Republic Services

EXHIBIT 29
REPUBLIC SERVICES LETTER TO THE BENTON COUNTY BOARD OF COMMISSIONERS RELATING TO ARSENIC

REPUBLIC SERVICES

Sustainability in Action

To: Benton County Commissioners

Date: 2/15/2024

Dear Commissioner Augerot,

During Republic Services' annual report presentation on Feb. 6, you asked that we follow up with you on three topics. In this email, I'd like to address your questions regarding arsenic levels in the monitoring wells at Coffin Butte Landfill. Thank you for giving me the time and opportunity to come back to you with additional information.

We noted in our landfill annual report (page 9) that "the primary drinking water standard for arsenic was exceeded" at the compliance boundary for Cells 4 and 5 on the landfill's east side, but that these "concentrations represent natural background conditions."

This week, we asked our Coffin Butte Landfill consultant, Eric Tuppan, for additional detail. Tuppan, a registered geologist, and owner/operator of Tuppan Consultants, LLC., has 40 years of industry experience. He founded his Oregon-based geology, hydrogeology, and environmental consulting firm consulting firm in 2003.

In summary:

- The presence of arsenic in soil and rock in Oregon has been documented by the Oregon Department of Environmental Quality with background concentrations specific to geographic regions.
- In the Portland Basin, the background concentration is 8.8 milligrams per kilogram; in the Cascade Range it is 19 milligrams per kilogram; and in the South Willamette Valley (where Coffin Butte is located) it is 18 milligrams per kilogram.
- Arsenic has been detected in three areas of the landfill since sampling first began in 1991. These are described in the text that follows.
- There is no data to suggest that the existing arsenic levels are anything other than what is naturally occurring in the soil, or that leachate is impacting the environment or public health.

As you noted during the Feb. 6 meeting, there was a seepage event that occurred at the Landfill in the 1990s. Valley Landfills Inc. (VLI) discovered this issue in 1994, after groundwater monitoring samples in well MW-23, located on the south side of Cell 2, showed elevated levels of arsenic.

At the time of the investigation, VLI determined that increased concentrations of arsenic, chloride, sodium, and bicarbonate were due to leachate seeping from the south slope of Cell 2. Corrective measures, including excavating the south slope of the landfill and installing a gravel drain, fixed the issue and allowed groundwater quality to recover over time.

REPUBLIC SERVICES

Sustainability in Action

The groundwater sampling referenced in our 2022 annual report was taken from two wells on the eastern side of the landfill, more than 1,000 feet away from the well that's located south of Cell 2.

These two compliance wells, which were installed in 2011, have had stable arsenic readings for the past 20 years, averaging 14.2 micrograms per liter at one site, and 13.3 micrograms per liter for the other.

Both these averages are consistent with the background concentrations of arsenic in the Willamette Valley, as documented by the Department of Environmental Quality. The steady readings over time indicate there have been no leachate releases or impacts on groundwater at these locations.

Arsenic testing at Coffin Butte initially began in April 1991, in well MW-S9 on the landfill's northeast side. This third location has historically had higher concentrations of arsenic, ranging from 27 to 41.8 micrograms per liter over the past 30 years.

However, it is important to note that the initial sampling at this well – which established baseline arsenic levels in background concentrations - occurred prior to the completion of Cell 2 construction or any landfilling on the east side of Coffin Butte.

Because this well is more than 1,800 feet away from MW-23, and because sampling occurred prior to the construction of Cell 2, it is implausible for the readings at this location to have been impacted by leachate.

Coffin Butte conducts groundwater sampling twice a year, in April and October, in a set number of locations as outlined in our DEQ-approved Environmental Monitoring Plan. That plan also specifies the frequency of testing at each well. The most recent sampling at well MW-S9 occurred in 2019 in collaboration with DEQ; it is set to be tested again later this year.

As noted in our 2022 annual report, the Landfill was inspected seven times by a variety of agencies, including the EPA, DEQ's Division of Material Management, DEQ's Division of Air Quality and the cities of Corvallis and Salem. In addition, we submitted annual, semi-annual, quarterly, and monthly reports to federal, state, and local regulators. Coffin Butte remains in compliance with all our permits and regulatory requirements.

I hope this email provides you with the information you requested. Should you have any follow-up questions, please don't hesitate to contact me directly at grough@republicservices.com.

Thank you,
Ginger Rough, Sr. Manager for Public Affairs

REPUBLIC SERVICES
28972 Coffin Butte Rd Corvallis, OR 97330
o 541.745.5792 f 541.230.5534 republicservices.com

January 15, 2025

To: Petra Schuetz, Benton County Community Development Department

Re: Arsenic Memo Addendum

Dear Director Schuetz:

Benton County's consultant, Maul Foster Alongi, requested that Coffin Butte Landfill consider sharing the most recent findings available as it relates to arsenic levels in groundwater monitoring well "MW-59."

We believe this to be a typographical error and that Maul Foster Alongi is requesting information about well MW-9S. This well has been subject to a quintennial sampling schedule (every 5 years) since 1991, as set by the Oregon Department of Environmental Quality.

Groundwater monitoring well MW-9S is located on the landfill's northeast side and has historically had arsenic readings above what is considered the normally occurring "background concentrations" typically found in this geographic region.

Arsenic concentrations in groundwater well MW-9S have ranged from 27 to 41.8 micrograms per liter over the past 30 years. Natural background concentrations for arsenic in the South Willamette Valle (where Coffin Butte is located) is 18 milligrams per kilogram.*

Coffin Butte Landfill conducts groundwater sampling twice a year, in April and October. As part DEQ's split-sampling, well MW-9S was sampled in October 2024. These samples were sent to a third-party laboratory for statistical analysis and it was determined that arsenic concentrations were at 27 micrograms per liter, which is consistent with previous years. The results will be submitted to ODEQ in March as part of our state-required Annual Environmental Monitoring Report (AEMR.)

Well MW-9S was previously sampled in 2019.

**As noted in the attached arsenic memo, dated February 13, 2024.*

Respectfully submitted,

Ginger D. Richardson
Director, Public Affairs
Republic Services

EXHIBIT 30
PROPOSED COFFIN BUTTE LANDFILL SEISMIC DESIGN

MEMORANDUM

To: Ian Macnab – Republic Services, Inc. (Republic)

From: Timothy D. Mitchell, P.E. – Civil & Environmental Consultants, Inc. (CEC)
Jeff Shepherd, P.E. – CEC

Date: July 9, 2024

Subject: Seismic Design
Coffin Butte Landfill
Corvallis, Benton County, Oregon
Republic Services
CEC Project 322-142

The purpose of this memorandum (memo) is to address the engineering scope regarding slope stability and earthquake response for the newly proposed cell at the Coffin Butte Landfill operated by Republic. CEC understands that the Benton County Neighborhood Tour posed questions relative to the impact of an earthquake and the performance of the various landfill systems (liner, methane capture, etc.) during potential seismic events. This memo intends to explain the process for considering earthquakes and seismicity during the design of a municipal solid waste landfill.

The criteria for the design of a solid waste landfill is described in a document by the United States Environmental Protection Agency (USEPA) in Title 40 CFR Part 258 (Seismic Design Guidance for Municipal Solid Waste Landfill Activities). Oregon has codified its implementation of these rules under the Oregon Administrative Rules (OAR), specifically OAR 340-094. CEC will design the proposed landfill cell to meet the regulatory requirements for seismic impact zones and for potential seismic events as described in the rules.

The code requires that landfill containment structures, including liners, leachate collection systems, and surface water control systems are designed to resist the maximum horizontal acceleration in rock at the site. In addition to the waste itself, the landfill design for this project will take into account the performance of the liner system and leachate collection system in response to seismic loads. This was one point of concern from the neighborhood tour summary letter.

CEC will work closely with Republic and regulators to develop appropriate earthquake and seismic models for use in the design of the landfill cell. According to the USGS, the seismic probability map can be used as a basis to obtain site specific seismic parameters for design. This method provides a high degree of protection to the environment against earthquakes reasonably expected over the life and post-closure maintenance period of the landfill.

The code also requires that the landfill or expansions to the landfill not be located within 200 feet of a fault that has had displacement in Holocene time (11,700 years ago). There are no known faults that have had displacement within 200 feet of the landfill.

In regards to general slope stability considerations, the static and seismic stability will be checked in detail for acceptable factors of safety for the proposed expansion. The stability calculations will consider the geometry of the landfill, the proposed liner system, the anticipated leachate, and leachate drainage. The steepest outer slope allowed by state regulation is 3 Horizontal:1 Vertical (3H:1V).

In summary, CEC will work with Republic to develop a thorough landfill design that addresses possible seismic implications in accordance with applicable codes and requirements and in conjunction with the appropriate regulators.

TDM:JS/ad

M-322142.Jul9/P

FARM LEASE

THIS FARM LEASE ("Lease"), made and entered into as of the 15th day of January, 2020 (the "Effective Date"), by and between **VALLEY LANDFILLS, INC.**, an Oregon corporation ("Landlord"), and **AGRI-INDUSTRIES, INC.**, an Oregon corporation ("Tenant").

WITNESSETH:

WHEREAS, the Landlord is the owner of certain real estate located in the City of Corvallis, Benton County, Oregon, more particularly described on Exhibit A attached hereto and incorporated herein (the "Land"); and

WHEREAS, Landlord operates a solid waste disposal landfill on the Land which is known as the Coffin Butte Landfill (the "Landfill"); and

WHEREAS, the Landlord desires to lease to Tenant a portion of the Land consisting of approximately 80 acres, as generally shown on Exhibit A attached hereto and incorporated herein, (the "Premises") in accordance with the terms and provisions of this Lease; and

WHEREAS, Tenant desires to lease from Landlord the Premises, in accordance with the terms and provisions of this Lease; and

WHEREAS, Landlord and Tenant are parties to that certain Compost Processing Agreement dated as of the Effective Date (the "Compost Agreement").

NOW, THEREFORE, in consideration of the mutual covenants and conditions hereinafter set forth, the parties agree as follows:

1. **Lease and Term.** (a) The Landlord leases to the Tenant and the Tenant leases from the Landlord the Premises for a term commencing on the Effective Date and terminating on the earlier to occur of (1) September 30, 2030, or (2) the expiration or earlier termination of the Compost Agreement (the "Term") commencing on the Effective Date. The Term of this Lease may be extended upon the mutual written agreement of Landlord and Tenant. In the event Tenant desires to extend the Term of this Lease, Tenant shall provide Landlord with prior written notice at least 60 days prior to the expiration of the Term.

(b) Notwithstanding anything to the contrary set forth herein, in the event that Landlord determines in its sole discretion that all or any portion of the Premises is needed in connection with the use or development of the Landfill, Landlord shall have the right to terminate this Lease with respect to all or any portion of the Premises upon 30 days prior written notice to Tenant. In the event of a termination of this Lease by Landlord in accordance with this Section, Tenant shall not be required to surrender possession of the Premises to Landlord until after the harvesting of any crops which were planted on the Premises prior to the date of Landlord's notice of termination to Tenant.

2. **Rent; Use.** (a) Landlord acknowledges that the amounts paid by Tenant pursuant to the Compost Agreement include the rent for the Term of this Lease, provided, however, that all costs of maintenance, repairs, utilities, insurance and any and all other expenses necessary in connection with the operation or maintenance of the Premises by Tenant will be paid solely by Tenant during the Term of this Lease, except as expressly set forth herein.

(b) Tenant shall use the Premises solely for the purpose of growing crops, and for no other use or purpose without the prior written consent of the Landlord, which may be withheld in Landlord's sole discretion.

3. Tenant's Duties. The Tenant shall till the Premises in a good and husbandlike manner, consistent with sound agricultural practices. The Tenant shall maintain at all times liability insurance with limits of not less than $1,000,000.00 for injuries to one person in each accident and not less than $1,000,000.00 for injuries to more than one person in each accident and $500,000.00 property damage. The liability insurance shall name the Landlord as an additional insured and the Tenant shall provide to the Landlord a certificate of insurance evidencing that this requirement has been met, on or before the Effective Date. Such policy shall provide that it shall not be amended or terminated without providing Landlord with 30 days advance written notice.

4. Taxes and Maintenance. (a) Landlord shall pay, as the same shall become due and payable, all taxes, assessments and charges of any kind whatsoever accruing during the Term that may at any time be levied or assessed against or with respect to the Premises. Tenant shall be solely responsible for the payment of any taxes, assessments or charges of any kind whatsoever accruing during the Term that may at any time be levied or assessed on the rent, the harvesting of crops thereon, or Tenant's machinery, equipment or other property installed or brought onto the Premises.

(b) Tenant shall, at its sole cost and expense, keep and maintain the Premises in good repair and appearance during the Term of this Lease, and will make all changes and repairs of every kind or nature which may be required to be made upon or in connection with the Premises or any part thereof in order to keep and maintain the Premises in such good repair and appearance. Landlord shall not be required to maintain, repair or rebuild, or make any alterations, replacements or renewals of any kind or nature to the Premises or any part thereof, whether ordinary or extraordinary, foreseen or unforeseen, or to maintain the Premises or any part thereof in any way, and Tenant hereby expressly waives any right to make repairs at the expense of Landlord which may be provided for in any statute or law in effect at the time of the execution of this Lease, or any statute or law which may thereafter be enacted.

5. Carryover. As part of the consideration, Landlord and Tenant acknowledge that a residue may exist from the nutrients applied by the Tenant and they have considered such residue in arriving at the rental arrangement. Consequently, the parties agree that the Landlord will not be indebted to the Tenant in any amount due to the existence of such residue.

6. Surrender at End of Term. Any crops or personal property remaining on the Premises or the Real Estate shall be removed by Tenant at its expense, prior to the expiration of the Term or the sooner termination hereof, failing which, such crops or personal property shall be deemed abandoned and shall immediately become the property of the Landlord. Upon the expiration of the Term or earlier expiration thereof, Tenant shall deliver the Premises to Landlord in as good a condition as existing on the date hereof, in compliance with all laws, and free of any hazardous or toxic substances.

7. Transfers. Tenant shall not sublease or assign its interest in this Lease without the prior written consent of Landlord, which may be withheld in Landlord's sole discretion. Landlord shall have the right to assign its interest in this Lease to any party in Landlord's sole discretion. If Landlord sells the Premises or assigns its interest in this Lease, Landlord shall be released from all obligations and liabilities accruing thereafter under this Lease, provided Landlord's successor has assumed in writing Landlord's obligations under this Lease.

8. Events of Default. The occurrence of any one or more of the following shall constitute an "Event of Default" hereunder: (a) Failure of Tenant to pay any amount required hereunder, which

failure shall not be cured by Tenant within 10 days of written notice from Landlord; or (b) Failure of Tenant to perform any other covenant, condition, agreement or provision contained herein within 20 days after receipt by Tenant of written notice of such failure; or (c) Commencement of bankruptcy, insolvency, assignment for the benefit of creditors or receivership proceedings in respect of Tenant; or (d) a breach or default under the Compost Agreement, which is not cured within the applicable notice and cure periods set forth in the Compost Agreement.

9. Remedies. Upon the occurrence and continuance of an Event of Default the Landlord may, at its option and without any obligation to do so, elect any one or more of the following remedies: (a) Terminate and cancel this Lease; (b) Cure such Event of Default and recover the costs thereof, together with interest thereon at the "Default Rate" (hereinafter defined), from Tenant; or (c) Pursue any other remedy now or hereafter available under the laws or judicial decisions of the State of Oregon. For purposes of this Lease, the "Default Rate" shall mean 12% percent per annum upon any such amount, and if any such amount shall remain unpaid after 6 months of receipt of notice, such rate shall increase to 18% percent per annum; provided, however, that such interest rate shall in no event exceed the maximum rate of interest permitted under the governing law of this Lease.

10. Access to Premises. Landlord may, at anytime, enter the Premises to make an examination of the same, provided Landlord does not and shall not unreasonably interrupt the farming operation or damage any growing or standing crops.

11. Relationship of Parties. The relationship between the parties hereto shall be solely as set forth herein. Neither party shall be deemed the employee, agent, partner or joint venturer of the other.

12. Brokers. Each party represents and warrants that it has not dealt with any real estate brokers and that there are no claims for brokerage commissions of finders' fees due and owing in connection with this Lease. Any party that defaults under this Section (the "Defaulting Party") agrees to indemnify and hold harmless the other party from any and all liabilities, costs and expenses (including attorneys' fees) arising from any such claim by any real estate broker or other party that has dealt with the Defaulting Party.

13. Separability. Each and every covenant and agreement herein shall be separate and independent from any other. The breach of any covenant or agreement shall in no way discharge or relieve the performance of any other covenant or agreement. Each and all of the rights and remedies given to either party by this Lease or by law or equity are cumulative, and the exercise of any such right or remedy by either party shall not impair such party's right to exercise any other right or remedy available to such party under this Lease or by law or equity.

14. No Waiver. No delay in exercising or omission of the right to exercise any right or power by either party shall impair any such right or power or shall be construed as a waiver of any breach or default or as acquiescence thereto. One or more waivers of any covenant, term or condition of this Lease by either party shall not be construed by the other party as a waiver of a continuing or subsequent breach of the same covenant, provision or condition. The consent or approval by either party to or of any act by the other party of a nature requiring consent or approval shall not be deemed to waive or render unnecessary consent to or approval of any subsequent similar act.

15. Entire Lease. This Lease together with any Exhibits or attachments hereto constitutes and represents the entire agreement between the parties hereto and supersedes any prior understandings or agreements, written or verbal, between the parties hereto respecting the subject matter herein. This Lease may be amended, supplemented, modified or discharged only upon an agreement in writing executed by all of the parties hereto.

16. Governing Law, Venue, and Jurisdiction. This Lease and all acts and transactions pursuant or relating hereto, and all rights and obligations of the parties hereto shall be governed, construed, and interpreted in accordance with the laws of the State of Oregon. In order to induce the parties to accept this Lease, and as a material part of the consideration therefore: (a) the parties hereto agree that all actions or proceedings arising out of this Lease shall be litigated in courts located within Multnomah County, Oregon; (b) the parties hereto consent to the exclusive jurisdiction of such court and consent to the service of process in any such action or proceeding by personal delivery or any other method permitted by law; and (c) the parties waive any and all rights they may have to transfer or change the venue of any such action or proceeding.

17. Subordination; Release. This Lease is and shall be subject and subordinate, at all times, to the lien of any mortgages for deeds of trust which now affect the Premises, or any ground leases hereinafter entered into by Landlord. Tenant acknowledges that Landlord or its affiliate will be developing and using the Real Estate and certain property contiguous or adjacent thereto for purposes of operating a landfill or for the handling, transportation, recycling or disposal of solid waste, and any other uses or activities in connection therewith, and Tenant (which for purposes hereof shall include any person or entity which owns or controls Tenant) agrees and hereby releases Landlord and its affiliates from any liability, damages, claims, causes of action associated with such development and use of the Real Estate and any property contiguous or adjacent thereto. Further, in the event Landlord or its affiliate requires the cooperation or execution of any documents from Tenant in connection with its use and development of the Real Estate, Tenant agrees to cooperate with any such request made by Landlord or its affiliate.

18. Notices. All notices and other communications under this Lease shall be in writing and shall be deemed to have been given 3 business days after deposit in the mail, designated as certified mail, return receipt requested, postage-prepaid, or one business day after being entrusted to a reputable commercial overnight delivery service. All notices and other communications under this Agreement shall be given to the parties hereto at the following addresses:

To Landlord:	Valley Landfills, Inc. c/o Republic Services, Inc. 18500 North Allied Way Phoenix, AZ 85054 Attn: Chief Legal Officer
And a copy to:	Spotts Fain PC 411 E Franklin Street, Suite 600 Richmond, VA 23219 Attn: David A. Reed, Esq.
To Tenant:	Agri-Industries, Inc. 3405 NE Garden Avenue Corvallis, OR 97330 Attn: Tim Winn, President

Any party hereto may change the address to which notices shall be directed under this Section 18 by giving written notice of such change to the other parties.

19. Binding Effect. All of the terms, covenants, conditions and provisions of this Lease, whether so expressed or not, shall be binding upon, inure to the benefit of, and be enforceable by he

parties and their respective administrators, executors, other legal representatives, heirs and permitted assigns.

20. Remedies Cumulative. No remedy herein conferred upon any party is intended to be exclusive of any other remedy, and each and every such remedy shall be cumulative and shall be in addition to every other remedy given hereunder or now or hereafter existing at law or in equity or by statute or otherwise. No single or partial exercise by any party of any right, power or remedy hereunder shall preclude any other or further exercise thereof.

21. Attorneys' Fees. In the event of any controversy arising under or relating to this Lease, the prevailing party shall be entitled to payment for all costs and attorneys' fees (both trial and appellate) incurred in connection therewith.

22. Liens. Tenant shall discharge any lien, encumbrance, or charge arising out of the work of any contractor, mechanic or material contracted for by Tenant or any subtenant, or on behalf of Tenant or any subtenant. If any lien on account of an alleged debt or any notice of contract shall be filed against the Real Estate or Premises, Tenant shall, within 5 days after the notice of the filing thereof, cause the same to be discharged of record by payment, deposit or bond.

23. Compliance with Laws; Environmental. (a) Tenant agrees, at its sole cost and expense, to comply with all laws, orders and regulations of federal, state and municipal authorities and with any lawful direction of any public officer which shall impose any duty upon Tenant with respect to work to be performed by Tenant on the Premises, the Premises, or Tenant's use thereof. Tenant shall, at its own expense, obtain and maintain all required licenses or permits necessary for any work to be performed by Tenant on the Premises or its use of the Premises.

(b) Tenant shall not use the Premises for the storage, use treatment, or disposal of any hazardous or toxic substances or petroleum products. Tenant agrees to indemnify, defend and hold Landlord and its officers, partners, directors, shareholders, employees and agents harmless from any claims, judgments, damages, fines, penalties, costs, liabilities (including sums paid in settlement of claims) or loss including attorney's fees, consultant's fees, and expert fees which arise during or after the Term in connection with the presence or suspected presence of hazardous or toxic substances in the soil, groundwater, or soil vapor on or under the Premises. Without limiting the generality of the foregoing, this indemnification shall survive the expiration of this Lease.

24. AS IS; WAIVER OF WARRANTIES. Tenant agrees to accept the Premises in its "AS IS" condition with all faults. TENANT AGREES THAT NEITHER LANDLORD NOR ANY AGENT OF LANDLORD HAS MADE ANY REPRESENTATION OR WARRANTY AS TO THE SUITABILITY OF THE PREMISES FOR TENANT'S USE. TENANT AGREES THAT NEITHER LANDLORD NOR LANDLORD'S AGENTS HAVE MADE ANY REPRESENTATIONS OR PROMISES WITH RESPECT TO THE PHYSICAL CONDITION OF THE LAND OR ANY OTHER MATTER OR THING AFFECTING OR RELATED TO THE PREMISES, AND NO RIGHTS, EASEMENTS OR LICENSES ARE ACQUIRED BY TENANT BY IMPLICATION OR OTHERWISE. TENANT HAS INSPECTED THE PREMISES AND IS THOROUGHLY ACQUAINTED WITH THEIR CONDITION, AND AGREES TO TAKE THE SAME "AS IS", AND ACKNOWLEDGES THAT THE TAKING OF POSSESSION OF THE PREMISES BY TENANT SHALL DE CONCLUSIVE EVIDENCE THAT THE PREMISES WERE IN GOOD AND SATISFACTORY CONDITION AT THE TIME SUCH POSSESSION WAS SO TAKEN.

25. Recording. Tenant shall not record this Lease, or any short form or memorandum hereof.

26. Time of the Essence. Time shall be of the essence in interpreting the provisions of this Lease.

27. Eminent Domain. If any portion of the Premises shall be appropriated or taken under the power of eminent domain by any public or quasi-public authority, then the Lease shall terminate as to affected portion as of the date of such taking. In no event shall Tenant have any right or claim to any award or compensation in connection therewith.

28. Indemnification. Tenant agrees to indemnify and hold harmless Landlord and its affiliated companies and their agents, servants, directors, officers, shareholders, and employees ("Indemnitees") from and against any and all liabilities, losses, damages, liens, claims, suits, causes of action, costs (including court costs, attorneys' fees and costs of investigation), and actions of any kind arising out of, caused by, resulting from or alleged to arise by reason of injury to or death of any person or damage to or loss of property occurring on, in, or about the Premises or by reason of any other claim whatsoever of any person or party occasioned or alleged to be occasioned in whole or in part by any act or omission on the part of Tenant or any invitee, licensee, employee, director, officer, servant, contractor, subcontractor or Tenant of Tenant, or by any breach, violation, or nonperformance of any covenant of Tenant under this Lease. If any action or proceeding shall be brought by or against any Indemnitee in connection with any such liability or claim, Tenant, on notice from Landlord, shall defend such action or proceeding, at Tenant's expense, by or through attorneys reasonably satisfactory to Landlord.

29. Counterparts. This Lease may be executed in counterparts, each of which shall be deemed an original and all of which shall be one Lease. A signature received by electronic mail in "portable document format" (".pdf") or facsimile shall be deemed an original.

30. Assignment. Tenant shall not assign, sublet or otherwise transfer its interest in this Lease, or permit the use or occupancy of the Premise by any other person or entity, without the prior written consent of Landlord, which may be withheld in Landlord's sole discretion.

[*Signatures appear on the page following*]

[*Signature page for Farm Lease*]

In Witness Whereof, the Landlord and the Tenant have signed this Lease on the day and date first set forth above.

LANDLORD:

VALLEY LANDFILLS, INC., an Oregon corporation

Adrienne Wilhoit

By: _____

Printed Name: Adrienne Wilhoit

Title: Vice President

TENANT:

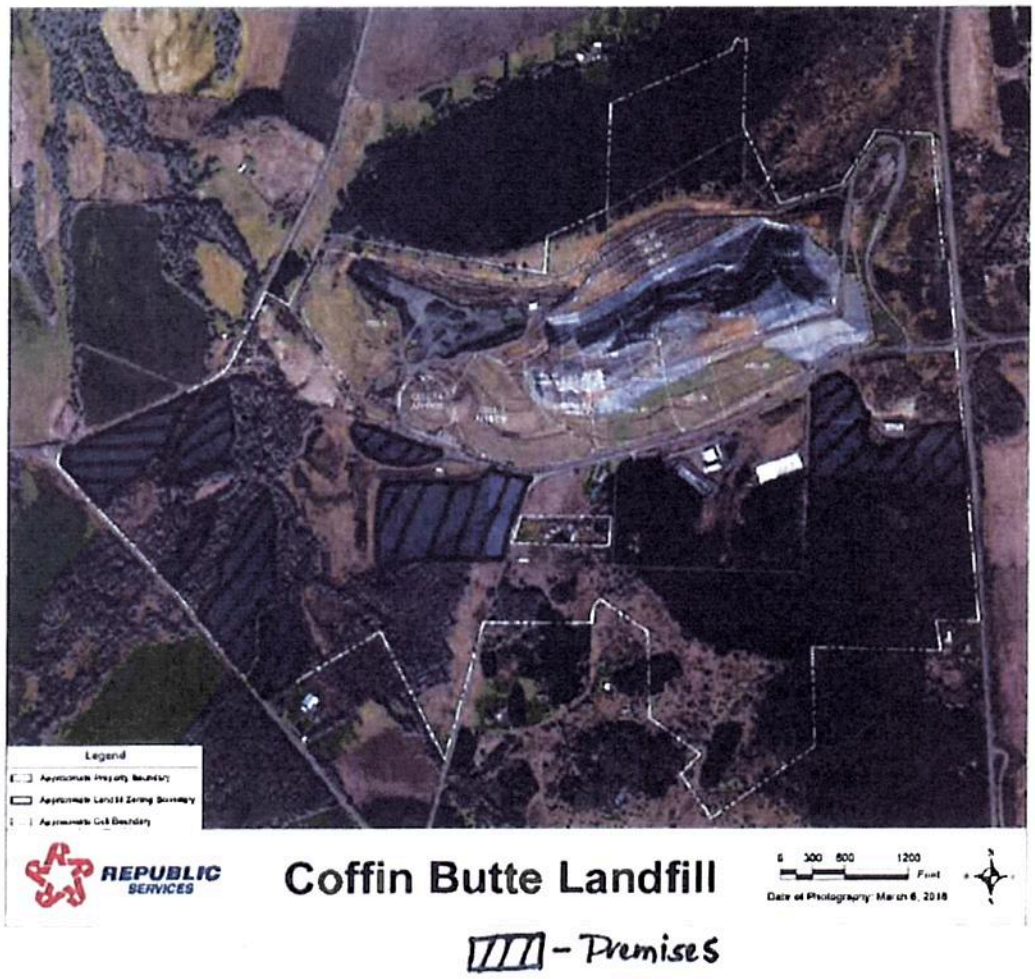
AGRI-INDUSTRIES, INC., an Oregon corporation

By: _____

Printed Name: Timothy E. Winn

Title: President

EXHIBIT "A"


Legend
REPUBLIC SERVICES
Coffin Butte Landfill
0 300 600 1200
Feet
Date of Photography: March 6, 2018
- Premises

Lot 1105.

Lot 1103 from the office on Lot 1100.

Lot 1103 from Soap Creek Road.

Lot 0103.

Lot 0190.

Lot 0104.

Lot 0200.

Lot 0200.

Foreground is Lot 0220 and distance is Lot 0880.

Lot 0800.

Lot 0400.

Lot 0300.

Lot 0200.

Lot 0201.

Lot 0202.

Lot 0203.

Lot 0301.

Lot 0301 vicinity.

Lots 0900, 0500, and 0600 vicinity.

Another view of lots 0900, 0500, and 0600.

View toward Lot 0200.

Lot 0800.

E. E. WILSON WILDLIFE AREA
COFFIN BUTTE TRACT
THE PURCHASE OF THIS LAND WAS MADE POSSIBLE BY
GENEROUS DONATIONS FROM THE FOLLOWING CONTRIBUTORS
OREGON WILDLIFE HERITAGE FOUNDATION
OREGON HUNTER'S ASSOCIATION
OREGON FOUNDATION FOR BLACKTAIL DEER
CHUCK & GAIL WOOSLEY
MULTNOMAH ANGLERS AND HUNTERS
PHEASANTS FOREVER INC.
ODFW'S ACCESS AND HABITAT PROGRAM
ODFW'S GAME BIRD STAMP PROGRAM

Lot 0800.

DOGS PROHIBITED EXCEPT ON LEASH
AREA CLOSED TO ALL USE
DISCHARGING RIFLES & HAND GUNS PROHIBITED
CLOSED

Coffin Butte Landfill
2024 Expansion Application
Odor Dispersion Modeling Study

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

SCS ENGINEERS

Project No. 04225008.00 | March 2025

15940 SW 72nd Avenue
Portland, OR 97224
503-639-9201

Table of Contents

Section Page

1.0 INTRODUCTION 1
2.0 FACILITY DESCRIPTION 2
2.1 Location 2
2.2 Local Land Use / Zoning 3
2.3 Terrain / Topography 4
2.4 Climate and Meteorology 4
2.5 Potential Odor Activities 4
2.6 Odor Monitoring and Control Measures 5
2.7 Odor Complaint History 5
2.8 Proposed Project 7
2.9 Other Potential Sources of Odor in the Region 8
3.0 METHODOLOGY 9
3.1 Model Selection 9
3.2 Scenarios Modeled 9
3.3 Source Parameters 10
3.4 Building Downwash 12
3.5 Receptors 12
3.6 Meteorological Data 13
3.7 Terrain Data 16
3.8 Nuisance Odor Threshold 16
3.9 Scenario Emission Rates 17
4.0 RESULTS 19
5.0 CONCLUSIONS 25
5.1 Odor Complaint Analysis 25
5.2 Odor Dispersion Modeling 25
6.0 REFEFENCES 26

Appendices

Appendix A Odor Complaint Review
Appendix B Odor Pollutant Screening
Appendix C Scenario #1 Emission Rates
Appendix D Scenario #2 Emission Rates
Appendix E Odor Thresholds

Figures

Figure 1. Facility Location 2
Figure 2. Local Zoning Map 3
Figure 3. Elevation Contour Map 4
Figure 4. Proposed Expansion Area (Taxlot 104180001107) 7
Figure 5. Modeled Area Source Locations 12
Figure 6. Nested Receptor Grid 13
Figure 7. Wind Rose of Modeled Meteorological Data 15
Figure 8. Peak 1-Hour Off-site Odor Impact Locations 20
Figure 9. Scenario #1 NOx Odor D/T Contours 21
Figure 10. Scenario #1 Dimethyl Sulfide Odor D/T Contours 22
Figure 11. Scenario #2 NOx Odor D/T Contours 23
Figure 12. Scenario #2 Dimethyl Sulfide Odor D/T Contours 24

Tables

Table 1. Point Source Release Parameters 11
Table 2. Flare Source Release Parameters 11
Table 3. Area Source Parameters 11
Table 4. Scenario #1: 2023 Emissions By Source (g/s) 17
Table 5. Scenario #2: 2052 Emissions By Source (g/s) 18
Table 6. Scenario #1: 2023 Model Results 19
Table 7. Scenario #2: 2052 Model Results 19

1.0 INTRODUCTION

The Coffin Butte Landfill (CBLF) is proposing to expand the waste disposal area of the landfill by using an existing property just south of Coffin Butte Road. The goal of this study was to conduct an odor dispersion modeling analysis that compares the existing and proposed operating scenarios for potential nuisance odor impacts. Since odor is a subjective human response, odor dispersion modeling was used to provide an objective approach towards understanding how on-site emissions of odor potentially impact off-site locations.

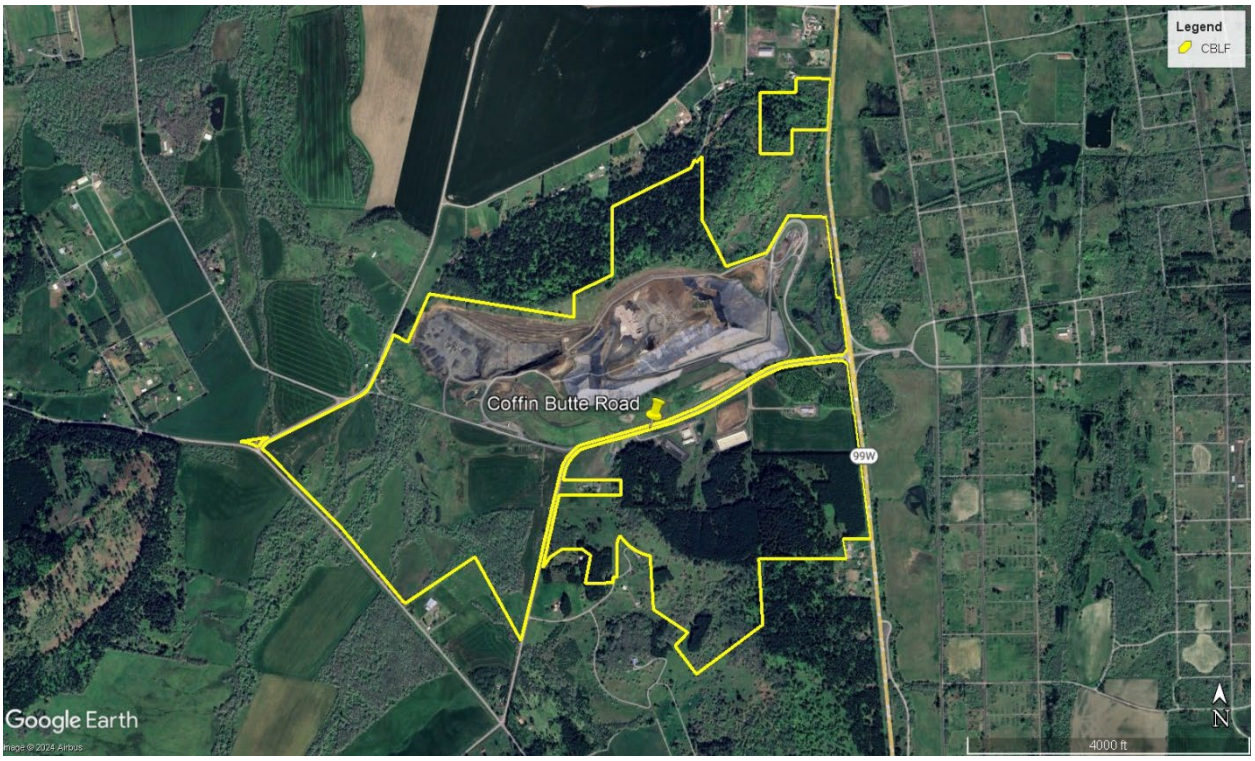
Following this Introduction, Section 2 provides a description of the facility. Section 3 describes the methodology used in this study while Section 4 summarizes the results. Section 5 then presents the conclusions. Finally, the appendices provide supporting documentation.

2.0 FACILITY DESCRIPTION

2.1 LOCATION

The CBLF is located at 28972 Coffin Butte Road in Corvallis, Oregon (Benton County). The facility is located just west of Highway 99W, approximately nine miles north of downtown Corvallis. Coffin Butte Road runs through the facility. See Figure 1 for the CBLF property boundary [1].

Figure 1. Facility Location

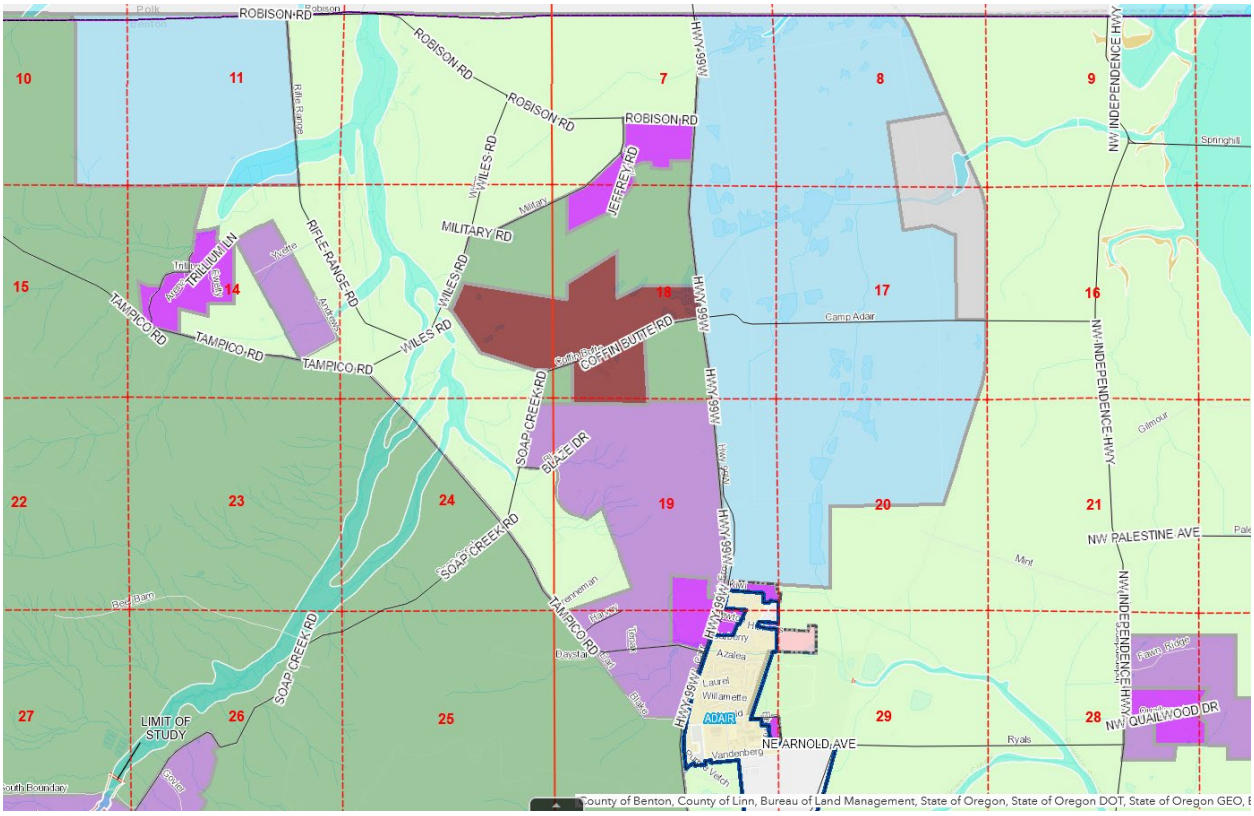


Note: Google Earth imagery from April 18, 2024.

2.2 LOCAL LAND USE / ZONING

Local land usage impacts air dispersion as surface characteristics differ for rural and urban conditions. Local land use near the CBLF is rural based upon the zoning map in Figure 2 [2].

Figure 2. Local Zoning Map



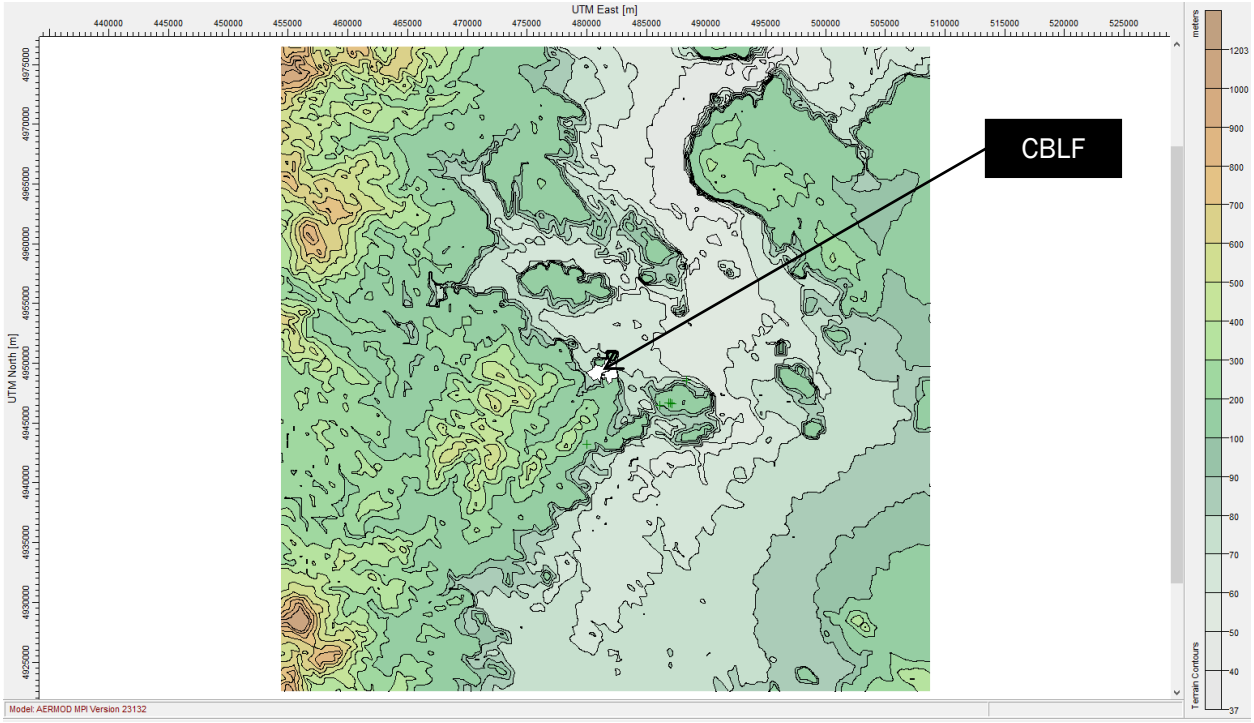
Zoning Color Code Legend:

- Exclusive farm use (light green);
- Forest conservation (green);
- Landfill (brown);
- Open space (light blue);
- Rural residential – 5 acre minimum parcel or lot size (magenta); and
- Rural residential – 10 acre minimum parcel or lot size (light magenta).

2.3 TERRAIN / TOPOGRAPHY

Local terrain also impacts air dispersion as winds can be channeled when flowing through canyons and valleys. In this case, the CBLF is located along the western edge of the Willamette Valley. See Figure 3 for the elevation contours surrounding the landfill [3].

Figure 3. Elevation Contour Map



2.4 CLIMATE AND METEOROLOGY

Local air quality is also impacted by the regional climate and meteorology as weather conditions control the transport and diffusion of emitted pollutants downwind from the release point into the surrounding area. Climate deals with long-term weather patterns while meteorology deals with short-term daily and hourly weather conditions. Nuisance odors are more likely to occur under poor meteorological conditions (e.g., low wind speed and stable wind conditions) that are common in the late night and early morning hours.

2.5 POTENTIAL ODOR ACTIVITIES

CBLF accepts commercial and public solid waste. The waste is placed in layers at the working face, compacted by heavy equipment, and then covered daily. Once an area of the CBLF has reached capacity, it is eventually capped with final cover to minimize infiltration of precipitation and release of gases not captured by the landfill gas collection and control system (GCCS). Odor is potentially emitted from sources such as:

- working face;
- tippers;
- leachate (i.e., water that has passed through the landfill's layers);
- landfill gas (LFG) which is a natural byproduct of decomposing organic material; and
- flares which burn any excess LFG collected by the CBLF.

Flares conservatively combust 98% of LFG sent to them. The 2% of un-combusted odor constituents in LFG is modeled for odors.

2.6 ODOR MONITORING AND CONTROL MEASURES

CBLF has developed and implemented a site-specific odor management plan that includes:

- application of daily cover;
- operating a LFG collection and control system;
- conducting surface emissions monitoring (SEM);
- monitoring local weather conditions (temperature, wind direction, etc.);
- conducting routine odor patrol inspections;
- responding to odor complaints received from the public and/or the Oregon Department of Environmental Quality (DEQ);
- taking action when odors are detected/reported;
- observing the area of concern for smell and conditions;
- inspecting landfill operations for any unusual activities or conditions;
- identifying possible sources of odor; and
- confirming implementation of applicable odor minimization measures.

2.7 ODOR COMPLAINT HISTORY

CBLF maintains a log of odor complaints received from the public and the DEQ. For this study, SCS Engineers (SCS) reviewed the odor complaints from 2022 through 2024 for potential patterns (e.g., time of day, day of week, season of year) as well as potential correlation to concurrent wind conditions measured on-site. For review purposes, each odor complaint log entry (event) was assigned a unique ID (1 through 84) as well as an estimated distance and wind direction from CBLF (e.g., if a complaint location was southeast (SE) of CBLF, then the concurrent wind direction at CBLF would need to be northwest (NW) for correlation). Note, odor event #1 (25 odor complaints between 11/18/21 and 2/7/22) could not be categorized since specific complaint dates/times were not provided.

Based upon the review, the following observations were made:

- Location
    - Complaint locations ranged from the adjacent surrounding area to approximately seven miles from CBLF.
    - Complaint locations varied from not provided to general areas to specific addresses.
    - The most common complaint locations specified were southwest (35%) and south (29%) of CBLF.
    - Complaint locations southwest of CBLF were within a valley whose terrain may be channeling odor from CBLF under certain wind conditions.
    - Populated areas south of CBLF include Adair Village, Lewisburg, and Corvallis.

- Time of Day
  - Odor complaints were reported in 16 different hours of the day.
  - Odor complaints peaked in the morning between 8:00 am and 11:00 am:
    - 7:00 am to 7:59 am (11%);
    - 8:00 am to 8:59 am (12%);
    - 9:00 am to 9:59 am (12%); and
    - 10:00 am to 10:59 am (7%).
- Complaints in a Single Day
  - Two days each had five odor events (1/18/2024 and 2/3/2024).
  - Two days each had four odor events (5/23/2024 and 12/1/2024).
  - Four days each had three odor events (2/10/2024, 2/20/2024, 4/1/2024, and 12/29/2024).
  - Seven days each had two odor events.
  - Thirty nine days each had one odor event.
- Day of Week
  - Odor events were reported on each day of the week and peaked on Thursday:
    - Thursday (20%);
    - Saturday (19%);
    - Friday (17%);
    - Tuesday (14%);
    - Sunday (11%);
    - Wednesday (10%); and
    - Monday (8%).
- Month and Season of the Year
  - The odor events peaked in December with the top four months being:
    - December (24%);
    - February (23%);
    - August (11%); and
    - January (10%).
  - The odor events peaked in the winter:
    - Winter (46%);
    - Fall (24%);
    - Summer (18%); and
    - Spring (12%).
  - Thermal inversions could be a contributing factor to the odor complaints. Radiation from the sun can heat the ground which in turn can warm the air near the Earth's surface. When warm air expands and cools as it rises, air temperature decreases with altitude. However, a thermal inversion occurs when air temperature increases with altitude. There are two kinds of thermal inversions: surface and aloft. Surface inversions can result in poor air quality (e.g., odors) as pollutants are trapped near ground level, dispersing only horizontally within the inversion. Surface inversions are stronger and more common during the winter months when winds are calm, skies are clear, and nights are long [4, 5]. Thermal inversions were not considered when evaluating each individual odor event. Air temperature needs to be measured at different heights to determine if a thermal inversion exists. The on-site meteorological station only collected air temperature data at one height. Any odors trapped within an inversion would still disperse horizontally based upon wind direction.
- Correlation of Odor Complaint to On-Site Wind Data

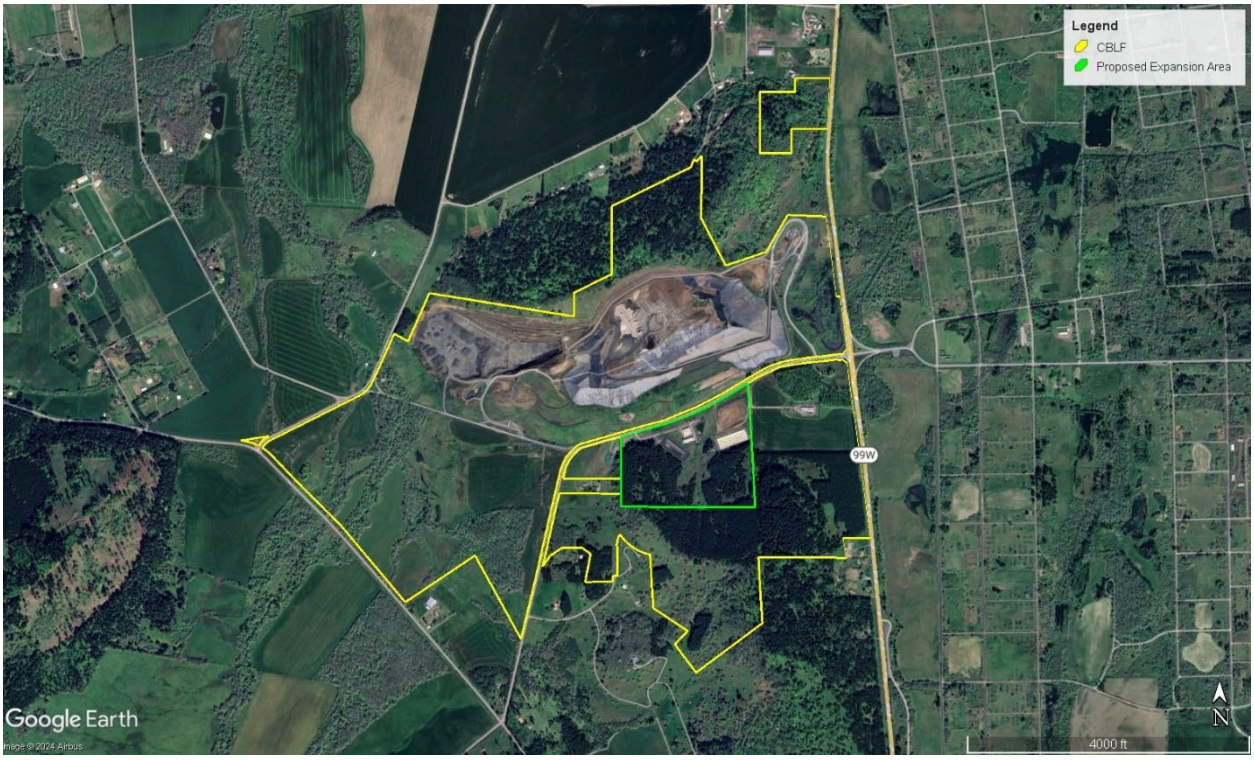
- Correlation of odor complaints to on-site wind data took into account several factors including complaint location (distance and direction relative to CBLF), complaint time, and the wind speed/direction at and before the complaint time.
- Odor events were then categorized as follows for correlation:
  - "Likely" based on complaint location and wind conditions (1%);
  - "Not likely" based on complaint location and wind conditions (29%);
  - "Possible" due to ambiguity or lack of data (58%); and
  - "Unknown" due to complaint time not specified (12%).

See Appendix A for the odor complaint review details.

2.8 PROPOSED PROJECT

CBLF is requesting approval of a conditional use permit (CUP) application to expand the area on which landfill activities will be conducted to the south side of Coffin Butte Road (the "Development Site"). In addition to using the Development Site for the landfill, the proposed changes include an 1,800-square-foot employee building and parking on land to the west of the landfill, access road modifications on lands to the north, and the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, the shop/maintenance area, cut activities for landfill, and leachate ponds to support the landfill onto the property to the east (collectively, the "Project") [6]. Figure 4 displays the location of the expansion area in relation to existing operations.

Figure 4. Proposed Expansion Area (Taxlot 104180001107)



2.9 OTHER POTENTIAL SOURCES OF ODOR IN THE REGION

Although this study only addresses potential odor impacts from the CBLF, it is important to note that other potential sources of odor exist in the region including (but not limited to):

- Agriculture.
- Biosolids land application fields (used only in summer months, but not every).
- Compost / organics recycling facility.
- Wastewater treatment plant.

3.0 METHODOLOGY

Since odor is a subjective human response, odor dispersion modeling provides an objective approach towards understanding how on-site emissions of odor potentially impact off-site locations. The following summarizes the methodology used in this study.

3.1 MODEL SELECTION

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (Version 24142 incorporated into the Lakes Environmental AERMOD View 13.0 software suite) [7] was used to model estimated emissions of odorous pollutants from the landfill and predict maximum, off-site, 1-hour concentrations for each pollutant using the rural dispersion mode and elevated terrain.

AERMOD was selected for this study since:

- AERMOD is preferred/recommended by the EPA for near-field dispersion of emissions for distances less than 50 kilometers in both simple and complex terrain.
- AERMOD is acceptable to the DEQ for dispersion modeling studies [8].
- AERMOD has undergone numerous validation studies.
- AERMOD is in the public domain and is readily available.
- AERMOD can model multiple sources and multiple receptors.
- AERMOD can use representative meteorological data to simulate atmospheric conditions that affect the transport and dispersion of air pollution from sources.
- AERMOD can use local terrain data to model receptors in complex terrain.
- AERMOD can be used to model impacts of odor causing pollutants.

Input data for AERMOD included the following which are described below:

- source parameters (locations, dimensions, emission rates, etc.);
- receptor locations;
- meteorological data;
- terrain data; and
- model options.

See below for details regarding the AERMOD model input.

3.2 SCENARIOS MODELED

In order to estimate odors from the landfill at its current state as well as with the proposed expansion, modeling was performed in two scenarios. The first scenario (Scenario #1) modeled actual operations in 2023 using estimated emission rates from the following resources:

- Revised 2023 Annual Title V Report (October 11, 2024) for criteria pollutants using process throughputs and emission factors that have already been approved by DEQ;
- Revised 2023 Air Toxics Emission Inventory (ATEI) (August 2024) for speciated air toxics and Volatile Organic Compounds (VOCs) using process throughputs and emission factors that have already been approved by DEQ; and

- U.S. EPA LandGEM model (LandGEM) ran for the 2023 ATEI for additional non-toxic pollutants not included above assuming an EPA default 75% collection efficiency and 98% destruction efficiency by the flares[1].

The second scenario (Scenario #2) looked at year 2052, which is the estimated closure year if current tonnages of waste acceptance from 2023 continue. 2052 would also see the highest landfill gas generation rate based on the model. A 75 collection efficiency was used in this scenario as well. The estimated waste design capacity will be 41,110,068 tons including the expansion area.

A third scenario was considered to show a middle point in landfill expansion, but is dependent on the odor results of the first two scenarios to see if needed.

3.3 SOURCE PARAMETERS

Source parameters were used to model the release of odorous pollutants from the fugitive landfill surface, landfill gas flares, the tipper engines, and the aggregate insignificant (AI) source. The AI source is incorporated by DEQ into each criteria pollutant emission total for the facility, taking into consideration sources that are too small to be permitted.

In Scenario #1, the fugitive landfill source was located in the currently permitted waste area North of Coffin Butte Road. In 2023, two open (candlestick) flares were present at the landfill, as well as two tipper engines and the AI source.

Scenario #2 is proposed to include a fugitive landfill source in the current permitted area, as well as an expansion area South of Coffin Butte Road. Since 2023, the two open flares have been replaced with one enclosed flare with a landfill gas capacity of 3,390 standard cubic feet per minute (scfm). For a conservative approach, it is assumed that all landfill gas collected is going through this flare even though a landfill gas to energy (LFGTE) plant is on-site and expected to control a significant amount of the gas. The proposed landfill gas generation rate from LandGEM in 2052 would exceed this flare's capacity, but for simplicity all emissions were still modeled from this flare source, as a second flare with similar exhaust parameters would be installed close by if needed. The tipper engines and AI source parameters were not changed in Scenario #2; however, these sources were moved to the expansion area as the final buildout's active face would likely be in this region. The size of the AI source needed to be shrunk in order to fit in the smaller expansion area.

Tables 1 through 3 summarize the source parameters modeled while Figure 5 displays the modeled source locations. Most model parameters were taken from the November 2024 Modeling Report submitted to DEQ for CBLF. A revised extent of waste was used for the fugitive landfill surface source, with sources in the expansion area estimated based on engineering drawings.

[1] EPA, 2008a. Background Information Document for Updating AP42 Section 2.4 for Estimating Emissions from Municipal Solid Waste Landfills. National Risk Management Research Laboratory, Air Pollution Prevention and Control Division, U.S. EPA. September 2008.
http://www.epa.gov/ttn/chief/ap42/ch02/draft/db02s04.pdf

Table 1. Point Source Release Parameters

Model ID	Description	Elevation above mean sea level (ft)	Stack Height (ft)	Temperature (F)	Exit Velocity (ft/s)	Stack Diameter (ft)
EFLARE	Enclosed Flare	245.8	40	1,600	39.5	11.68
TIP2	Tipper Engine #2	301.1	9	1,016.6	57.7	0.66
TIP3	Tipper Engine #3	301.3	7.5	927.1	24.3	0.66

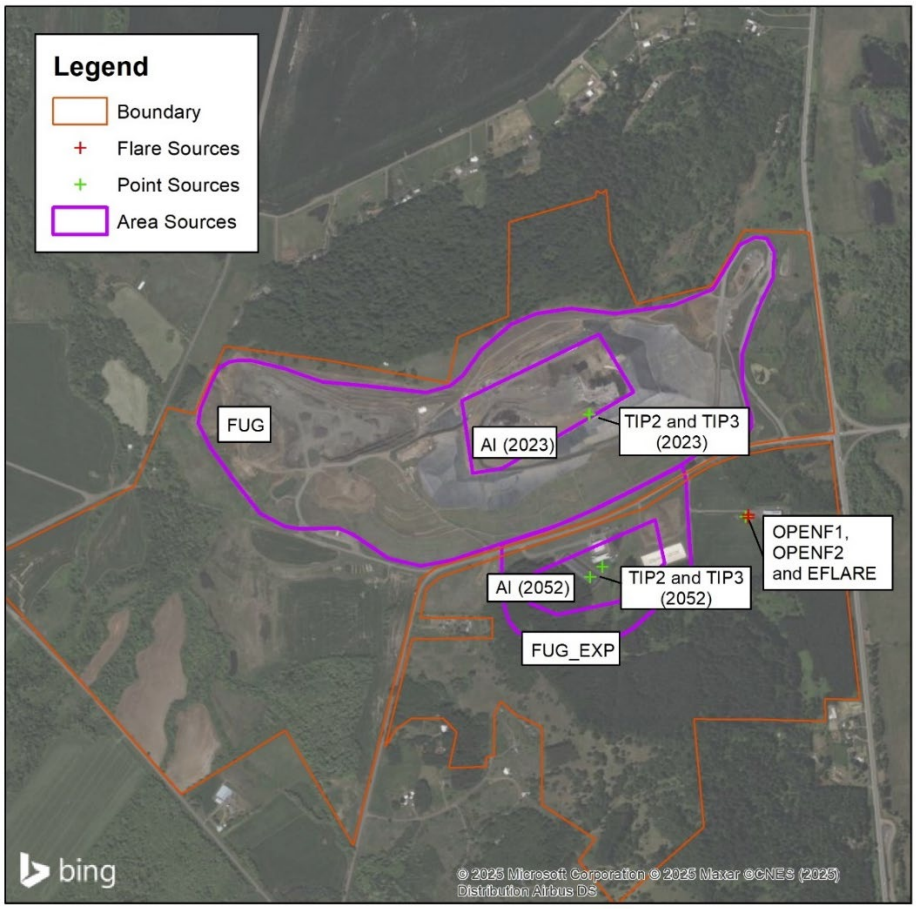
Table 2. Flare Source Release Parameters

Model ID	Description	Elevation above mean sea level (ft)	Effective Release Height (ft)	Temperature (F)	Exit Velocity (ft/s)	Stack Diameter (ft)
OPENF1	Open Flare #1	242.6	42.26	900	60	0.67
OPENF2	Open Flare #2	242.6	42.26	900	60	0.67

Table 3. Area Source Parameters

Model ID*	Description	Elevation above mean sea level (ft)	Area (ft^2)	Release Height (ft)	Initial Vertical Dimension (ft)
FUG	Current Fugitive Surface	246.1	8,813,545	262.5	122.1
FUG_EXP	Expanded Fugitive Surface	246.0	2,077,535	154	71.6
AI (2023)	Aggregate Insignificant	281.6	1,132,482	0	0
AI (2052)	Aggregate Insignificant	281.6	668,917	0	0

Figure 5. Modeled Area Source Locations



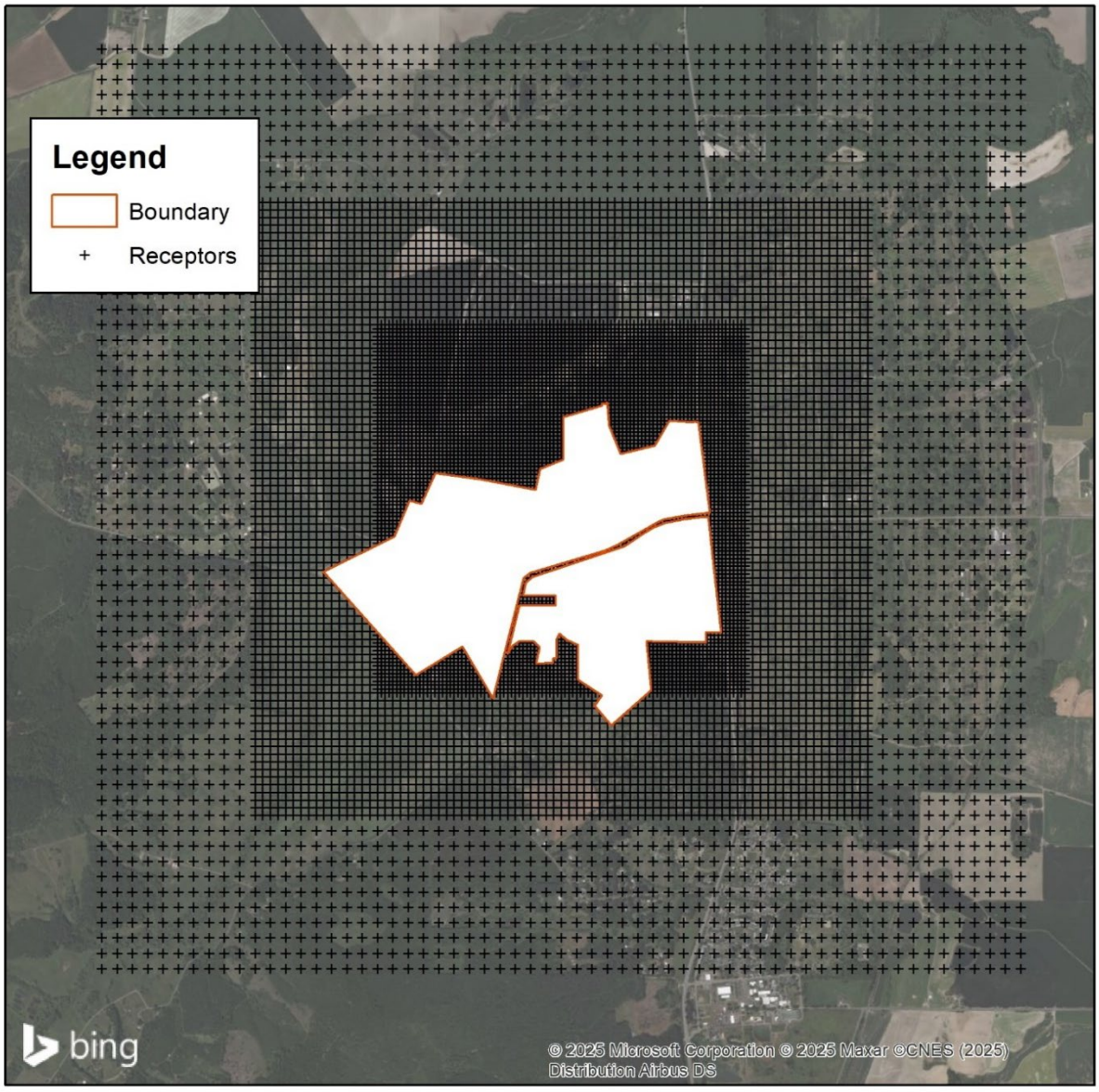
3.4 BUILDING DOWNWASH

Building downwash occurs when wind flowing over/around buildings impacts the dispersion of pollution from nearby stacks (point sources). One building exists 140 feet East of the flares where the LFGTE plant is located. This building is 175 feet by 60 feet wide and 25 feet tall.

3.5 RECEPTORS

AERMOD was used to generate nested 25-meter, 50-meter, and 100-meter spaced receptor grids over the landfill and surrounding area. Receptor flag pole heights were set to zero meters (ground level). On-site receptors within the landfill's property boundary were removed from the analysis. See Figure 6 for the layout of the nested grids.

Figure 6. Nested Receptor Grid



3.6 METEOROLOGICAL DATA

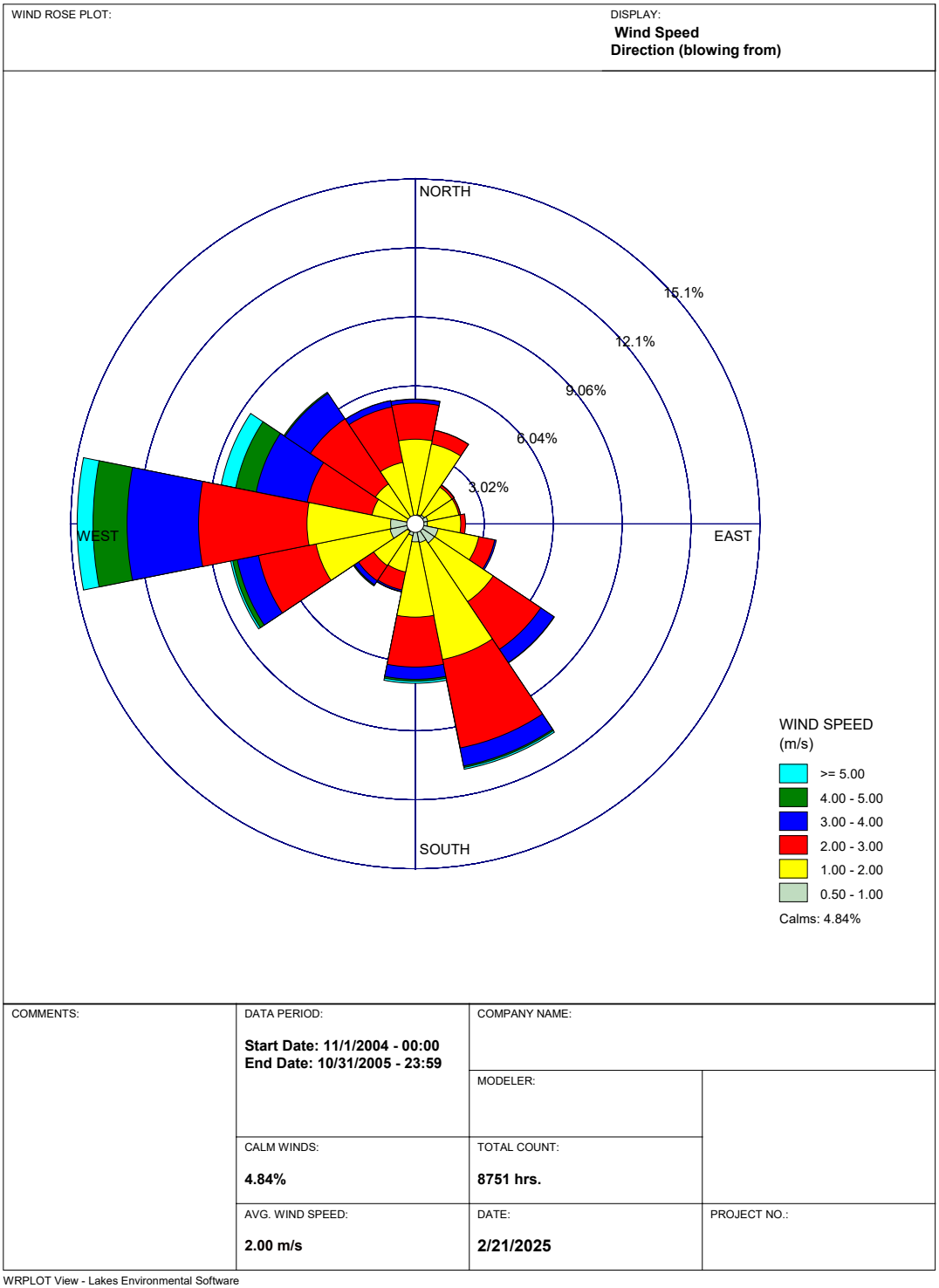
On-site data was collected between November 1, 2004 and October 30, 2005 by CH2M HILL to support permitting for the LFGTE facility (operated by Pacific Northwest Generating Cooperative) expansion which added two additional engines to the facility in 2006. At the time of collection, the meteorological station was located on-site, at a location recommended by DEQ, approximately 100 feet southeast of the LFGTE facility. The data collected from the onsite station included wind speed, wind direction, standard deviation of horizontal wind direction, temperature, delta temperature, and solar radiation. Data for this period is available for 8,727 hours for the year, resulting in a data availability of 99.9%, with greater than 90% availability for any single parameter. Additional details regarding the collected on-site data are available in the 2006 Air Modeling Report prepared by CH2M HILL.

This data set is characterized by strong west-southeast wind pattern. The meteorological data summary was included in the Modeling Protocol approved by DEQ.

The Salem McNary Field was used as the upper air data set. AERSURFACE was used to calculate site specific values for albedo, Bowen ratio, and surface roughness on an annual basis for 12 surface sectors.

A wind rose displays wind speed and wind direction graphically for a designated historical time period. Figure 7 displays the lower altitude (surface) wind rose for the meteorological data modeled in this study. Dominant surface wind patterns occur from the south-southeast and west in this meteorological set. Note, wind data in Figure 7 was measured during a different time period and at a different location than the on-site wind data used for the odor complaint analysis. Therefore, the wind data in Figure 7 was not used in the odor complaint analysis.

Figure 7. Wind Rose of Modeled Meteorological Data



3.7 TERRAIN DATA

Local terrain data was first downloaded from the United States Geological Survey (USGS) 1 arc-second National Elevation Dataset (NED). Elevations were then processed and imported into AERMOD for the sources and receptors modeled.

3.8 NUISANCE ODOR THRESHOLD

Oregon state laws prohibit businesses from emitting odors which cause a nuisance. These nuisance laws are implemented by the DEQ which has developed a strategy for responding to odor complaints reported through an online tool. The strategy emphasizes early odor detection, voluntary cooperation, and the rapid resolution of nuisance conditions related to odors [9]. Since the DEQ has not specified a protocol for odor evaluations, this study modeled pollutants individually so that predicted off-site concentrations could be directly evaluated against the individual pollutant's published odor detection threshold to determine whether the individual pollutant may be detectable in residential or commercial land use areas. Pollutant-specific odor thresholds were obtained from the following resources [10, 11, 12]:

- American Industrial Hygiene Association (AIHA), "Odor Thresholds for Chemicals with Established Occupational Health Standards, 3rd edition".
- National Oceanic and Atmospheric Administration (NOAA), "Computer-Aided Management of Emergency (CAMEO)".
- United States Environmental Protection Agency (EPA), "Health Effects Notebook for Hazardous Air Pollutants".

Note, many pollutants have a range of published odor thresholds. For this study, the lowest odor threshold published by AIHA was used for most pollutants. For pollutants with wide ranges in odor thresholds (e.g., sulfur based compounds such as hydrogen sulfide), the published odor threshold from CAMEO was used. CAMEO was also used for one pollutant that did not have a published odor threshold from AIHA. Finally, EPA odor thresholds were used for two pollutants that either did not have a published odor threshold from AIHA or had an EPA odor threshold lower than the published odor threshold from AIHA. See Appendix E for the odor thresholds modeled in this study.

Scenario #1 (2023 actual operations) had 49 pollutants with published odor thresholds. Since emission rates and odor thresholds vary by pollutant, the 2023 emissions (taken from the 2023 ATEI as well as non-toxics from LandGEM) were screened for pollutants with the highest potential for causing off-site odors. This was accomplished by ranking each pollutant based on the ratio of facility level emissions (in units of grams per second) to odor threshold (in units of grams per meter cubed). Based upon this screening process, this study focused upon evaluating the following top eight pollutants (approximately 95% of the 2023 odor emissions):

- Dimethyl sulfide (methyl sulfide);
- Ethyl benzene;
- Ethyl mercaptan (ethanethiol);
- Hydrogen sulfide;
- Methyl mercaptan;
- Nitrogen oxides (NOx as NO_2);
- Toluene; and
- Xylenes.

See Appendix B for the odor pollutant screening results.

3.9 SCENARIO EMISSION RATES

Emissions of the eight pollutants with the highest odor potential as mentioned in Section 3.8 were calculated for both Scenario #1 and #2. As mentioned, the estimated actual emissions from 2023 were used for Scenario #1. Hydrogen Sulfide, Xylene, Toluene, and ethyl benzene from this ATEI were directly brought into the model. The only change to sources from the ATEI was the landfill surface, noted as F-LFG1 and F-LFG2, which were combined and modeled as FUG. Dimethyl sulfide, methyl mercaptan, and ethyl mercaptan were taken from LandGEM for the 2023 year, which determined 591.58 MMscf of landfill gas was emitted fugitively and 607.56 MMsf of landfill gas was combusted by the open flares. These three pollutants are only present in the landfill gas sources. Nitrogen oxides (NOx) emissions were taken from the 2023 annual Title V emission calculations reported to DEQ. See Appendix C for Scenario #1 emission rates.

Scenario #2 requires LandGEM to estimate future yearly tonnages until the design capacity is reached. The design capacity is 41,110,068 tons including the expansion area, which will be reached in year 2052 assuming the 2023 waste acceptance of 930,373 tons continues annually. This would generate 1,132 MMscf of fugitive landfill gas and 3,399 MMscf of collected gas in year 2052. The same methodology from Scenario #1 was used to calculate fugitive and flare emissions using the permitted emission factor for NOx of 27.35 lb/MMscf. The total landfill fugitive surface area is 1,011,815 square meters, with 81% of this being in the current area, and 19% in the southern proposed expansion. Total fugitive emissions were split between FUG and FUG_EXP based on this area percentage. See Appendix D for Scenario #2 emission rates for the eight targeted odorous pollutants.

Emissions by source for each scenario are shown in Tables 4 and 5 below.

Table 4. Scenario #1: 2023 Emissions By Source (g/s)

Pollutant	FUG	OPENF1	OPENF2	TIP2	TIP3	AI
Ethyl Benzene	1.06E-02	1.04E-04	1.14E-04			
Hydrogen Sulfide	2.63E-02	2.57E-04	2.82E-04			
Toluene	7.86E-02	7.70E-04	8.45E-04	8.12E-05	6.26E-05	
Xylene	2.79E-02	2.73E-04	3.00E-04	5.66E-05	4.36E-05	
Dimethyl Sulfide	9.67E-03	2.90E-04	2.90E-04			
Ethyl Mercaptan	2.85E-03	8.56E-05	8.56E-05			
Methyl Mercaptan	2.40E-03	7.20E-05	7.20E-05			
Nitrogen Oxides		9.15E-02	1.71E-01	8.79E-01	6.77E-01	2.88E-02

Table 5. Scenario #2: 2052 Emissions By Source (g/s)

Pollutant	FUG	FUG_EXP	EFLARE	TIP2	TIP3	AI
Ethyl Benzene	1.65E-02	3.88E-03	1.22E-03			
Hydrogen Sulfide	4.07E-02	9.60E-03	3.02E-03			
Toluene	1.22E-01	2.87E-02	9.03E-03	8.12E-05	6.26E-05	
Xylene	4.32E-02	1.02E-02	3.21E-03	5.66E-05	4.36E-05	
Dimethyl Sulfide	1.66E-02	3.91E-03	1.23E-03			
Ethyl Mercaptan	4.89E-03	1.15E-03	3.63E-04			
Methyl Mercaptan	4.12E-03	9.71E-04	3.05E-04			
Nitrogen Oxides			1.34E+00	8.79E-01	6.77E-01	2.88E-02

4.0 RESULTS

Tables 6 and 7 summarize the peak, off-site, 1-hour pollutant concentrations for each modeling scenario in units of micrograms per meter cubed (ug/m3). Each pollutant impact was then compared to its odor threshold via a ratio called dilution to threshold or D/T (i.e., maximum impact divided by odor threshold). A D/T ratio of less than one indicates that the predicted impact would not cause a detectable nuisance odor impact. See Figure 8 for the peak, off-site impact locations. Figures 9 through Figure 12 show the odor concentration contours from the two pollutants in each scenario with the highest D/T values. For each scenario, NOx had the highest D/T with the tipper engines as driving sources, and dimethyl sulfide had the highest D/T with the fugitive landfill surface as the driving source. All six of the remaining pollutants would show similar contours to dimethyl sulfide as they have the same driving source.

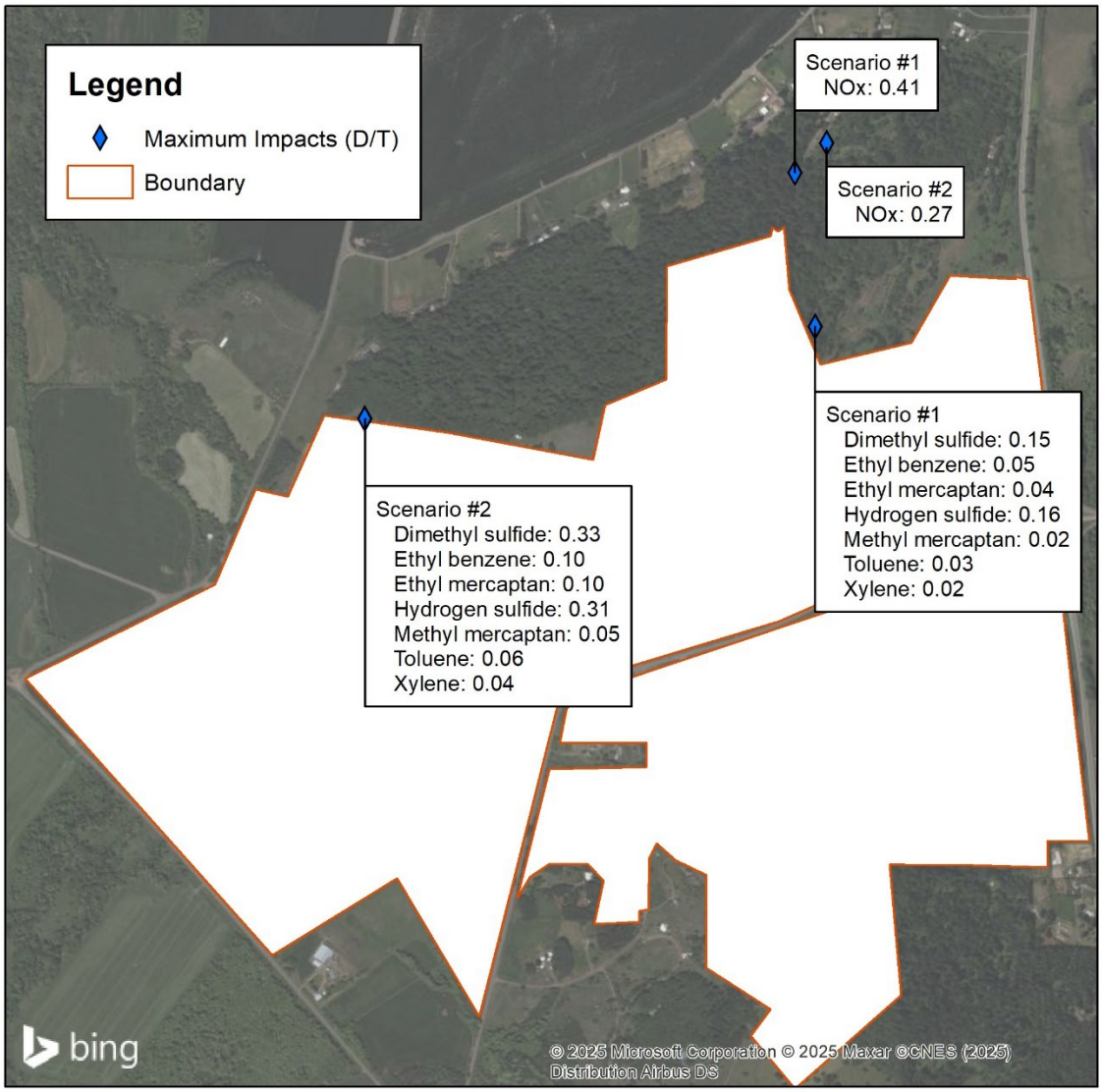
Table 6. Scenario #1: 2023 Model Results

Odor Pollutant	Max Impact (ug/m3)	Odor Threshold (ug/m3)	Max D/T	Driving Source	Max Impact Easting UTM Zone 10 (m)	Max Impact Northing UTM Zone 10 (m)
Dimethyl sulfide (methyl sulfide)	**0.38**	**2.54**	**0.15**	**FUG**	**481,895**	**4,950,080**
Ethyl benzene	0.42	8.68	0.05	FUG	481,895	4,950,080
Ethyl mercaptan (ethanethiol)	0.11	2.54	0.04	FUG	481,895	4,950,080
Hydrogen sulfide	1.04	6.55	0.16	FUG	481,895	4,950,080
Methyl mercaptan	0.095	4.13	0.02	FUG	481,895	4,950,080
NOx (as NO2)	**769.18**	**1,881.62**	**0.41**	**TIP2 and TIP3**	**481,845**	**4,950,455**
Toluene	3.12	97.99	0.03	FUG	481,895	4,950,080
Xylene (mixture)	1.09	52.10	0.02	FUG	481,895	4,950,080

Table 7. Scenario #2: 2052 Model Results

Odor Pollutant	Max Impact (ug/m3)	Odor Threshold (ug/m3)	Max D/T	Driving Source	Max Impact Easting UTM Zone 10 (m)	Max Impact Northing UTM Zone 10 (m)
Dimethyl sulfide (methyl sulfide)	**0.84**	**2.54**	**0.33**	**FUG**	**480,795**	**4,949,855**
Ethyl benzene	0.84	8.68	0.10	FUG	480,795	4,949,855
Ethyl mercaptan (ethanethiol)	0.25	2.54	0.10	FUG	480,795	4,949,855
Hydrogen sulfide	2.06	6.55	0.31	FUG	480,795	4,949,855
Methyl mercaptan	0.21	4.13	0.05	FUG	480,795	4,949,855
NOx (as NO2)	**511.58**	**1,881.62**	**0.27**	**TIP2 and TIP3**	**481,920**	**4,950,530**
Toluene	6.16	97.99	0.06	FUG	480,795	4,949,855
Xylene (mixture)	2.19	52.10	0.04	FUG	480,795	4,949,855

Figure 8. Peak 1-Hour Off-site Odor Impact Locations



No odor pollutants individually exceeded a D/T value of 1 in this analysis. However, isopleths are shown in the next four figures for NOx and dimethyl sulfide in both scenarios to show where odor impacts are expected to be highest based on modeling. Scenario #2 shows a 2 to 2.5 times increase in impacts from all pollutant driven by the fugitive source as landfill gas generation from the landfill is expected to significantly increase from 2023 to 2052. Scenario #1 shows the higher impacts from Nox as relocating the tipper engines and AI source to the southern expansion area is much better for modeling, having a larger buffer to the North and being at a lower elevation.

Based on the odor results in Scenario #1 and #2, a third scenario in the middle of expansion does not seem necessary. This middle scenario would show results in between Scenario #1 and #2 with slight differences based on landfill mound height in the expansion area and would certainly show D/T values less than 1 for all pollutants.

Figure 9. Scenario #1 NOx Odor D/T Contours

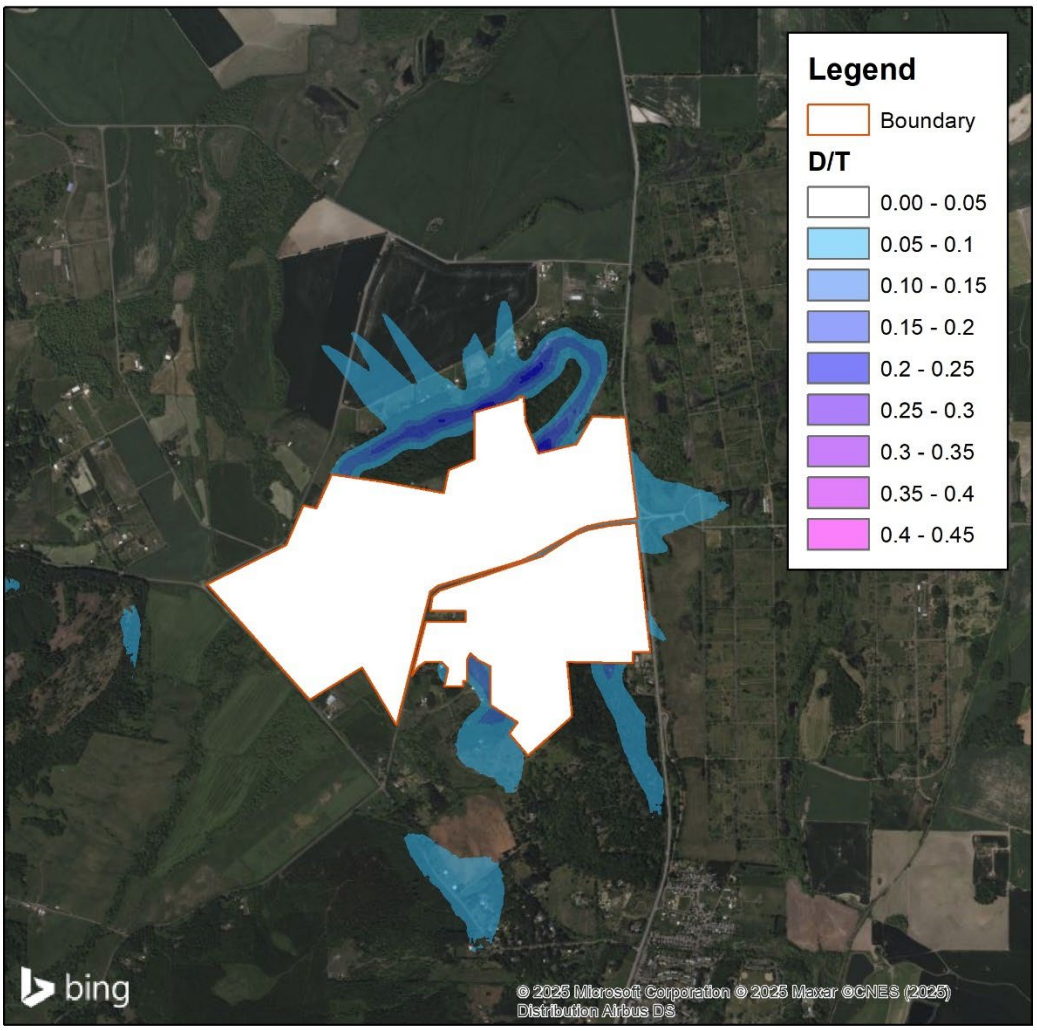


Figure 10. Scenario #1 Dimethyl Sulfide Odor D/T Contours

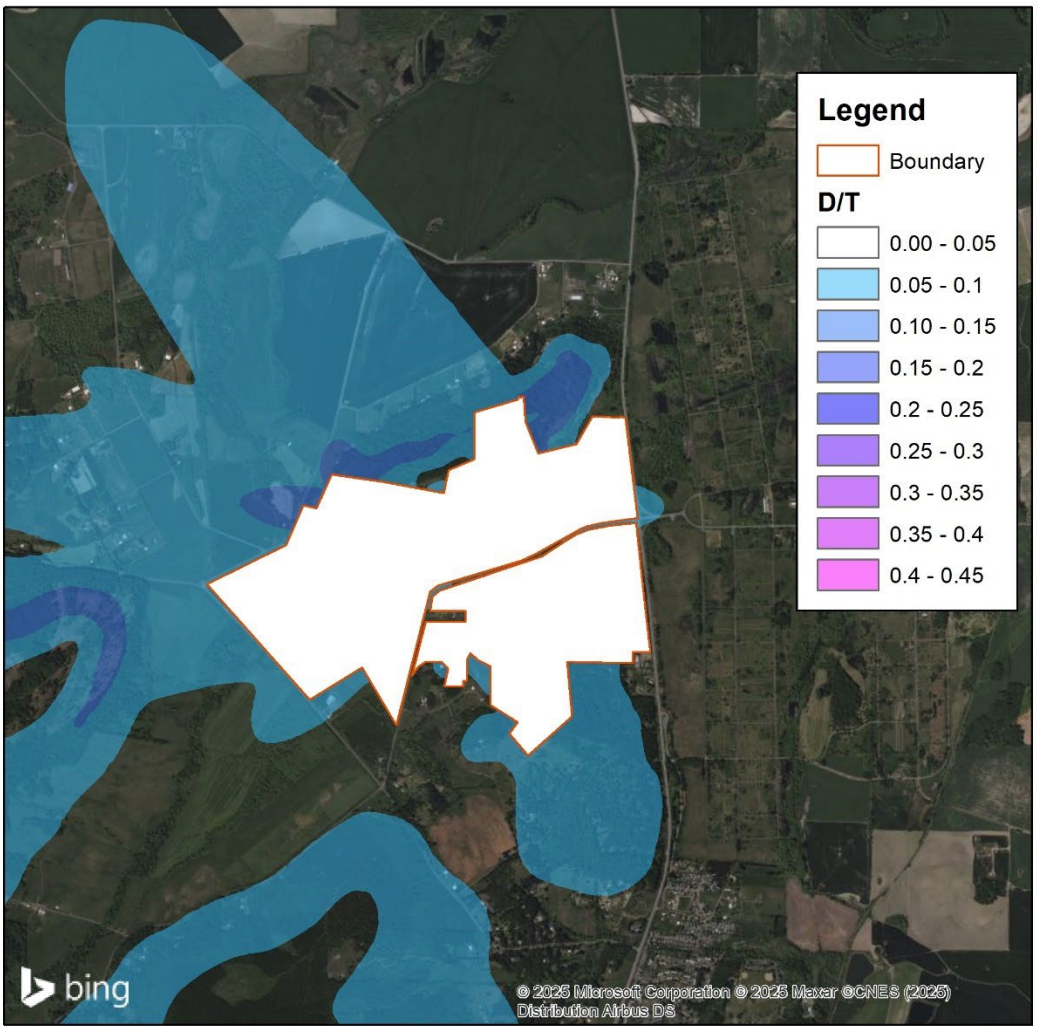


Figure 11. Scenario #2 NOx Odor D/T Contours

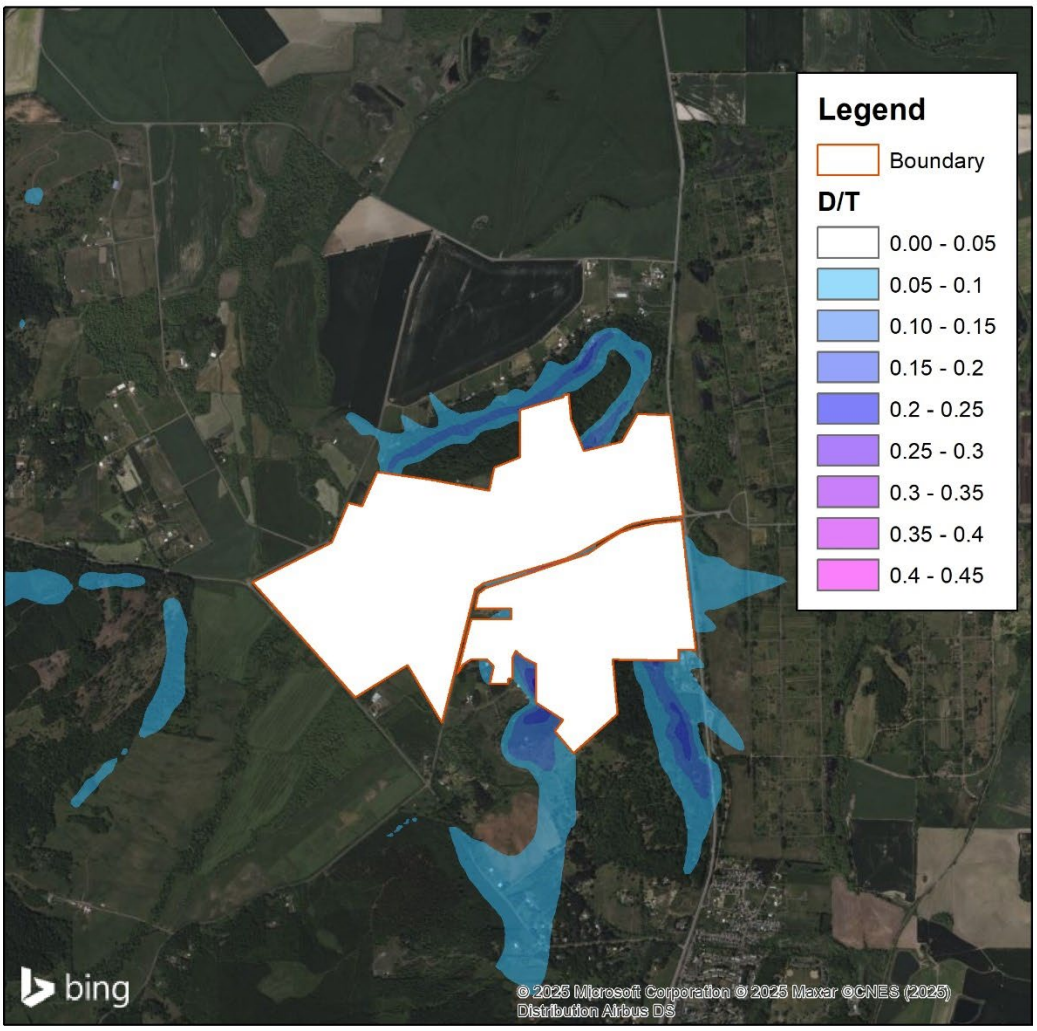
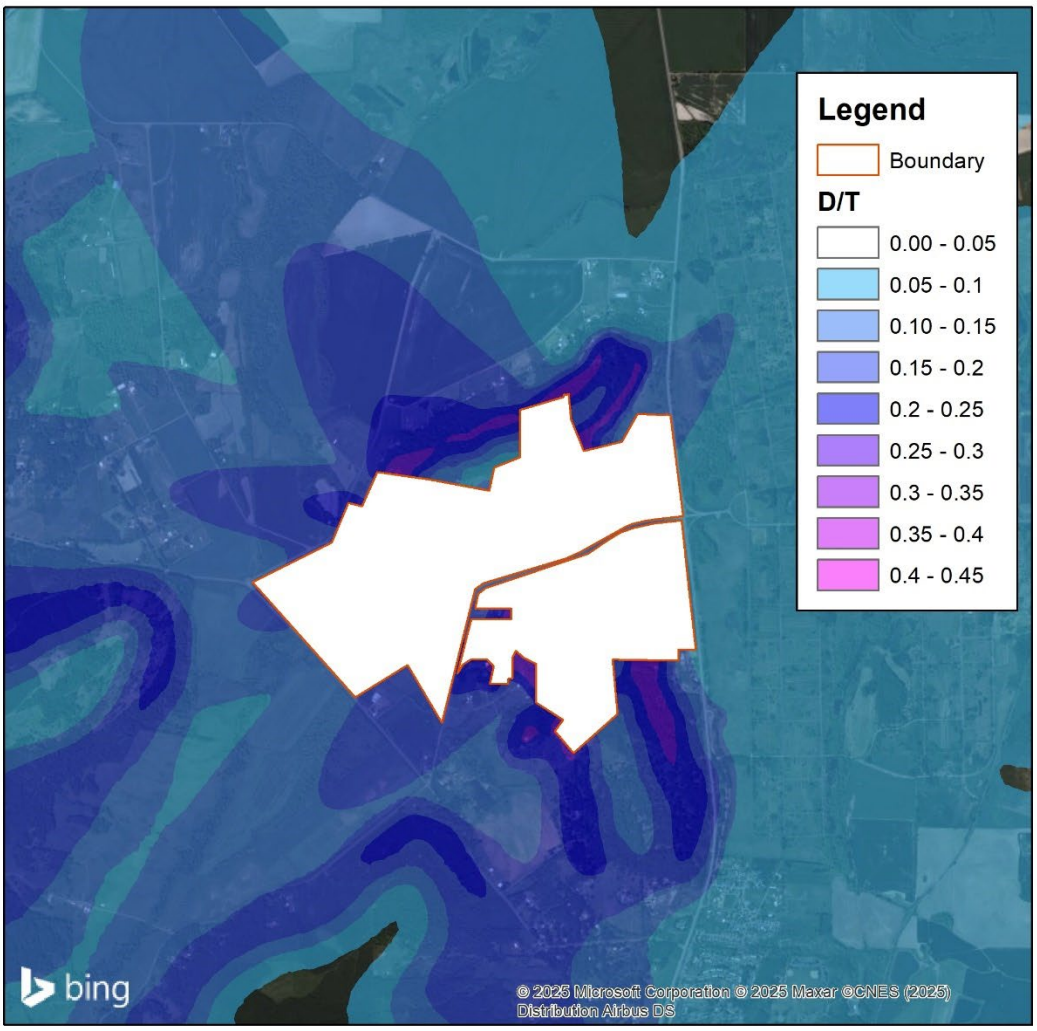


Figure 12. Scenario #2 Dimethyl Sulfide Odor D/T Contours



5.0 CONCLUSIONS

5.1 ODOR COMPLAINT ANALYSIS

Based upon the analysis of the odor complaints logged in 2022 through 2024, the following conclusions are presented:

- Complaint locations ranged from adjacent to CBLF to as far as seven miles away.
- Most complaints were located Southwest and South of CBLF, requiring wind from the North or Northeast to be coming from the landfill.
- Based upon the 2022 through 2024 weather data measured on-site; winds were from the North 3.1% of the time and from the Northeast 4.6% of the time (the dominant wind direction was from the South-Southwest 18.7% of the time).
- Complaints peaked in the morning from 8:00 AM to 11:00 AM.
- Complaints specifically peaked in winter months, possibly due to thermal inversions. Colder temperatures have less thermal mixing which leads to higher air quality and odor impacts.
- Correlating the complaint location to wind data during the complaint time showed only 1% of complaints "likely" to come from the landfill and 58% to be "possible" from the landfill.

5.2 ODOR DISPERSION MODELING

Since the DEQ has not specified a protocol for odor evaluations, this study modeled pollutants individually so that predicted off-site concentrations could be directly evaluated against the individual pollutant's published odor detection threshold to determine whether the individual pollutant may be detectable in residential or commercial land use areas. This evaluation was accomplished using a D/T ratio for each pollutant modeled (i.e., maximum 1-hour pollutant concentration modeled divided by its odor threshold). A D/T ratio of one for each pollutant was then used as the threshold for determining whether the existing landfill or proposed expansion project would cause a detectable nuisance odor impact.

Based upon the modeling results of the two scenarios, the following conclusions are presented:

- Scenario #1 (2023 actual operations) was not expected to cause detectable nuisance odors since the D/T ratio for each pollutant modeled was well below one.
- Scenario #2 (2052 proposed operations) was not expected to cause detectable nuisance odors since the D/T ratio for each pollutant modeled was well below one.
- Scenario #2 (2052 proposed operations) D/T ratios increased by 2 to 2.5 times as compared to Scenario #1 (2023 actual operation) for all pollutants except NOx. The decrease in the NOx D/T ratio was due to the change in tipper and AI location. As noted above, all D/T ratios were well below one.
- Peak impact locations were all north of the landfill boundary in Scenario #1 and Scenario #2.
- Moving operations to the proposed expansion area will move the predicted peak, off-site 1-hour impact locations, but the D/T ratio for each pollutant would remain below one.

Typically, odors become a nuisance at or above 7 D/T [13, 14] so using 1 D/T for comparison is expected to be conservative. Therefore, this study concludes that the proposed expansion Project will not cause detectable off-site nuisance odor impacts at nearby residential or commercial areas.

6.0 REFEFENCES

1. Benton County, “Taxlots”, https://gis.co.benton.or.us/gisdata/Assessment/.

2. Benton County, “Benton County Zoning Map Online”, https://cd.bentoncountyor.gov/maps/.

3. United States Geological Survey, “National Elevation Dataset (NED)”, https://www.usgs.gov/publications/national-elevation-dataset.

4. Arizona Department of Environmental Quality, “Temperature Inversions Impact Air Quality”, https://legacy.azdeq.gov/environ/air/ozone/Inversion%20Info.pdf.

5. National Weather Service, “What Is An Inversion?”, https://www.weather.gov/media/lzk/inversion101.pdf.

6. Valley Landfills, Inc., “Burden of Proof 2024 Conditional Use Application”, https://coffinbuttelandfill.com/2024-cup/.

7. Lakes Environmental, “AERMOD View 13.0”, AERMOD Version 24142, https://www.weblakes.com/, January 2025.

8. Oregon Department of Environmental Quality, “Recommended Procedures for Air Quality Dispersion Modeling”, https://www.oregon.gov/deq/aq/Pages/default.aspx, March 2022.

9. Oregon Department of Environmental Quality, “Nuisance Odor Strategy”, https://www.oregon.gov/deq/aq/pages/nuisance-odor.aspx.

10. American Industrial Hygiene Association (AIHA), “Odor Thresholds for Chemicals with Established Occupational Health Standards, 3rd edition”, https://www.aiha.org.

11. National Oceanic and Atmospheric Administration (NOAA), “Computer-Aided Management of Emergency (CAMEO), https://cameochemicals.noaa.gov/search/simple.

12. United States Environmental Protection Agency (EPA), “Health Effects Notebook for Hazardous Air Pollutants”, https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants.

13. San Diego State University and California Integrated Waste Management Board, “Contractor’s Report to the Board – Comprehensive Compost Odor Response Project”, March 2007, https://www2.calrecycle.ca.gov/Publications/Download/841.

14. McGinley, P.E., Charles M., “Enforceable Permit Odor Limits”, St. Croix Sensory, Inc., https://www.fivesenses.com/, 2000.

Appendix A

Odor Complaint Review

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
1	2/22/2022	(N/A)	DEQ informed us of 25 odor complaints they had received between 11/18/21 and 2/7/22. No additional details provided	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	Complaint times not specified. Wind speeds and wind directions varied throughout the period.	Unknown
2	7/1/2022	10:00 AM	via DEQ	(N/A)	"The usual stench from the landfill. Once again occuring at my location as the marine clouds lift and the day warms.	(N/A)	(N/A)	Calm	Southwest wind (0 mph). Winds were from the southwest (0-3 mph) between 0030 and 1030 hours.	Possible
3	7/26/2022	8:00 AM	via DEQ	(N/A)	"odors from the Coffin Butte Landfill. Quite noticeable this morning while we had a high pressure system and no wind", complex toxic chemical slew	(N/A)	(N/A)	SW	Southwest wind (1 mph). Winds were calm (0 mph) between 0230 and 0730 hours.	Possible
4	7/30/2022	8:00 AM	via DEQ	(N/A)	Coffin Butte Landfill by Republic. Sulfur, dump odor	(N/A)	(N/A)	Calm	South-southeast wind (0 mph). Winds were from the east-northeast (4 mph) at 0700 hours, then calm (0 mph) at 0730 and 0800 hours.	Possible
5	8/15/2022	9:13 AM	via DEQ	(N/A)	"the Coffin Butte Dump smell is noticeable on occasion. Today it is really bad. To the point of making me sick to my stomach when I walk around outside", methane	(N/A)	(N/A)	S / SW	South to southwest winds (1-5 mph). Winds were calm (0 mph) between 0430 and 0830 hours.	Possible
6	8/17/2022	(N/A)	DEQ	assorted via DEQ	(N/A)	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
7	12/13/2022	(N/A)	complaint forwarded to Ian Macnab from Hugh Gao of DEQ. No specific details of timing of event.	"neighborhood surrounding landfill"	"emissions gas, unsafe air quality"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
8	9/28/2023	(N/A)	N/A (forwarded from DEQ) 2/7/24	(N/A)	"overpowering and pervasive to my nostrils and eyes"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
9	11/21/2023	(N/A)	Becky LeBlanc	Writsman Creek Dr	"dump smell"	~ 3. 8 miles	NE	(N/A)	Complaint time not specified. Winds were briefly from north-northeast at 1000, 1130, and 1230 hours. Winds were from the north-northeast (0-5 mph) between 1400 and 2330 hours. Possible due to channeling effects of terrain.	Unknown
10	11/29/2023	12:40 PM	Larry Leblanc	Writsman Creek Dr	(N/A)	~ 3. 8 miles	NE	Calm	North-northeast wind (0 mph). Winds were from the north-northeast (0-4 mph) between 0700 to 1300 hours. Possible due to channeling effects of terrain.	Possible
11	12/1/2023	3:36 PM	Becky LeBlanc	Writsman Creek Dr	(N/A)	~ 3. 8 miles	NE	S	South wind (6 mph). Winds had a southerly component prior to event.	Not likely
12	12/12/2023	1:35 PM	Larry LeBlanc	Writsman Creek Dr	(N/A)	~ 3. 8 miles	NE	WNW	West-northwest wind (2 mph). Wind was briefly from the northeast (2 mph) at 1230 hours.	Possible
13	12/14/2023	(N/A)	N/A (forwarded from DEQ) 2/7/24	(N/A)	"particularly nasty"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
14	12/15/2023	12:00 PM	N/A (forwarded from DEQ) 2/7/24	highway 20 at independence highway	"absolutely overpowering"	~ 5.1 miles	NNW	WNW	West-northwest wind (1 mph). Winds were from the west-northwest (0-3 mph) between 0000 and 1230 hours.	Not likely
15	12/16/2023	2:00 PM	Larry LeBlanc	Writsman Creek Dr	"overwelming stench this morning"	~ 3. 8 miles	NE	NNE	North-northeast wind (4 mph). Winds were from the north-northeast (3-4 mph) between 1230 and 1400 hours. Possible due to channeling effects of terrain.	Possible
16	12/25/2023	(N/A)	N/A (forwarded from DEQ) 2/7/24	(N/A)	"like rotten garbage, some sort of gas"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
17	1/12/2024	12:15 PM	N/A (forwarded from DEQ)	"apx 3 miles from Coffin Butte landfill"	"horrible smell of the landfill"	~ 3 miles	(N/A)	N / NNE	North-northeast wind (6 mph) at 1200 hours. North wind (4 mph) at 1230 hours.	Possible
18	1/18/2024	12:00 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	(N/A)	(N/A)	(N/A)	Calm	Northeast wind (0 mph). Winds were from the northeast (0-3 mph) between 0800 and 1200 hours.	Possible
19	1/18/2024	12:00 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"odor was very obvious"	(N/A)	(N/A)	Calm	Northeast wind (0 mph). Winds were from the northeast (0-3 mph) between 0800 and 1200 hours.	Possible
20	1/18/2024	1:30 PM	N/A (forwarded from DEQ) 2/7/24	"several miles south of Coffin Butte landfill"	"incredibly intense"	~ 2+ miles	N	NNW	North-northwest wind (2 mph). Winds had a northerly component between 0530 and 1330 hours.	Possible
21	1/18/2024	3:30 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"really bad"	(N/A)	(N/A)	SW	Southwest wind (3 mph). Winds had just shifted from northwest / west-northwest to southwest.	Possible
22	1/18/2024	4:00 PM	N/A (forwarded from DEQ) 2/7/24	"town of Corvallis"	"hits you like a wet blanket and permeates into the home as well"	~ 6.7 miles	N	NW	Northwest wind (6 mph).	Not likely
23	1/19/2024	8:00 AM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"very apparent"	(N/A)	(N/A)	SW	Southwest wind (2 mph). Winds were calm (0 mph) between 0500 and 0730 hours.	Possible
24	2/3/2024	9:00 AM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"foul chemical odor"	(N/A)	(N/A)	S	South wind (2 mph). Winds were calm (0 mph) between 0530 and 0830 hours.	Possible
25	2/3/2024	10:00 AM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"Strong smell of methane"	(N/A)	(N/A)	Calm	South wind (0 mph). Winds were calm (0 mph) between 0530 and 1000 hours except for south wind (2 mph) at 0900 hours.	Possible
26	2/3/2024	1:00 PM	N/A (forwarded from DEQ) 2/7/24	"apx 3 miles from the landfill"	"nasty, horrible and probably not good for anyone to breathe"	~ 3 miles	(N/A)	NNE	North-northeast wind (2 mph). Winds were calm (0 mph) between 0930 and 1230 hours.	Possible
27	2/3/2024	3:00 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"Chemical type smell, Horrible"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds from the north-northeast (1-4 mph) between 1400 and 1430 hours.	Possible
28	2/3/2024	(N/A)	N/A (forwarded from DEQ) 2/16/24	"south end Tampico Rd"	"so strong"	~ 1.7 miles	NNW	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
29	2/8/2024	12:46 PM	N/A (forwarded from DEQ) 2/16/24	(N/A)	"strong"	(N/A)	(N/A)	NNE	North-northeast wind (1-5 mph). Winds were calm (0 mph) between 0000 and 1130 hours.	Possible
30	2/10/2024	7:30 AM	N/A (forwarded from DEQ) 2/16/24	"soap creek rd"	"awful stench"	~ 0 to 5.4 miles	Various	Calm	South wind (0 mph). Winds were calm (0 mph) between 0000 and 0730 hours.	Possible
31	2/10/2024	8:30 AM	N/A (forwarded from DEQ) 2/16/24	"soap creek valley"	"stinky air" "especially bad"	~ 3.3 miles	NE	Calm	South wind (0 mph). Winds were calm (0 mph) between 0000 and 0830 hours.	Not likely

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
32	2/10/2024	9:29 AM	N/A (forwarded from DEQ) 2/16/24	"by the landfill"	(N/A)	(N/A)	(N/A)	Calm	South wind (0 mph). Winds were calm (0 mph) between 0000 and 1030 hours.	Possible
33	2/13/2024	(N/A)	N/A (forwarded from DEQ) 2/16/24	"above 800ft elevation, along Vineyard Mountain Ridge"	"the usual Coffin Butte stench"	~ 4.7 miles	NNE	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
34	2/14/2024	8:30 AM	N/A (forwarded from DEQ) 2/16/24	(N/A)	"very bad"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were calm (0 mph) between 0700 and 0830 hours.	Possible
35	2/14/2024	11:00 AM	N/A (forwarded from DEQ) 2/23/24	"my home, Soap creek rd, Tampico rd, Adair Village"	"usual rotting garbage odor"	~ 0 to 1.8 miles	Various	Calm	North-northeast wind (0 mph). Winds were calm (0 mph) between 0700 and 1100 hours.	Possible
36	2/15/2024	10:51 PM	N/A (forwarded from DEQ) 2/23/24	(N/A)	"extremely strong"	(N/A)	(N/A)	WSW	West-southwest wind (3 mph) at 2300 hours. Winds had a northerly component between 2030 and 2230 hours.	Possible
37	2/20/2024	9:00 AM	N/A (forwarded from DEQ) 2/23/24	(N/A)	"rotting garbage"	(N/A)	(N/A)	S	South wind (3 mph). Winds were from the east-northeast (0-3 mph) between 0700 and 0830 hours.	Possible
38	2/20/2024	3:00 PM	N/A (forwarded from DEQ) 2/23/24	700-800 ft elevation	"usual landfill stench"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were calm (0 mph) between 1330 and 1500 hours except for north-northeast (4 mph) at 1430 hours.	Possible
39	2/20/2024	3:37 PM	N/A (forwarded from DEQ) 2/23/24	(N/A)	"malodorous chemical smell"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph) at 1530. Winds were calm (0 mph) between 1330 and 1600 hours except for north-northeast (4 mph) at 1430 hours.	Possible
40	2/22/2024	10:48 AM	N/A (forwarded from DEQ) 3/1/24	7 miles south of the landfill	(N/A)	~ 7 miles	N	W	West wind (3 mph). Winds were calm or from the south (0-3 mph) between 0400 and 1030 hours.	Not likely
41	2/24/2024	1:00 PM	N/A (forwarded from DEQ) 3/1/24	(N/A)	"Rotting stench"	(N/A)	(N/A)	NNE	North-northeast wind (3 mph).	Possible
42	2/24/2024	(N/A)	N/A (forwarded from DEQ) 3/1/24	3 miles south of landfill	"sour, reeking stench"	~ 3 miles	N	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
43	3/6/2024	7:30 AM	forwarded from DEQ	"South of Landfill"	"Reeking Stench"	~ 0 miles	N	Calm	South-southeast wind (0 mph). Winds were calm (0 mph) between 0000 and 0930 hours.	Possible
44	3/8/2024	8:30 AM	Faye Yoshihara	37461 Soap Creek Rd.	"rotting garbage plus acrid chemical smell", level 8	~ 3.7 miles	NE	Calm	South-southeast wind (0 mph). Winds were calm (0 mph) between 0000 and 0830 hours.	Not likely
45	3/8/2024	1:00 PM	Ken Kupperman	12425 Sauerkraut Rd	"5"	~ 5 miles	SE	NNE	North-northeast (1 mph). Wind was from the north-northeast (0-2 mph) between 1030 and 1300 hours.	Not likely
46	3/12/2024	2:30 PM	forwarded from DEQ	E.E. Wilson State Wildlife Area	"landfill odor with a noxious chemical component"	~ 1 mile	W	SSW	South-southwest wind (9 mph). Strong winds (6-9 mph) between 1330 and 1430 hours are not typically associated with odor complaints.	Not likely
47	3/23/2024	8:00 AM	Kate Schoenhals	White Fir and Trillium Lane, also Robison road	"foul/gassy, for two hours"	~ 1.1 to 1.8 miles	Various	Calm	Northeast wind (0 mph). Winds were from the northeast (0-2 mph) between 0500 and 0800 hours.	Not likely
48	4/1/2024	8:00 AM	Elizabeth Patte	37655 Zeolite Hills Rd	10	~ 3.6 miles	NE	Calm	South-southwest wind (0 mph). Winds were calm (0 mph) between 0000 and 0800 hours except for south-southwest (1 mph) at 0400 hours.	Not likely

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
49	4/1/2024	9:00 AM	Vicki Druliner	27673 Writsman Creek Drive	"incredibly bad", 10	~ 3.7 miles	NE	Calm	South-southwest wind (0 mph). Winds were calm (0 mph) between 0000 and 0900 hours except for south-southwest (1 mph) at 0400 hours.	Not likely
50	4/1/2024	11:30 PM	Nathalie Sutherland	2281 Paddington Dr NW	10, "smells like rotten eggs. But worse. More chemically."	~ 5.2 miles	WNW	Calm	Southeast wind (0 mph). Winds were mostly calm (0 mph) between 1830 and 2330 hours except for east-southeast (1 mph) at 2300 hours.	Not likely
51	4/12/2024	7:00 AM	forwarded from DEQ	"my house"	"overpowering landfill stench"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were from the north-northeast (0-1 mph) between 0600 and 0700 hours.	Possible
52	5/2/2024	7:00 PM	forwarded from DEQ	(N/A)	"Strong odors"	(N/A)	(N/A)	Calm	East-northeast wind (0 mph). Winds were calm (0 mph) between 1500 and 1900 hours.	Possible
53	5/23/2024	7:30 AM	forwarded from DEQ	(N/A)	"smell of Garbage" overwhelming	(N/A)	(N/A)	NNE	North-northeast wind (4 mph). Winds were calm (0 mph) between 0300 and 0700 hours.	Possible
54	5/23/2024	7:50 AM	forwarded from DEQ	5 miles from the dump	smell the dump	~ 5 miles	(N/A)	NNE	North-northeast wind (3-4 mph). Winds were calm (0 mph) between 0300 and 0700 hours.	Possible
55	5/23/2024	9:30 AM	forwarded from DEQ	5 miles south, adair	"coffin Butte's effluence"	~ 5 miles	N	NNE	North-northeast wind (3 mph). Winds were from the north-northeast (0-4 mph) between 0730 and 0930 hours.	Possible
56	5/23/2024	6:00 PM	forwarded from DEQ	"near coffin Butte"	"trash and rotten egg"	~ 0 miles	Various	NE	Northeast wind (10 mph). Strong winds are not typically associated with odor complaints.	Not likely
57	7/12/2024	12:06 AM	forwarded from DEQ	"south of the landfill"	"landfill smell"	~ 0 miles	N	WSW	West-southwest wind (3 mph). Winds were from the northwest (1-2 mph) between 2300 and 2330.	Not likely
58	7/24/2024	1:00 PM	forwarded from DEQ	near SE corner of Landfill buffer property	Noticeable unpleasant methane odor	~ 0 miles	NW	S	South wind (6 mph). Winds were from the northwest (4 mph) at 1230 hours.	Possible
59	7/30/2024	5:30 PM	forwarded from DEQ	4 miles SE of landfill	"landfill dump smell"	~ 4 miles	NW	SW	Southwest wind (6 mph).	Not likely
60	8/4/2024	8:30 AM	forwarded from DEQ (8/26)	SW of Landfill or driving by	dump stench	~ 0 miles	NE	Calm	South wind (0 mph). Wind was calm (0 mph) between 0600 and 0830 hours.	Possible
61	8/8/2024	7:40 AM	Ryan Griffin	Oak Grove Drive & Powers	"dump smell, like driving by", "10"	~ 4 miles	WNW	Calm	West-southwest wind (0 mph). Winds were from the west-southwest (0-3 mph) between 0330 and 0800 hours.	Not likely
62	8/8/2024	7:45 AM	Lauren Griffin	Palestine & Oak Grove	"9"	~ 3.8 miles	WNW	Calm	West-southwest wind (0 mph). Winds were from the west-southwest (0-3 mph) between 0330 and 0800 hours.	Not likely
63	8/9/2024	3:15 PM	forwarded from DEQ	(N/A)	Piercing garbage smell	(N/A)	(N/A)	WNW / NE	West-northwest wind (2 mph) at 1500 hours. Northeast wind (2 mph) at 1530 hours.	Possible
64	8/9/2024	5:53 PM	forwarded from DEQ	"miles away"	"terrible smell"	~ 2+ miles	(N/A)	SW	Southwest wind (10 mph). Strong winds are not typically associated with odor complaints.	Not likely
65	8/18/2024	7:30 AM	Ryan Griffin	Oak Grove Drive & Powers	"smells like driving by the dump", 8	~ 4 miles	WNW	Calm	South wind (0 mph). Winds were calm (0 mph) between 0500 and 0730 hours except from the south (2 mph) at 0630 hours.	Not likely
66	8/23/2024	6:30 PM	forwarded from DEQ	South of Landfill	"landfill chemical stink"	~ 0 miles	N	NW	Northwest wind (1 mph).	Possible
67	11/26/2024	11:30 AM	forwarded from DEQ	(N/A)	"Coffin Butte dump stench"	(N/A)	(N/A)	SE	Southeast wind (2 mph).	Possible

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
68	11/27/2024	7:15 AM	forwarded from DEQ	(N/A)	"went outside with my cup of coffee. Hit with the smell of the landfill"	(N/A)	(N/A)	S / Calm	South wind (0-1 mph). Winds were calm (0 mph) between 0400 and 0630 hours.	Possible
69	11/30/2024	10:00 AM	forwarded from DEQ	7 miles S of landfill	"sitting at my dest, when I stared to smell it. It lasted for a about 3 hours"	~ 7 miles	N	NNE	North-northeast wind (1 mph). Winds were from the north to northeast between 0000 and 1000 hours.	Possible
70	11/30/2024	12:00 PM	forwarded from DEQ	"passing by the… landfill"	"a terrible odor that we could smell from our car for about a mile north	~ 0 miles	Various	ENE	East-northeast wind (1 mph).	Possible
71	12/1/2024	8:30 AM	forwarded from DEQ	Soap Creek/Writsman Brook	"some sort of chemical", "rotten garbage"	~ 3.7 miles	NE	Calm	South-southwest wind (0 mph). Wind was calm (0 mph) between 0200 and 0830 hours.	Not likely
72	12/1/2024	10:00 AM	forwarded from DEQ	"near Coffin Butte"	"odor is so bad"	~ 0 miles	Various	SSW	South-southwest wind (1 mph). Wind was calm (0 mph) between 0200 and 0930 hours.	Possible
73	12/1/2024	10:00 AM	forwarded from DEQ	(N/A)	"sometimes unbearable"	(N/A)	(N/A)	SSW	South-southwest wind (1 mph). Wind was calm (0 mph) between 0200 and 0930 hours.	Possible
74	12/1/2024	11:52 AM	forwarded from DEQ	"soap creek valley"	"toxic landfill gases"	~ 3.3 miles	NE	N	North wind (3 mph). Winds were from the south-southwest (0-2 mph) between 1000 and 1130 hours. Possible due to channeling effects of terrain.	Possible
75	12/6/2024	9:45 AM	forwarded from DEQ	(N/A)	"landfill stench"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were mainly from the north-northeast (0-4 mph) between 0530 and 1000 hours.	Possible
76	12/14/2024	1:30 PM	forwarded from DEQ	Coffin Butte Road	“like a cross between a putrid low tide and an auto repair garage”.	~ 0 miles	Various	SSW	South-southwest wind (3 mph). Winds were from the south-southwest (0-3 mph) between 1030 and 1330 hours.	Not likely
77	12/20/2024	3:00 PM	forwarded from DEQ	4 miles SSE of the Landfill	"odor" "far worse than usual"	~ 4 miles	NNW	Calm	West wind (0 mph). Winds were from the west (0-4 mph) between 1330 and 1500 hours.	Not likely
78	12/23/2024	09:30 AM-12:30 PM	forwarded from DEQ	(N/A)	“Coffin Butte Landfill is belching landfill gas permeating the air. I was 6.3 miles from the landfill and the stench was very noticeable.”	~ 6.3 miles	(N/A)	Calm / NE	Northeast wind (0-4 mph) during this time period. Winds were calm (0 mph) between 0330 and 1030 hours.	Possible
79	12/23/2024	2:00 PM	Maggie Livesay	7580 NW Mountain View Drive	landfill smell, 5	~ 4.2 miles	N	Calm	Northeast wind (0 mph). Winds were from the northeast (4 mph) at 1200 hours. Winds were calm (0 mph) between 1230 and 1400 hours.	Not likely
80	12/29/2024	9:29 AM	Virginia Scott	"driving past dump"	"stench", "not one type of aroma"	~ 0 miles	Various	SSE	South-southeast wind (2 mph). Winds were calm (0 mph) between 0700 and 0900 hours.	Not likely
81	12/29/2024	9:29 AM & 6:30 PM	forwarded from DEQ	(N/A)	“As I was driving past the Coffin Butte dump on Coffin Butte Road in Benton County, OR on Sunday morning the stench was so strong that I has to put the car's air on recirculate until I was well north of the dump. It was equally as terrible on my return trip past the dump at about 6:30 PM on 12/29/24 and was smelly even on recirculate well past the Tampico/Soap Creek intersection. This is an issue because on moist days, like Sunday, when the car air is on recirculate, the car windows fog up which makes it dangerous to turn onto Hwy 99.”	Various	Various	SSE / S	South-southeast wind (2 mph) at 0930 hours. South wind (2 mph) at 1830 hours.	Likely

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
82	12/29/2024	4:45 PM	forwarded from DEQ	(N/A)	“Almost every evening to early morning there is a strong methane odor originating from the Coffin Butte Landfill located north of Corvallis in Benton County Oregon. This year the odor has become strong enough to smell indoors if an air filter isn't in use. There is also a tremendous amount of litter and garbage along Camp Adair Road, Hwy 99 and other tributary roads leading to the landfill. The garbage is on the roads, in the ditches soaking in water and leaching into the ground. The air and material pollution is a hazard to humans, wildlife and plant life in the local area. There is no telling what chemicals and hazardous materials are contaminating the local biosphere.”	(N/A)	(N/A)	S	South wind (2 mph).	Possible
83	12/31/2024	3:45 PM	forwarded from DEQ	(N/A)	“Coffin butte landfill is releasing methane gas and stink into the atmosphere. The stink is becoming worse each day. I don't have enough time to notify you each day of the occurrence but it is becoming much more frequent, approximately 5 days a week now.”	(N/A)	(N/A)	S	South wind (2-3 mph).	Possible
84	1/1/2025	12:00 AM	forwarded from DEQ	(N/A)	“The Coffin Butte Landfill stench was wafting through the air. Landfill gasses 5 miles from the Landfill. Very strong odor”	~ 5 miles	(N/A)	SW	Southwest wind (1 mph).	Possible

Notes:

*	Distance relative to CBLF working face reference point (44.700815, -123.233034).
**	Direction relative to CBLF working face reference point (44.700815, -123.233034).
(N/A)	Not applicable.

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/1/2022 0:00	28.8	2	W	265	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 0:30	28.2	4	WNW	299	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 1:00	28	3	NW	310	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 1:30	27.8	2	WNW	304	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 2:00	27.3	2	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 2:30	27.6	2	NW	313	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 3:00	27.4	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 3:30	26	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 4:00	24.8	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 4:30	24.5	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 5:00	25.6	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 5:30	26	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 6:00	26.7	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 6:30	27	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 7:00	27.3	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 7:30	27.3	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 8:00	27.5	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 8:30	27.7	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 9:00	28.1	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 9:30	28.5	2	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 10:00	29	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 10:30	29.9	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 11:00	32.4	1	NW	315	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 11:30	34.3	2	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 12:00	34.8	2	NNE	15	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 12:30	35.3	2	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 13:00	35.9	3	S	172	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 13:30	35.5	2	S	190	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 14:00	36.1	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 14:30	36.6	5	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 15:00	36.4	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 15:30	37.1	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 16:00	35.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 16:30	34.3	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 17:00	32.8	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 17:30	31.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 18:00	30.2	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 18:30	30.3	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 19:00	29.9	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 19:30	29.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 20:00	29.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 20:30	29.9	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 21:00	29.9	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 21:30	29.5	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 22:00	30.2	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 22:30	29.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 23:00	32.6	2	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 23:30	33.7	3	SSE	153	1	11/18/2021 to 2/7/2022	(not specified)	7
1/2/2022 0:00	34.2	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 0:30	33.7	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 1:00	33	2	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 1:30	33.8	1	NW	322	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 2:00	35.3	5	S	180	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 2:30	35	0	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 3:00	34.7	0	SW	219	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 3:30	35	0	WSW	248	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 4:00	34	1	NE	53	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 4:30	35.1	0	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 5:00	35.9	3	SE	134	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 5:30	35.9	4	S	190	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 6:00	35.7	8	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 6:30	36.3	3	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 7:00	37	6	S	170	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 7:30	37.3	8	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 8:00	36.7	4	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 8:30	36.7	6	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 9:00	37.2	9	S	185	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 9:30	37.7	6	SE	146	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 10:00	38.9	7	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 10:30	40.4	5	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/2/2022 11:00	41.4	10	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 11:30	41.5	4	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 12:00	43.5	4	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 12:30	43.7	7	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 13:00	44.8	8	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 13:30	45.6	2	SW	220	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 14:00	46.4	5	S	182	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 14:30	46.8	9	S	188	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 15:00	47.3	9	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 15:30	47.3	12	S	187	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 16:00	47.4	10	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 16:30	47.7	8	SSW	204	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 17:00	47.1	6	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 17:30	46.8	9	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 18:00	46.5	5	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 18:30	45.4	4	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 19:00	44.2	8	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 19:30	44.2	9	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 20:00	44.2	10	S	185	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 20:30	44.8	8	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 21:00	45.4	6	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 21:30	45.8	5	S	190	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 22:00	45.3	8	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 22:30	45	11	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 23:00	45	8	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 23:30	44.5	7	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	1
1/3/2022 0:00	44.4	9	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 0:30	44.3	12	SSW	214	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 1:00	44.3	7	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 1:30	44.2	4	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 2:00	44.4	7	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 2:30	44.5	9	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 3:00	44.6	4	S	188	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 3:30	44.8	4	WSW	248	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 4:00	44.9	9	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 4:30	44.2	4	S	178	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 5:00	42.1	1	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 5:30	41.9	1	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 6:00	41.6	6	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 6:30	40.3	7	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 7:00	39.8	5	S	184	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 7:30	39.7	10	S	186	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 8:00	39.6	5	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 8:30	39.6	12	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 9:00	38.8	5	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 9:30	38.3	6	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 10:00	37.9	6	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 10:30	37.9	6	S	171	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 11:00	38	6	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 11:30	38.3	7	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 12:00	38.6	3	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 12:30	38.8	2	S	188	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 13:00	38.6	1	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 13:30	38.2	2	S	179	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 14:00	38	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 14:30	37.8	5	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 15:00	37.2	2	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 15:30	34.7	4	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 16:00	34.7	3	WSW	244	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 16:30	35.4	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 17:00	35.5	0	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 17:30	35.3	1	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 18:00	35.6	2	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 18:30	36.6	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 19:00	36.5	3	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 19:30	36.7	5	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 20:00	37	5	S	188	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 20:30	36.6	4	S	178	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 21:00	36.1	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 21:30	36.8	2	S	171	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/3/2022 22:00	36.8	5	SW	224	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 22:30	36.9	11	SSW	213	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 23:00	37.4	6	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 23:30	37.5	6	S	173	1	11/18/2021 to 2/7/2022	(not specified)	2
1/4/2022 0:00	37.2	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 0:30	36.6	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 1:00	36.4	4	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 1:30	37	1	S	172	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 2:00	37	0	S	172	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 2:30	37.6	1	S	184	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 3:00	37.3	3	S	184	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 3:30	37.6	1	S	175	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 4:00	37.1	2	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 4:30	37.4	4	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 5:00	38	4	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 5:30	38.3	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 6:00	38.2	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 6:30	38.9	11	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 7:00	38.7	8	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 7:30	38.9	3	S	183	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 8:00	39.1	4	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 8:30	39	6	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 9:00	39.3	3	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 9:30	39.8	5	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 10:00	40.2	5	SSW	162	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 10:30	40.6	6	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 11:00	41.2	3	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 11:30	41.6	4	S	170	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 12:00	42.3	3	SSW	212	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 12:30	42.4	3	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 13:00	43	3	S	174	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 13:30	43.2	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 14:00	43.5	2	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 14:30	43.7	2	SE	134	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 15:00	43.8	1	ENE	67	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 15:30	43.7	3	ESE	111	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 16:00	43.5	4	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 16:30	43.2	3	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 17:00	43	5	ESE	118	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 17:30	43	7	S	181	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 18:00	43	5	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 18:30	43	9	S	177	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 19:00	43.2	11	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 19:30	43.2	9	S	175	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 20:00	43.1	9	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 20:30	43.1	6	SSE	166	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 21:00	43.4	8	S	184	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 21:30	43.7	6	S	175	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 22:00	43.6	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 22:30	43.7	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 23:00	43.8	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 23:30	44.5	2	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	3
1/5/2022 0:00	45.3	2	SE	143	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 0:30	45.4	1	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 1:00	45.6	1	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 1:30	45.5	0	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 2:00	45	3	S	175	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 2:30	44.8	0	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 3:00	44.4	2	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 3:30	43.8	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 4:00	43.8	3	S	184	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 4:30	43.3	4	S	184	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 5:00	43.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 5:30	42.9	4	S	187	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 6:00	42.7	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 6:30	42.3	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 7:00	42.2	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 7:30	42	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 8:00	41.7	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 8:30	41.9	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/5/2022 9:00	41.9	0	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 9:30	42.6	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 10:00	42.9	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 10:30	43	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 11:00	43.2	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 11:30	43.5	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 12:00	43.6	0	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 12:30	44.1	0	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 13:00	43.7	0	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 13:30	43.9	2	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 14:00	44	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 14:30	44.2	1	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 15:00	44.3	2	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 15:30	44.4	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 16:00	44.3	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 16:30	44.3	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 17:00	44.2	1	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 17:30	44.2	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 18:00	44.3	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 18:30	44.6	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 19:00	44.9	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 19:30	46.6	3	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 20:00	46.7	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 20:30	46.8	8	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 21:00	47.6	4	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 21:30	48.3	4	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 22:00	48.9	7	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 22:30	49.7	4	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 23:00	50	7	SW	218	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 23:30	50.2	3	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	4
1/6/2022 0:00	50.9	5	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 0:30	51.3	7	SW	236	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 1:00	51.6	8	W	261	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 1:30	51.9	6	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 2:00	52.1	9	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 2:30	52.2	7	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 3:00	52.3	3	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 3:30	52.3	5	S	180	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 4:00	52.4	3	S	172	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 4:30	52.1	4	S	185	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 5:00	52.3	6	S	175	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 5:30	52.4	4	ENE	57	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 6:00	52.5	3	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 6:30	52.7	5	S	174	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 7:00	52.8	12	S	187	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 7:30	53	7	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 8:00	52.9	7	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 8:30	52.6	11	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 9:00	52.5	11	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 9:30	53.1	10	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 10:00	53.7	10	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 10:30	53.8	7	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 11:00	53.9	8	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 11:30	52.5	8	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 12:00	52.5	8	S	172	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 12:30	52.6	8	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 13:00	52.4	8	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 13:30	52.7	9	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 14:00	53.1	11	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 14:30	53.4	4	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 15:00	53.4	8	SW	235	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 15:30	53.6	13	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 16:00	53.5	11	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 16:30	53.1	14	SE	146	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 17:00	52.6	5	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 17:30	52.2	7	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 18:00	51.9	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 18:30	51.9	2	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 19:00	51.6	3	S	184	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 19:30	51.5	4	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/6/2022 20:00	51.5	4	SSW	212	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 20:30	51.5	6	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 21:00	51.1	12	WSW	239	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 21:30	50.9	7	SSW	170	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 22:00	50	1	S	181	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 22:30	49.7	9	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 23:00	49.2	4	S	177	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 23:30	48.8	5	SE	133	1	11/18/2021 to 2/7/2022	(not specified)	5
1/7/2022 0:00	48.1	6	SW	220	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 0:30	47.8	12	S	175	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 1:00	47.8	7	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 1:30	47.8	10	S	170	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 2:00	48	5	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 2:30	48.2	8	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 3:00	48.4	9	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 3:30	48.5	10	S	172	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 4:00	48.4	3	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 4:30	48.5	8	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 5:00	48.4	8	S	190	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 5:30	48.5	10	S	177	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 6:00	49.4	14	S	191	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 6:30	48.1	16	SW	222	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 7:00	46.9	16	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 7:30	45.3	6	SW	222	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 8:00	44	10	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 8:30	43.2	13	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 9:00	42.4	16	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 9:30	42.1	3	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 10:00	41.7	9	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 10:30	41.7	2	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 11:00	42.2	2	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 11:30	42	8	S	189	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 12:00	42.7	4	S	190	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 12:30	43.4	6	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 13:00	43.2	8	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 13:30	42.6	9	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 14:00	44.4	6	S	190	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 14:30	43.8	9	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 15:00	44.2	12	SW	230	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 15:30	42.9	9	SW	224	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 16:00	42.6	3	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 16:30	41.6	8	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 17:00	40.7	5	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 17:30	39.7	6	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 18:00	39	2	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 18:30	38.8	1	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 19:00	39	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 19:30	39	0	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 20:00	38.6	0	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 20:30	38.9	0	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 21:00	39.1	3	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 21:30	39	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 22:00	38.7	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 22:30	38.6	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 23:00	38.5	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 23:30	38.7	3	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	6
1/8/2022 0:00	38.4	2	ESE	108	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 0:30	38.8	3	NNW	341	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 1:00	39.1	0	WNW	297	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 1:30	39.4	3	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 2:00	39.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 2:30	39.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 3:00	39.4	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 3:30	39.5	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 4:00	39.6	4	S	181	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 4:30	39.6	3	S	182	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 5:00	39.6	5	S	191	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 5:30	39.4	0	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 6:00	39.2	1	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 6:30	38.9	1	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/8/2022 7:00	38.9	2	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 7:30	38.8	4	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 8:00	39.1	5	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 8:30	39.7	2	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 9:00	40.3	2	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 9:30	41.1	1	S	175	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 10:00	41.7	4	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 10:30	42.8	2	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 11:00	44.8	6	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 11:30	45.5	3	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 12:00	46.8	0	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 12:30	47.2	1	S	171	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 13:00	47.9	2	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 13:30	48.4	0	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 14:00	48.7	1	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 14:30	49.3	4	S	189	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 15:00	49.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 15:30	47.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 16:00	45.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 16:30	43.1	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 17:00	41.1	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 17:30	39.7	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 18:00	38.8	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 18:30	37.7	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 19:00	37	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 19:30	35.5	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 20:00	35.4	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 20:30	35.6	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 21:00	35	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 21:30	34.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 22:00	32.9	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 22:30	33.5	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 23:00	33.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 23:30	33.1	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/9/2022 0:00	33	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 0:30	33.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 1:00	32.4	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 1:30	31.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 2:00	32.1	1	SE	137	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 2:30	32.3	0	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 3:00	32.2	2	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 3:30	31.1	1	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 4:00	31	1	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 4:30	30.5	0	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 5:00	31.1	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 5:30	30.7	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 6:00	30.3	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 6:30	29.7	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 7:00	30.8	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 7:30	30.1	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 8:00	30.3	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 8:30	30	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 9:00	29.6	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 9:30	30.1	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 10:00	30.5	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 10:30	32.4	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 11:00	34.7	3	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 11:30	35.4	4	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 12:00	36.8	2	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 12:30	39.3	1	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 13:00	40.9	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 13:30	42.1	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 14:00	43.7	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 14:30	44.7	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 15:00	44.1	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 15:30	44.5	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 16:00	44	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 16:30	42	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 17:00	39.2	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 17:30	38.3	1	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/9/2022 18:00	36.6	2	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 18:30	36.1	1	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 19:00	35.4	3	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 19:30	34.7	1	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 20:00	34.8	0	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 20:30	34.5	0	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 21:00	33.8	0	SE	127	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 21:30	32.3	0	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 22:00	31.6	0	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 22:30	31	3	ESE	102	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 23:00	30.6	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 23:30	30.3	4	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/10/2022 0:00	30.5	3	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 0:30	30.8	4	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 1:00	30.7	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 1:30	30.8	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 2:00	30.7	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 2:30	30	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 3:00	29.9	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 3:30	29.9	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 4:00	30.1	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 4:30	30.7	1	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 5:00	31.1	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 5:30	31.3	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 6:00	31.8	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 6:30	31.8	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 7:00	32.6	1	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 7:30	33.5	3	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 8:00	33.4	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 8:30	33.2	3	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 9:00	33.5	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 9:30	34.4	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 10:00	35.2	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 10:30	36.7	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 11:00	36.9	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 11:30	38.4	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 12:00	38.7	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 12:30	40.1	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 13:00	40.6	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 13:30	42.6	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 14:00	44	2	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 14:30	44.1	2	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 15:00	43.8	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 15:30	44.2	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 16:00	44.1	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 16:30	42.6	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 17:00	41.8	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 17:30	39.5	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 18:00	40	2	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 18:30	38.9	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 19:00	38.5	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 19:30	37.1	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 20:00	38.1	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 20:30	38.9	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 21:00	39.8	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 21:30	40	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 22:00	40.6	2	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 22:30	41	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 23:00	41.2	1	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 23:30	41.1	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	2
1/11/2022 0:00	41	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 0:30	41.2	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 1:00	40.9	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 1:30	41.7	2	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 2:00	43.8	0	S	185	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 2:30	45.3	2	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 3:00	43.2	9	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 3:30	42.7	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 4:00	44.3	6	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 4:30	44.8	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/11/2022 5:00	45.6	1	S	176	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 5:30	44.6	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 6:00	44	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 6:30	43.9	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 7:00	43.5	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 7:30	44.3	3	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 8:00	43.6	0	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 8:30	44.9	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 9:00	45.8	2	ESE	103	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 9:30	46.2	1	E	99	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 10:00	46.4	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 10:30	46.9	4	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 11:00	48.5	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 11:30	50.6	4	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 12:00	52.9	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 12:30	53	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 13:00	52.8	1	S	180	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 13:30	53	2	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 14:00	53.1	3	SE	134	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 14:30	55.6	3	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 15:00	55.6	6	S	172	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 15:30	55.7	5	S	189	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 16:00	55.7	5	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 16:30	53.9	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 17:00	52.2	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 17:30	54.2	1	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 18:00	52.4	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 18:30	53.6	4	S	176	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 19:00	54.3	2	SE	125	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 19:30	53.4	6	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 20:00	53.8	4	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 20:30	54.6	5	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 21:00	54.1	11	S	178	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 21:30	54.2	4	SSE	153	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 22:00	53.5	0	N	355	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 22:30	53.7	1	ESE	104	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 23:00	55.1	2	ESE	114	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 23:30	54.5	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/12/2022 0:00	53.2	9	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 0:30	55.1	6	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 1:00	53	3	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 1:30	51	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 2:00	50.3	3	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 2:30	49.8	5	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 3:00	50.1	4	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 3:30	50.3	4	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 4:00	50.3	1	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 4:30	52.3	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 5:00	52.7	0	S	183	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 5:30	51	1	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 6:00	51	2	ENE	66	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 6:30	49.3	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 7:00	46.1	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 7:30	45.5	4	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 8:00	44.6	3	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 8:30	44.8	4	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 9:00	45.6	2	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 9:30	48.5	2	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 10:00	51.3	2	SE	128	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 10:30	54.8	4	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 11:00	56.1	5	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 11:30	57	5	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 12:00	57.3	1	SE	141	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 12:30	58	0	ESE	118	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 13:00	59	0	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 13:30	58.3	2	SE	133	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 14:00	57.8	3	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 14:30	56.6	2	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 15:00	55	7	S	182	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 15:30	54.6	6	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/12/2022 16:00	54.8	1	NE	52	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 16:30	52.8	3	NE	45	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 17:00	49.9	2	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 17:30	46.8	0	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 18:00	45.9	0	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 18:30	45.3	0	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 19:00	45.3	0	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 19:30	46.3	0	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 20:00	45.6	0	SE	141	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 20:30	43.6	1	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 21:00	42.3	0	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 21:30	42	3	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 22:00	46.2	0	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 22:30	46.6	4	W	273	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 23:00	46.7	4	WNW	295	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 23:30	45.9	3	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	4
1/13/2022 0:00	45.2	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 0:30	50.7	4	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 1:00	53.6	5	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 1:30	52.1	8	SSE	151	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 2:00	49.6	4	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 2:30	47.9	1	N	360	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 3:00	47.8	4	SW	228	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 3:30	48.7	2	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 4:00	48.1	4	ENE	68	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 4:30	49.5	9	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 5:00	50	9	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 5:30	50.4	3	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 6:00	50.8	8	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 6:30	50.4	2	SE	132	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 7:00	49.4	2	S	179	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 7:30	48.5	3	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 8:00	48.3	5	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 8:30	48.2	4	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 9:00	48	1	E	90	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 9:30	48.1	4	S	170	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 10:00	48.2	6	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 10:30	48.1	4	SW	231	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 11:00	48.4	6	S	171	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 11:30	48.3	8	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 12:00	48.4	3	WSW	244	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 12:30	48.7	2	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 13:00	48.9	5	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 13:30	49.2	1	WNW	283	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 14:00	49.4	2	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 14:30	49.6	2	S	184	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 15:00	49.8	1	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 15:30	49.9	0	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 16:00	50.1	1	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 16:30	50	0	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 17:00	49.8	1	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 17:30	49.6	0	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 18:00	49.4	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 18:30	49.1	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 19:00	49	1	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 19:30	48.9	1	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 20:00	48.8	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 20:30	47.5	2	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 21:00	47	1	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 21:30	47.5	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 22:00	47.3	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 22:30	47.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 23:00	46.3	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 23:30	45.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	5
1/14/2022 0:00	43.9	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 0:30	42.5	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 1:00	42	1	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 1:30	42.8	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 2:00	42.8	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 2:30	42.7	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/14/2022 3:00	42.2	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 3:30	41.6	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 4:00	41.8	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 4:30	41.7	1	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 5:00	42.2	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 5:30	42.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 6:00	42.8	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 6:30	42.8	2	NW	315	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 7:00	42.7	1	NW	311	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 7:30	43	0	NW	311	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 8:00	43.6	0	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 8:30	44.2	1	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 9:00	45.6	1	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 9:30	45.7	1	WNW	300	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 10:00	46.3	2	WNW	294	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 10:30	46.8	0	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 11:00	47.2	0	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 11:30	47.4	1	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 12:00	47.4	2	NE	39	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 12:30	47.6	0	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 13:00	47.6	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 13:30	48.2	0	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 14:00	48.4	3	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 14:30	48.8	0	NNW	331	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 15:00	49.3	1	W	267	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 15:30	48.9	0	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 16:00	49.6	3	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 16:30	48.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 17:00	46.7	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 17:30	46.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 18:00	43.9	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 18:30	42	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 19:00	41.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 19:30	40.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 20:00	40.1	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 20:30	39.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 21:00	38.7	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 21:30	39	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 22:00	38.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 22:30	36.6	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 23:00	37	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 23:30	36.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/15/2022 0:00	35.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 0:30	35.1	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 1:00	35	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 1:30	35.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 2:00	34.9	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 2:30	34.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 3:00	34.9	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 3:30	35.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 4:00	35.5	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 4:30	35.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 5:00	35.9	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 5:30	36.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 6:00	36.6	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 6:30	36.6	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 7:00	36.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 7:30	36.3	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 8:00	35.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 8:30	36.4	3	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 9:00	36.9	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 9:30	37.2	3	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 10:00	37.5	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 10:30	38.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 11:00	39	3	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 11:30	39.6	3	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 12:00	39.6	2	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 12:30	39.3	3	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 13:00	39.2	1	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 13:30	39.3	1	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/15/2022 14:00	39.4	4	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 14:30	39.7	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 15:00	39.9	4	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 15:30	41	2	NNW	330	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 16:00	40.4	1	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 16:30	39.4	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 17:00	38.7	4	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 17:30	38.2	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 18:00	38.1	0	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 18:30	38.1	2	W	273	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 19:00	38	3	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 19:30	38	2	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 20:00	38	2	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 20:30	37.6	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 21:00	37.8	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 21:30	37.5	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 22:00	37.4	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 22:30	37.3	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 23:00	36.9	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 23:30	36.9	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/16/2022 0:00	36.8	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 0:30	36.4	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 1:00	36.2	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 1:30	36.3	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 2:00	36.3	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 2:30	36.3	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 3:00	36	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 3:30	35.8	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 4:00	35.8	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 4:30	35.8	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 5:00	35.5	1	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 5:30	35.4	3	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 6:00	35.4	0	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 6:30	35.3	1	WSW	258	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 7:00	35.2	0	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 7:30	35.2	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 8:00	35.2	0	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 8:30	35.2	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 9:00	35.3	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 9:30	35.5	2	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 10:00	35.8	2	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 10:30	36.1	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 11:00	36	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 11:30	36.2	2	W	270	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 12:00	36.4	2	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 12:30	36.9	3	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 13:00	37	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 13:30	37.1	2	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 14:00	37.6	3	W	265	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 14:30	38	0	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 15:00	38.1	0	NE	41	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 15:30	38.2	2	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 16:00	38.3	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 16:30	37.7	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 17:00	36.8	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 17:30	36.2	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 18:00	36.3	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 18:30	36.5	2	WNW	284	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 19:00	36.3	0	WNW	284	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 19:30	36.3	1	WNW	284	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 20:00	36.2	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 20:30	35.9	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 21:00	36.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 21:30	36.5	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 22:00	36.3	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 22:30	36.7	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 23:00	36.9	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 23:30	35.9	1	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/17/2022 0:00	36	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 0:30	36.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/17/2022 1:00	36.8	1	W	273	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 1:30	36.2	1	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 2:00	36.4	1	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 2:30	36.6	0	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 3:00	36.5	2	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 3:30	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 4:00	36.1	1	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 4:30	36.1	1	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 5:00	36.3	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 5:30	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 6:00	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 6:30	36.3	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 7:00	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 7:30	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 8:00	36	1	SSE	154	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 8:30	36.1	2	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 9:00	36.4	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 9:30	36.8	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 10:00	37.1	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 10:30	37.7	2	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 11:00	37.7	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 11:30	38.2	3	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 12:00	39.3	2	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 12:30	39.8	4	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 13:00	39.8	1	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 13:30	40.2	2	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 14:00	40.5	1	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 14:30	40.5	1	NNW	348	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 15:00	40.8	3	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 15:30	40.3	0	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 16:00	40.4	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 16:30	40.2	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 17:00	40	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 17:30	39.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 18:00	39.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 18:30	39.6	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 19:00	39.3	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 19:30	39.2	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 20:00	38.8	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 20:30	38.5	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 21:00	38.7	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 21:30	38.3	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 22:00	37	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 22:30	37.2	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 23:00	37.4	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 23:30	37.5	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/18/2022 0:00	37.8	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 0:30	37.9	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 1:00	38	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 1:30	38.2	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 2:00	38.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 2:30	38.8	4	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 3:00	39.3	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 3:30	39.3	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 4:00	39.4	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 4:30	39.2	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 5:00	39.4	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 5:30	39.5	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 6:00	39.8	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 6:30	40.9	0	E	94	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 7:00	41.1	2	E	94	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 7:30	41.1	1	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 8:00	41.4	2	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 8:30	42	3	SSE	154	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 9:00	42.5	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 9:30	43.3	3	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 10:00	44.2	0	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 10:30	45.3	1	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 11:00	46.4	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 11:30	46.5	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/18/2022 12:00	47.6	6	ESE	115	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 12:30	48.2	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 13:00	47.6	2	ESE	112	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 13:30	48.1	0	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 14:00	49.9	5	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 14:30	51.6	1	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 15:00	51.4	5	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 15:30	50.9	0	SE	146	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 16:00	49.9	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 16:30	48.6	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 17:00	47.4	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 17:30	47.4	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 18:00	47.6	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 18:30	48.3	0	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 19:00	48.3	0	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 19:30	48.1	2	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 20:00	48.3	1	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 20:30	48.3	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 21:00	48	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 21:30	48	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 22:00	47.8	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 22:30	47.9	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 23:00	48	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 23:30	47.7	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/19/2022 0:00	47.4	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 0:30	47.1	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 1:00	46.4	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 1:30	45.7	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 2:00	46.3	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 2:30	47	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 3:00	47.4	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 3:30	47.6	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 4:00	47.9	5	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 4:30	47.9	4	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 5:00	48.1	1	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 5:30	48	0	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 6:00	48.4	2	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 6:30	48.5	2	S	171	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 7:00	48.3	1	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 7:30	48.2	0	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 8:00	48.4	2	S	176	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 8:30	48.5	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 9:00	48.7	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 9:30	48.7	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 10:00	49	2	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 10:30	49.3	5	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 11:00	49.4	5	S	174	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 11:30	49.6	7	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 12:00	49.8	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 12:30	50	4	SSE	152	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 13:00	50.5	4	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 13:30	50.6	4	S	185	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 14:00	51	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 14:30	51.2	4	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 15:00	51.5	2	S	178	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 15:30	51.6	3	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 16:00	51.6	6	S	179	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 16:30	51.6	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 17:00	51.7	4	SSE	147	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 17:30	51.7	4	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 18:00	51.8	2	S	189	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 18:30	51.8	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 19:00	51.9	3	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 19:30	51.9	2	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 20:00	51.9	2	SW	226	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 20:30	52.1	4	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 21:00	52.2	3	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 21:30	52.3	2	S	185	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 22:00	52.3	8	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 22:30	52.2	5	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/19/2022 23:00	52.3	8	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 23:30	52.4	4	S	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/20/2022 0:00	52.6	2	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 0:30	52.6	3	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 1:00	52.8	6	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 1:30	53.1	3	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 2:00	52.7	4	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 2:30	52.6	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 3:00	52.5	3	S	182	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 3:30	52.7	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 4:00	52.5	4	S	191	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 4:30	52.5	0	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 5:00	52.3	2	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 5:30	52.1	0	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 6:00	52.1	0	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 6:30	52.9	4	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 7:00	52.3	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 7:30	52.5	4	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 8:00	52.9	4	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 8:30	52.6	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 9:00	52.3	3	SSW	213	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 9:30	52.4	4	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 10:00	52.9	3	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 10:30	52.8	6	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 11:00	53.2	4	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 11:30	53.5	8	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 12:00	54.5	4	SSW	214	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 12:30	54.6	7	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 13:00	55.3	6	SW	236	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 13:30	55.6	10	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 14:00	55.3	8	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 14:30	53.8	11	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 15:00	54.4	9	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 15:30	53.2	4	SW	218	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 16:00	51.5	6	S	181	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 16:30	49.8	8	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 17:00	47.9	7	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 17:30	47	0	SSW	213	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 18:00	45.6	1	S	190	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 18:30	44.5	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 19:00	43.6	1	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 19:30	43	3	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 20:00	43.8	1	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 20:30	43.6	3	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 21:00	41.7	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 21:30	40.7	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 22:00	40	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 22:30	40.3	1	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 23:00	40.6	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 23:30	39.6	0	W	273	1	11/18/2021 to 2/7/2022	(not specified)	5
1/21/2022 0:00	38.3	0	W	273	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 0:30	36.9	1	W	273	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 1:00	35.6	2	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 1:30	36.6	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 2:00	35.7	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 2:30	35	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 3:00	35	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 3:30	34.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 4:00	32.4	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 4:30	32.9	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 5:00	33.1	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 5:30	33.2	1	W	262	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 6:00	33.9	0	W	262	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 6:30	33.6	3	W	262	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 7:00	32.7	2	WSW	241	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 7:30	33.1	2	WSW	241	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 8:00	32	3	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 8:30	32.8	2	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 9:00	34	1	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 9:30	38.4	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/21/2022 10:00	40.4	3	W	261	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 10:30	42.2	2	NE	54	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 11:00	43.6	7	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 11:30	43.7	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 12:00	44.6	9	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 12:30	45.3	5	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 13:00	45.6	5	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 13:30	45.6	2	NE	43	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 14:00	45.8	1	ENE	65	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 14:30	45.7	6	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 15:00	45.7	6	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 15:30	45.2	1	ENE	67	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 16:00	45.2	3	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 16:30	44.5	3	NE	43	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 17:00	43.7	1	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 17:30	42.8	0	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 18:00	42.2	1	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 18:30	42.3	0	NE	56	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 19:00	42.6	1	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 19:30	42.7	0	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 20:00	42.7	2	NNE	14	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 20:30	42.9	1	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 21:00	42.8	3	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 21:30	42.7	5	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 22:00	42.5	5	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 22:30	42.4	7	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 23:00	42.2	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 23:30	42	3	N	5	1	11/18/2021 to 2/7/2022	(not specified)	6
1/22/2022 0:00	41.6	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 0:30	41.4	3	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 1:00	41.3	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 1:30	41.3	5	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 2:00	41.3	3	NNW	336	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 2:30	41.3	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 3:00	41.1	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 3:30	41.1	4	E	84	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 4:00	41.1	3	N	9	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 4:30	41.1	3	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 5:00	41.2	2	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 5:30	41	0	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 6:00	40.9	3	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 6:30	40.6	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 7:00	40.5	2	ENE	76	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 7:30	40.3	6	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 8:00	40.2	2	E	101	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 8:30	40.2	1	E	94	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 9:00	40.4	4	NE	55	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 9:30	40.5	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 10:00	40.7	2	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 10:30	41	1	N	355	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 11:00	41.3	4	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 11:30	41.6	4	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 12:00	41.8	1	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 12:30	41.9	0	ENE	61	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 13:00	41.8	3	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 13:30	42.2	4	NE	53	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 14:00	42.7	2	SSE	152	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 14:30	43.4	0	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 15:00	45.2	1	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 15:30	45.6	2	W	269	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 16:00	45.6	0	NE	55	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 16:30	45.3	5	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 17:00	43.7	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 17:30	43.2	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 18:00	42.8	0	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 18:30	43	2	ESE	104	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 19:00	42.7	1	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 19:30	39.1	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 20:00	35.5	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 20:30	34.3	2	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/22/2022 21:00	33.4	1	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 21:30	33	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 22:00	33	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 22:30	32.7	1	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 23:00	33	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 23:30	32.9	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/23/2022 0:00	31.7	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 0:30	32.1	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 1:00	31.8	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 1:30	31.7	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 2:00	30.1	2	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 2:30	29.2	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 3:00	29.5	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 3:30	29.4	1	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 4:00	28.7	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 4:30	28.3	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 5:00	27.8	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 5:30	27.5	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 6:00	27.2	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 6:30	27.1	5	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 7:00	27	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 7:30	26.8	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 8:00	26.7	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 8:30	27	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 9:00	27.8	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 9:30	28.3	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 10:00	30	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 10:30	32.4	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 11:00	34	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 11:30	35	6	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 12:00	35.6	8	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 12:30	36.3	6	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 13:00	37.2	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 13:30	37.8	9	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 14:00	39.1	7	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 14:30	38.2	5	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 15:00	38.2	8	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 15:30	38.1	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 16:00	37.9	4	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 16:30	38	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 17:00	37.2	3	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 17:30	35.7	2	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 18:00	34.6	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 18:30	34.2	1	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 19:00	32.8	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 19:30	33.3	1	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 20:00	32.8	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 20:30	32.4	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 21:00	32	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 21:30	31.4	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 22:00	30.5	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 22:30	30.1	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 23:00	29.9	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 23:30	29.7	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
1/24/2022 0:00	30.1	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 0:30	30.5	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 1:00	30.9	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 1:30	30.3	1	SW	236	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 2:00	29.8	3	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 2:30	29.2	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 3:00	28.8	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 3:30	28.7	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 4:00	28.9	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 4:30	28.8	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 5:00	29.1	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 5:30	28.9	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 6:00	29	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 6:30	29	1	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 7:00	29.1	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 7:30	29.7	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/24/2022 8:00	29.4	1	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 8:30	29.7	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 9:00	29.4	4	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 9:30	30.4	0	NNE	12	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 10:00	31.4	0	NNW	327	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 10:30	31.8	6	W	270	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 11:00	31.7	1	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 11:30	32.7	1	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 12:00	33.5	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 12:30	33.9	0	ESE	104	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 13:00	35.2	2	SSE	151	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 13:30	36	4	N	360	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 14:00	36.1	0	N	360	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 14:30	36.5	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 15:00	36	3	WNW	290	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 15:30	35.7	4	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 16:00	35.4	3	W	261	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 16:30	35.5	0	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 17:00	35	3	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 17:30	35	5	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 18:00	34.6	4	NW	313	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 18:30	34.8	1	NW	317	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 19:00	34.8	4	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 19:30	34.5	3	NW	315	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 20:00	34.4	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 20:30	33.8	3	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 21:00	33.3	1	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 21:30	32.6	2	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 22:00	32.4	2	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 22:30	32.2	1	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 23:00	31.9	2	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 23:30	31.7	0	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	2
1/25/2022 0:00	32.4	2	NW	310	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 0:30	32.2	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 1:00	31.4	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 1:30	31.1	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 2:00	30.5	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 2:30	30	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 3:00	29.6	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 3:30	29.2	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 4:00	28.8	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 4:30	28.2	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 5:00	27.4	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 5:30	26.8	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 6:00	26.7	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 6:30	26.1	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 7:00	25.6	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 7:30	25.3	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 8:00	25.2	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 8:30	25.3	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 9:00	26.8	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 9:30	27.8	1	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 10:00	29.3	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 10:30	31.6	4	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 11:00	33.2	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 11:30	36.8	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 12:00	39.5	4	WSW	244	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 12:30	41.7	2	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 13:00	44	6	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 13:30	45.3	1	ENE	70	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 14:00	45.4	3	ENE	77	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 14:30	46.1	1	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 15:00	47.3	4	NE	52	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 15:30	48.8	0	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 16:00	48.4	2	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 16:30	47.7	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 17:00	45.1	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 17:30	41.4	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 18:00	37.2	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 18:30	35.7	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/25/2022 19:00	34.5	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 19:30	33.4	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 20:00	32.8	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 20:30	31	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 21:00	31.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 21:30	31.9	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 22:00	30.9	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 22:30	30.4	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 23:00	28.5	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 23:30	30.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/26/2022 0:00	30.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 0:30	28.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 1:00	27.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 1:30	27.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 2:00	26.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 2:30	27.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 3:00	27.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 3:30	25.7	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 4:00	25.1	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 4:30	26.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 5:00	26	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 5:30	24.4	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 6:00	23.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 6:30	23.6	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 7:00	24.7	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 7:30	24.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 8:00	24.5	2	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 8:30	24.3	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 9:00	25.2	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 9:30	26.3	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 10:00	28.2	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 10:30	30.6	4	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 11:00	32.2	3	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 11:30	33.7	2	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 12:00	36.4	1	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 12:30	39.1	1	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 13:00	40.2	1	NE	39	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 13:30	41.5	2	WSW	248	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 14:00	42.8	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 14:30	43.4	2	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 15:00	44.7	1	NE	54	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 15:30	45	4	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 16:00	44.8	2	ENE	57	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 16:30	44	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 17:00	42.8	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 17:30	37.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 18:00	35.5	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 18:30	34.6	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 19:00	33.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 19:30	32	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 20:00	31.8	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 20:30	31.3	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 21:00	30.7	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 21:30	29.9	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 22:00	28.5	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 22:30	28.7	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 23:00	27.8	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 23:30	27.2	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/27/2022 0:00	27.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 0:30	26.6	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 1:00	26.4	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 1:30	26.8	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 2:00	26.4	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 2:30	25.9	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 3:00	25.8	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 3:30	24.6	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 4:00	24.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 4:30	24.7	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 5:00	24	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 5:30	24.5	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/27/2022 6:00	25.9	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 6:30	25.9	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 7:00	24.7	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 7:30	24.5	2	WNW	286	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 8:00	24.8	0	WNW	285	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 8:30	24.6	1	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 9:00	31.9	2	S	185	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 9:30	34.8	4	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 10:00	36.5	3	SW	231	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 10:30	38.5	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 11:00	40	3	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 11:30	41.5	2	NE	45	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 12:00	43.2	5	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 12:30	43.6	5	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 13:00	45	4	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 13:30	46.1	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 14:00	47	7	W	267	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 14:30	47.9	6	W	260	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 15:00	48.4	8	W	271	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 15:30	49	1	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 16:00	48.6	2	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 16:30	48.2	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 17:00	46.5	2	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 17:30	41.2	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 18:00	41	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 18:30	36.4	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 19:00	34.2	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 19:30	32.7	2	SE	125	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 20:00	30.7	1	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 20:30	31.6	0	ESE	108	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 21:00	31	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 21:30	30.5	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 22:00	29.9	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 22:30	29	2	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 23:00	28.7	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 23:30	28.4	2	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/28/2022 0:00	27.7	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 0:30	27.6	3	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 1:00	31.9	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 1:30	27.4	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 2:00	26.7	2	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 2:30	26.1	2	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 3:00	26	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 3:30	25.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 4:00	25	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 4:30	25.3	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 5:00	24.8	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 5:30	24.8	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 6:00	25	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 6:30	25.8	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 7:00	25.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 7:30	25.9	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 8:00	24.6	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 8:30	26	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 9:00	27.4	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 9:30	28.2	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 10:00	29.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 10:30	34.3	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 11:00	37.7	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 11:30	41.3	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 12:00	41.8	7	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 12:30	41.4	4	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 13:00	42.9	1	NNW	333	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 13:30	44.2	1	W	267	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 14:00	44.6	5	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 14:30	45.5	4	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 15:00	46.7	2	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 15:30	46.5	1	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 16:00	45.2	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 16:30	43.8	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/28/2022 17:00	42.2	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 17:30	38.4	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 18:00	35.5	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 18:30	35.5	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 19:00	34.7	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 19:30	34.7	2	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 20:00	33.4	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 20:30	32.3	2	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 21:00	32.1	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 21:30	32.3	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 22:00	32.2	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 22:30	31.7	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 23:00	30.6	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 23:30	30.1	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/29/2022 0:00	28.5	3	S	178	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 0:30	27.9	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 1:00	29.1	2	S	178	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 1:30	28.4	1	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 2:00	27.3	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 2:30	26.7	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 3:00	27.4	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 3:30	26.1	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 4:00	25.1	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 4:30	24.4	2	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 5:00	24	1	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 5:30	25.8	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 6:00	25.7	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 6:30	26.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 7:00	27.2	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 7:30	26.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 8:00	25.5	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 8:30	26.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 9:00	26.8	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 9:30	29	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 10:00	30.5	1	ESE	120	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 10:30	33.6	0	ESE	110	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 11:00	36.6	2	N	10	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 11:30	38.6	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 12:00	40.7	2	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 12:30	43.1	0	ENE	59	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 13:00	44.6	2	NNW	331	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 13:30	45.7	2	NNW	347	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 14:00	46.6	1	N	360	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 14:30	46.8	1	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 15:00	46.9	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 15:30	48.1	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 16:00	47.2	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 16:30	45.6	3	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 17:00	44	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 17:30	40.9	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 18:00	37.4	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 18:30	35.3	1	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 19:00	36.4	0	E	81	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 19:30	35.3	0	E	81	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 20:00	35.4	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 20:30	34.4	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 21:00	33.3	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 21:30	32.5	2	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 22:00	30.6	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 22:30	30.9	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 23:00	31	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 23:30	31.8	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/30/2022 0:00	30.8	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 0:30	29.9	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 1:00	30.9	1	E	83	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 1:30	29.1	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 2:00	29.7	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 2:30	29.6	0	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 3:00	30.7	0	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 3:30	31.1	3	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/30/2022 4:00	32	3	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 4:30	32.6	4	SE	138	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 5:00	32	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 5:30	32	2	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 6:00	31.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 6:30	31.3	3	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 7:00	30.5	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 7:30	29.3	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 8:00	28.7	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 8:30	30.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 9:00	31.5	2	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 9:30	32.6	2	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 10:00	33.4	1	SW	226	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 10:30	38.6	3	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 11:00	43.4	5	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 11:30	46.7	3	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 12:00	47.4	6	S	171	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 12:30	47.3	6	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 13:00	48	4	SW	222	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 13:30	48.2	3	SE	139	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 14:00	47.8	3	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 14:30	48.2	3	S	175	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 15:00	49	10	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 15:30	49.7	2	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 16:00	50.5	10	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 16:30	49.6	7	S	183	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 17:00	49	7	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 17:30	48.4	4	SW	219	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 18:00	47.6	7	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 18:30	45.8	5	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 19:00	45.5	11	SW	230	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 19:30	44.5	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 20:00	42.9	1	ESE	107	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 20:30	43.4	14	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 21:00	42.8	12	S	171	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 21:30	42.7	13	S	172	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 22:00	42.2	4	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 22:30	41	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 23:00	40.2	3	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 23:30	40.9	4	S	187	1	11/18/2021 to 2/7/2022	(not specified)	1
1/31/2022 0:00	40.3	10	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 0:30	39.9	7	S	183	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 1:00	39.2	4	SSW	204	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 1:30	37.7	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 2:00	36.8	1	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 2:30	36.5	0	S	173	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 3:00	35.7	0	S	173	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 3:30	35.5	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 4:00	35.6	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 4:30	34.7	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 5:00	34.6	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 5:30	34.4	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 6:00	34.5	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 6:30	33.3	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 7:00	33.9	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 7:30	35.1	2	S	191	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 8:00	36.2	2	S	191	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 8:30	37.2	2	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 9:00	37.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 9:30	40	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 10:00	41	4	SSE	153	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 10:30	42.2	4	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 11:00	43.7	2	SE	137	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 11:30	44.2	6	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 12:00	42.8	5	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 12:30	44.4	6	S	180	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 13:00	44.3	4	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 13:30	46.1	3	S	175	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 14:00	44.5	4	S	190	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 14:30	45.9	12	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/31/2022 15:00	45.5	6	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 15:30	45.8	4	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 16:00	46.3	4	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 16:30	44.7	6	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 17:00	42.7	2	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 17:30	40.9	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 18:00	39	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 18:30	37.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 19:00	35.7	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 19:30	35.7	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 20:00	34.3	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 20:30	33.8	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 21:00	34.2	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 21:30	33.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 22:00	33.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 22:30	32.8	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 23:00	32.5	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 23:30	32.5	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
2/1/2022 0:00	31.7	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 0:30	31.6	3	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 1:00	32.7	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 1:30	32.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 2:00	32.1	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 2:30	32.8	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 3:00	32.1	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 3:30	31.7	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 4:00	32	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 4:30	32.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 5:00	30.7	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 5:30	30.9	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 6:00	31.3	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 6:30	30.1	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 7:00	29.1	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 7:30	29.4	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 8:00	30.4	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 8:30	31.9	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 9:00	32.4	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 9:30	33	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 10:00	34.5	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 10:30	36.4	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 11:00	38.5	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 11:30	39.1	1	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 12:00	41.2	4	S	171	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 12:30	42.4	1	S	171	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 13:00	42.4	1	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 13:30	43.4	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 14:00	43.1	2	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 14:30	42.7	0	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 15:00	43	3	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 15:30	43	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 16:00	42.3	1	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 16:30	41.6	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 17:00	40.8	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 17:30	40.2	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 18:00	39.4	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 18:30	39.1	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 19:00	39	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 19:30	39.1	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 20:00	39.1	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 20:30	38.8	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 21:00	38.5	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 21:30	38.8	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 22:00	38.4	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 22:30	38.9	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 23:00	38.7	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 23:30	38.5	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/2/2022 0:00	38.9	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 0:30	39.2	0	NE	52	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 1:00	39.3	1	SSE	147	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 1:30	39.3	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/2/2022 2:00	39.7	2	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 2:30	40	1	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 3:00	40.1	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 3:30	40	1	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 4:00	39.7	4	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 4:30	38.9	5	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 5:00	38.9	1	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 5:30	39	1	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 6:00	38.9	2	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 6:30	38.9	8	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 7:00	38.8	3	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 7:30	38.7	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 8:00	38.9	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 8:30	39.2	3	SE	137	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 9:00	39.5	5	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 9:30	40.3	4	S	175	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 10:00	40.7	4	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 10:30	41	5	S	171	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 11:00	41.6	2	S	179	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 11:30	42.2	4	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 12:00	42.9	4	S	175	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 12:30	44	3	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 13:00	44.1	4	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 13:30	44.7	10	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 14:00	45	7	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 14:30	45.4	6	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 15:00	45	5	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 15:30	45	3	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 16:00	45.2	3	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 16:30	45.3	1	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 17:00	44.8	3	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 17:30	43.3	5	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 18:00	43.1	3	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 18:30	42.7	0	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 19:00	42.1	0	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 19:30	42.1	0	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 20:00	42.2	1	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 20:30	42	2	S	190	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 21:00	42.2	4	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 21:30	42.1	3	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 22:00	42.1	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 22:30	41.6	3	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 23:00	41.6	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 23:30	41.2	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/3/2022 0:00	40.5	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 0:30	40.3	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 1:00	40	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 1:30	39.8	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 2:00	40.1	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 2:30	40.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 3:00	39.5	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 3:30	38.3	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 4:00	36.9	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 4:30	36.6	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 5:00	35.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 5:30	34.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 6:00	35	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 6:30	35.6	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 7:00	35.9	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 7:30	37	1	S	176	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 8:00	38.1	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 8:30	38.1	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 9:00	39.6	2	SE	135	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 9:30	41.5	0	SSE	154	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 10:00	43.4	2	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 10:30	44.7	5	NNE	12	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 11:00	45	1	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 11:30	48	4	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 12:00	49.2	7	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 12:30	49.7	4	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/3/2022 13:00	49.7	0	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 13:30	51.1	0	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 14:00	52.1	3	WNW	292	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 14:30	52.4	1	SW	228	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 15:00	53.7	1	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 15:30	52.9	1	SE	138	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 16:00	52.3	2	N	5	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 16:30	52.5	1	N	5	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 17:00	50.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 17:30	45.4	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 18:00	42.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 18:30	41.4	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 19:00	40.5	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 19:30	39.1	0	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 20:00	37.3	2	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 20:30	37.2	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 21:00	37.3	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 21:30	36.7	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 22:00	36.4	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 22:30	35	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 23:00	35.3	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 23:30	34.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/4/2022 0:00	33.5	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 0:30	33.1	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 1:00	32.9	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 1:30	32.5	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 2:00	34	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 2:30	34.7	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 3:00	35.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 3:30	35.7	2	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 4:00	35.7	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 4:30	36.3	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 5:00	36.3	3	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 5:30	36.5	0	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 6:00	37.5	0	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 6:30	37.7	1	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 7:00	37.4	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 7:30	37.2	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 8:00	36.6	0	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 8:30	37.2	3	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 9:00	37.7	0	S	184	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 9:30	38.1	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 10:00	38.8	4	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 10:30	40.2	2	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 11:00	41.4	4	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 11:30	42.7	3	N	360	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 12:00	42.8	4	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 12:30	43	6	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 13:00	44.7	1	ESE	118	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 13:30	46.4	0	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 14:00	45.5	2	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 14:30	45.6	2	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 15:00	46	4	SSE	166	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 15:30	46.8	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 16:00	47.9	5	SSW	214	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 16:30	47.7	2	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 17:00	47.2	1	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 17:30	46.6	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 18:00	46.3	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 18:30	46.4	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 19:00	46.2	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 19:30	45	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 20:00	43.9	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 20:30	43.9	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 21:00	43.9	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 21:30	44.9	3	SE	143	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 22:00	45.3	2	SSE	151	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 22:30	43.4	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 23:00	43	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 23:30	43	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/5/2022 0:00	41.4	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 0:30	41.5	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 1:00	39.8	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 1:30	41.6	1	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 2:00	40.8	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 2:30	40.4	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 3:00	40.7	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 3:30	40.3	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 4:00	41.1	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 4:30	40.4	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 5:00	37.8	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 5:30	39.7	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 6:00	40.1	2	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 6:30	41.1	1	NNW	336	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 7:00	41.7	0	NNW	333	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 7:30	41.3	0	NNW	333	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 8:00	41.4	0	ESE	115	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 8:30	41.6	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 9:00	42.1	4	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 9:30	42.7	1	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 10:00	43.4	10	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 10:30	44.3	8	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 11:00	44.9	7	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 11:30	45.8	5	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 12:00	46.4	3	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 12:30	47	6	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 13:00	47.4	4	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 13:30	47.1	3	W	261	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 14:00	47.7	4	W	267	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 14:30	48	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 15:00	48.3	10	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 15:30	48.9	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 16:00	48.2	2	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 16:30	48.2	3	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 17:00	46.6	3	E	85	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 17:30	45.5	2	S	188	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 18:00	44.3	2	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 18:30	44.2	4	S	171	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 19:00	44	3	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 19:30	43.6	2	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 20:00	43.6	1	E	96	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 20:30	44	5	W	262	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 21:00	43.7	3	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 21:30	43.4	1	W	265	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 22:00	42.3	1	ESE	120	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 22:30	42.5	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 23:00	40.8	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 23:30	40.4	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	7
2/6/2022 0:00	39.7	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 0:30	36	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 1:00	33.7	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 1:30	32.3	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 2:00	32.3	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 2:30	32.7	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 3:00	32.1	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 3:30	30.8	2	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 4:00	31	2	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 4:30	30.8	1	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 5:00	32.1	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 5:30	31.6	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 6:00	31.4	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 6:30	29.3	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 7:00	29	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 7:30	30.9	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 8:00	29.5	3	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 8:30	30.1	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 9:00	31.5	1	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 9:30	31.6	2	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 10:00	33.2	1	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 10:30	36.7	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/6/2022 11:00	38.7	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 11:30	39.9	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 12:00	41.4	5	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 12:30	41.1	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 13:00	42.8	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 13:30	44.5	3	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 14:00	46.9	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 14:30	47.7	4	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 15:00	48.6	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 15:30	49.3	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 16:00	49	2	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 16:30	49.1	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 17:00	46.2	2	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 17:30	43	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 18:00	40.9	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 18:30	39.9	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 19:00	39.9	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 19:30	38.6	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 20:00	36.4	1	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 20:30	35.5	1	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 21:00	36	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 21:30	35.3	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 22:00	34	4	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 22:30	36.7	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 23:00	34.5	3	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 23:30	32.4	1	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	1
2/7/2022 0:00	31	0	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 0:30	32.3	0	SE	145	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 1:00	31.7	0	SE	145	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 1:30	31.5	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 2:00	31.3	3	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 2:30	30.9	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 3:00	31.8	0	S	175	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 3:30	32.3	2	S	175	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 4:00	32.8	2	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 4:30	33	0	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 5:00	32.8	0	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 5:30	32.8	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 6:00	32.3	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 6:30	32.4	3	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 7:00	32.1	0	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 7:30	32.8	2	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 8:00	33.7	4	NE	41	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 8:30	35.5	3	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 9:00	35.7	0	WSW	241	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 9:30	37.8	0	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 10:00	38.9	1	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 10:30	40.3	1	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 11:00	42.5	0	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 11:30	43.6	2	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 12:00	46.6	1	WSW	243	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 12:30	49.2	4	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 13:00	51.3	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 13:30	52.6	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 14:00	53	1	NNW	339	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 14:30	52.9	2	N	355	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 15:00	52.9	0	N	355	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 15:30	52.4	0	N	355	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 16:00	52.9	4	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 16:30	53.5	2	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 17:00	52.9	0	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 17:30	51.2	2	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 18:00	49.3	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 18:30	47	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 19:00	44.9	1	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 19:30	42.8	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 20:00	41.9	0	NE	41	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 20:30	41.7	2	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 21:00	42.2	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 21:30	39.5	0	ENE	76	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/7/2022 22:00	38.3	2	E	84	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 22:30	37.3	2	E	84	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 23:00	36.1	2	E	84	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 23:30	34.7	2	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	2
7/1/2022 0:00	58	2	S	188				6
7/1/2022 0:30	57.3	2	SW	215				6
7/1/2022 1:00	56.3	0	SW	215				6
7/1/2022 1:30	55.1	0	SW	215				6
7/1/2022 2:00	54	0	SW	215				6
7/1/2022 2:30	53.1	0	SW	215				6
7/1/2022 3:00	52.3	0	SW	215				6
7/1/2022 3:30	51.9	0	SW	215				6
7/1/2022 4:00	51.3	0	SW	215				6
7/1/2022 4:30	50.7	0	SW	215				6
7/1/2022 5:00	50.5	0	SW	215				6
7/1/2022 5:30	50.6	0	SW	215				6
7/1/2022 6:00	49.7	0	SW	215				6
7/1/2022 6:30	51.5	0	SW	215				6
7/1/2022 7:00	53.5	0	SW	215				6
7/1/2022 7:30	55.7	1	SW	217				6
7/1/2022 8:00	56.9	0	SW	217				6
7/1/2022 8:30	58.3	0	SW	217				6
7/1/2022 9:00	59.9	3	SW	219				6
7/1/2022 9:30	61.4	1	SW	224				6
7/1/2022 10:00	62.8	0	SW	228	2	7/1/2022	10:00 AM	6
7/1/2022 10:30	64.6	0	SW	229				6
7/1/2022 11:00	67.3	4	NNW	342				6
7/1/2022 11:30	67.3	3	NNW	342				6
7/1/2022 12:00	68.1	2	NNW	340				6
7/1/2022 12:30	68.6	7	NNE	19				6
7/1/2022 13:00	69.8	2	NW	326				6
7/1/2022 13:30	71.9	2	NW	306				6
7/1/2022 14:00	71.7	1	W	275				6
7/1/2022 14:30	73.4	6	SW	218				6
7/1/2022 15:00	74.4	4	ENE	57				6
7/1/2022 15:30	75.2	3	SSW	207				6
7/1/2022 16:00	75.8	8	N	5				6
7/1/2022 16:30	76.5	7	NNE	12				6
7/1/2022 17:00	76.6	1	NNW	338				6
7/1/2022 17:30	76.8	7	NNE	18				6
7/1/2022 18:00	77.1	1	SW	228				6
7/1/2022 18:30	76.6	1	NW	305				6
7/1/2022 19:00	76	4	SW	234				6
7/1/2022 19:30	74.5	2	WSW	254				6
7/1/2022 20:00	70.4	2	SSW	199				6
7/1/2022 20:30	66.2	6	SW	223				6
7/1/2022 21:00	63.7	6	SSW	211				6
7/1/2022 21:30	61.9	4	SSW	201				6
7/1/2022 22:00	60.5	3	SSW	197				6
7/1/2022 22:30	59.3	3	SSW	200				6
7/1/2022 23:00	58.2	3	SSW	200				6
7/1/2022 23:30	57.7	3	SSW	195				6
7/26/2022 0:00	66	2	SW	232				3
7/26/2022 0:30	65.6	2	SW	232				3
7/26/2022 1:00	64.5	2	SW	232				3
7/26/2022 1:30	64	1	SW	232				3
7/26/2022 2:00	62.7	1	SW	232				3
7/26/2022 2:30	63.7	0	SW	232				3
7/26/2022 3:00	62	0	SW	232				3
7/26/2022 3:30	60.9	0	SW	232				3
7/26/2022 4:00	60.1	0	SW	232				3
7/26/2022 4:30	59	0	SW	232				3
7/26/2022 5:00	58.2	0	SW	232				3
7/26/2022 5:30	58	0	SW	232				3
7/26/2022 6:00	57.5	0	SW	232				3
7/26/2022 6:30	57.8	0	SW	232				3
7/26/2022 7:00	58.9	0	SW	232				3
7/26/2022 7:30	60.7	0	SW	232				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/26/2022 8:00	63.8	1	SW	232	3	7/26/2022	8:00 AM	3
7/26/2022 8:30	67.9	0	SW	232				3
7/26/2022 9:00	72.8	1	N	355				3
7/26/2022 9:30	76	3	NE	38				3
7/26/2022 10:00	78.7	3	NNE	23				3
7/26/2022 10:30	81.2	1	NNE	27				3
7/26/2022 11:00	82.9	4	N	9				3
7/26/2022 11:30	84.7	2	E	94				3
7/26/2022 12:00	86.8	4	N	5				3
7/26/2022 12:30	88.1	2	NNE	19				3
7/26/2022 13:00	90.4	5	NNE	19				3
7/26/2022 13:30	91.5	2	SSE	153				3
7/26/2022 14:00	93.2	2	NNE	20				3
7/26/2022 14:30	94.3	1	NE	53				3
7/26/2022 15:00	95.9	2	NNE	14				3
7/26/2022 15:30	96.6	0	NE	51				3
7/26/2022 16:00	97.3	2	NNE	22				3
7/26/2022 16:30	97.8	5	N	9				3
7/26/2022 17:00	98.2	2	NE	18				3
7/26/2022 17:30	99	4	SW	221				3
7/26/2022 18:00	96.7	3	WSW	241				3
7/26/2022 18:30	92.6	5	S	185				3
7/26/2022 19:00	89	4	SW	215				3
7/26/2022 19:30	85.8	5	SSW	194				3
7/26/2022 20:00	82.8	4	SSW	203				3
7/26/2022 20:30	79.8	4	S	187				3
7/26/2022 21:00	77.5	6	S	188				3
7/26/2022 21:30	75.6	8	SW	219				3
7/26/2022 22:00	74.2	5	SSW	192				3
7/26/2022 22:30	73.2	0	SSW	192				3
7/26/2022 23:00	70.3	3	SSW	192				3
7/26/2022 23:30	70	0	SSW	192				3
7/30/2022 0:00	71.3	2	S	171				7
7/30/2022 0:30	69.5	2	S	171				7
7/30/2022 1:00	68.2	2	S	171				7
7/30/2022 1:30	67	2	S	171				7
7/30/2022 2:00	66.7	0	S	171				7
7/30/2022 2:30	65.2	0	SSE	165				7
7/30/2022 3:00	64.6	0	SSE	163				7
7/30/2022 3:30	65.8	1	NE	47				7
7/30/2022 4:00	65.5	1	NE	46				7
7/30/2022 4:30	63.5	0	NE	46				7
7/30/2022 5:00	62.7	0	NE	46				7
7/30/2022 5:30	62.1	0	NE	46				7
7/30/2022 6:00	63	0	NE	46				7
7/30/2022 6:30	62.2	1	NE	46				7
7/30/2022 7:00	62.6	4	ENE	71				7
7/30/2022 7:30	64.2	0	SSE	158				7
7/30/2022 8:00	67.3	0	SSE	158	4	7/30/2022	8:00 AM	7
7/30/2022 8:30	69.2	2	SSE	158				7
7/30/2022 9:00	73.1	0	SSE	157				7
7/30/2022 9:30	74.2	4	NE	46				7
7/30/2022 10:00	77.4	2	NNE	30				7
7/30/2022 10:30	82	2	NNE	20				7
7/30/2022 11:00	84.1	3	NE	54				7
7/30/2022 11:30	86	2	NNW	339				7
7/30/2022 12:00	87.8	2	WSW	259				7
7/30/2022 12:30	88.8	2	W	274				7
7/30/2022 13:00	89.4	11	W	261				7
7/30/2022 13:30	92	7	SSW	206				7
7/30/2022 14:00	93.5	4	SW	232				7
7/30/2022 14:30	94.9	1	SSW	205				7
7/30/2022 15:00	92.6	6	WSW	245				7
7/30/2022 15:30	93.9	1	WSW	254				7
7/30/2022 16:00	95.9	2	W	269				7
7/30/2022 16:30	93.7	1	SSE	156				7
7/30/2022 17:00	97.2	4	NNE	28				7
7/30/2022 17:30	98.2	10	NE	36				7
7/30/2022 18:00	97.5	6	NE	37				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/30/2022 18:30	97.7	5	ENE	76				7
7/30/2022 19:00	97	1	WSW	244				7
7/30/2022 19:30	91.9	4	SSW	209				7
7/30/2022 20:00	87.7	3	SSW	199				7
7/30/2022 20:30	84.3	2	SSW	210				7
7/30/2022 21:00	80	4	SSW	210				7
7/30/2022 21:30	77	3	SSW	202				7
7/30/2022 22:00	76.5	3	SSW	202				7
7/30/2022 22:30	74.2	2	SSW	202				7
7/30/2022 23:00	71.9	0	SSW	202				7
7/30/2022 23:30	73.1	0	SSW	202				7
8/15/2022 0:00	63.2	1	SSW	202				2
8/15/2022 0:30	60.8	0	SSW	202				2
8/15/2022 1:00	59	0	SSW	202				2
8/15/2022 1:30	57.1	0	SSW	202				2
8/15/2022 2:00	57.2	2	SSW	202				2
8/15/2022 2:30	56.3	0	SSW	202				2
8/15/2022 3:00	54.4	0	SSW	202				2
8/15/2022 3:30	53.6	0	SSW	202				2
8/15/2022 4:00	53.7	1	SSW	202				2
8/15/2022 4:30	52.8	0	SSW	202				2
8/15/2022 5:00	51.6	0	SSW	202				2
8/15/2022 5:30	51.7	0	SSW	202				2
8/15/2022 6:00	51.5	0	SSW	202				2
8/15/2022 6:30	51.3	0	SSW	202				2
8/15/2022 7:00	51.6	0	SSW	202				2
8/15/2022 7:30	53.3	0	SSW	202				2
8/15/2022 8:00	55.6	0	SSW	202				2
8/15/2022 8:30	58.1	0	NNE	26				2
8/15/2022 9:00	62	5	S	187	5	8/15/2022	9:13 AM	2
8/15/2022 9:30	67.7	1	SW	227				2
8/15/2022 10:00	70.2	2	NW	314				2
8/15/2022 10:30	72.7	1	WSW	256				2
8/15/2022 11:00	75.2	2	NNW	335				2
8/15/2022 11:30	77.1	4	N	5				2
8/15/2022 12:00	78.4	1	WSW	256				2
8/15/2022 12:30	79.8	3	SSW	212				2
8/15/2022 13:00	81	1	SW	228				2
8/15/2022 13:30	82.6	4	SSE	168				2
8/15/2022 14:00	84	4	NNW	332				2
8/15/2022 14:30	85.4	5	SW	225				2
8/15/2022 15:00	86.8	2	SW	236				2
8/15/2022 15:30	87.1	3	ESE	110				2
8/15/2022 16:00	88	2	WSW	250				2
8/15/2022 16:30	88.4	1	WSW	257				2
8/15/2022 17:00	87.5	3	SW	230				2
8/15/2022 17:30	86.7	5	SW	225				2
8/15/2022 18:00	85.7	4	WSW	248				2
8/15/2022 18:30	83.5	7	S	188				2
8/15/2022 19:00	80.6	8	S	178				2
8/15/2022 19:30	78.5	6	SSW	203				2
8/15/2022 20:00	74.9	4	S	185				2
8/15/2022 20:30	72.2	8	WSW	252				2
8/15/2022 21:00	70.3	3	SSW	198				2
8/15/2022 21:30	68.8	3	SSW	200				2
8/15/2022 22:00	67.9	2	SSW	209				2
8/15/2022 22:30	66.2	3	SSW	209				2
8/15/2022 23:00	62.4	1	SSW	209				2
8/15/2022 23:30	63.3	0	SSW	209				2
8/17/2022 0:00	75.1	1	SSE	161	6	8/17/2022	(not specified)	4
8/17/2022 0:30	74.6	3	SW	216	6	8/17/2022	(not specified)	4
8/17/2022 1:00	73.6	3	SW	219	6	8/17/2022	(not specified)	4
8/17/2022 1:30	71.9	5	SSE	164	6	8/17/2022	(not specified)	4
8/17/2022 2:00	69.4	1	S	176	6	8/17/2022	(not specified)	4
8/17/2022 2:30	71	2	NE	38	6	8/17/2022	(not specified)	4
8/17/2022 3:00	71.2	2	ENE	64	6	8/17/2022	(not specified)	4
8/17/2022 3:30	71.1	2	NNW	331	6	8/17/2022	(not specified)	4
8/17/2022 4:00	70.4	0	NW	308	6	8/17/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/17/2022 4:30	69.3	1	W	269	6	8/17/2022	(not specified)	4
8/17/2022 5:00	64.2	0	W	263	6	8/17/2022	(not specified)	4
8/17/2022 5:30	61.4	0	W	263	6	8/17/2022	(not specified)	4
8/17/2022 6:00	61.6	0	NNW	342	6	8/17/2022	(not specified)	4
8/17/2022 6:30	60.4	1	WNW	298	6	8/17/2022	(not specified)	4
8/17/2022 7:00	58	2	WNW	298	6	8/17/2022	(not specified)	4
8/17/2022 7:30	59.1	0	WNW	298	6	8/17/2022	(not specified)	4
8/17/2022 8:00	62.1	0	WNW	290	6	8/17/2022	(not specified)	4
8/17/2022 8:30	68.7	1	NNW	329	6	8/17/2022	(not specified)	4
8/17/2022 9:00	70.1	1	NNW	327	6	8/17/2022	(not specified)	4
8/17/2022 9:30	72.4	5	SW	232	6	8/17/2022	(not specified)	4
8/17/2022 10:00	74	2	WSW	256	6	8/17/2022	(not specified)	4
8/17/2022 10:30	76.7	2	W	275	6	8/17/2022	(not specified)	4
8/17/2022 11:00	78.6	4	NNW	341	6	8/17/2022	(not specified)	4
8/17/2022 11:30	81.1	2	NE	44	6	8/17/2022	(not specified)	4
8/17/2022 12:00	83.1	6	NE	50	6	8/17/2022	(not specified)	4
8/17/2022 12:30	84.6	3	N	5	6	8/17/2022	(not specified)	4
8/17/2022 13:00	85.4	3	NE	48	6	8/17/2022	(not specified)	4
8/17/2022 13:30	85.7	1	NNE	15	6	8/17/2022	(not specified)	4
8/17/2022 14:00	88.8	3	NNE	19	6	8/17/2022	(not specified)	4
8/17/2022 14:30	89.2	3	E	93	6	8/17/2022	(not specified)	4
8/17/2022 15:00	89.8	3	NNE	14	6	8/17/2022	(not specified)	4
8/17/2022 15:30	91	3	NNE	15	6	8/17/2022	(not specified)	4
8/17/2022 16:00	90.1	1	NNE	23	6	8/17/2022	(not specified)	4
8/17/2022 16:30	92.1	0	ENE	58	6	8/17/2022	(not specified)	4
8/17/2022 17:00	92.8	1	WSW	259	6	8/17/2022	(not specified)	4
8/17/2022 17:30	94.7	0	SW	228	6	8/17/2022	(not specified)	4
8/17/2022 18:00	94.9	2	NNW	332	6	8/17/2022	(not specified)	4
8/17/2022 18:30	94.4	0	NE	49	6	8/17/2022	(not specified)	4
8/17/2022 19:00	94.9	1	NNE	17	6	8/17/2022	(not specified)	4
8/17/2022 19:30	91.7	0	SSW	195	6	8/17/2022	(not specified)	4
8/17/2022 20:00	87.5	2	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 20:30	82.5	0	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 21:00	78.6	2	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 21:30	77.1	0	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 22:00	75.5	1	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 22:30	74	2	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 23:00	74.2	1	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 23:30	74.4	2	SW	224	6	8/17/2022	(not specified)	4
12/13/2022 0:00	33.3	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 0:30	33.1	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 1:00	32.3	1	SE	132	7	12/13/2022	(not specified)	3
12/13/2022 1:30	31.9	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 2:00	32.6	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 2:30	32.9	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 3:00	33.4	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 3:30	31.4	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 4:00	31.2	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 4:30	31.9	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 5:00	32.4	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 5:30	31.7	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 6:00	31.6	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 6:30	31	3	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 7:00	30.7	1	SE	132	7	12/13/2022	(not specified)	3
12/13/2022 7:30	31.1	3	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 8:00	31.3	1	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 8:30	31.3	2	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 9:00	31.9	1	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 9:30	32.6	0	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 10:00	33.9	3	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 10:30	34.7	3	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 11:00	36.8	1	NNE	34	7	12/13/2022	(not specified)	3
12/13/2022 11:30	38	4	NNE	33	7	12/13/2022	(not specified)	3
12/13/2022 12:00	38.2	4	NNE	24	7	12/13/2022	(not specified)	3
12/13/2022 12:30	39	1	NNE	30	7	12/13/2022	(not specified)	3
12/13/2022 13:00	39.5	3	NNE	29	7	12/13/2022	(not specified)	3
12/13/2022 13:30	40.7	3	NNE	26	7	12/13/2022	(not specified)	3
12/13/2022 14:00	41.5	0	NNE	21	7	12/13/2022	(not specified)	3
12/13/2022 14:30	41.7	2	N	355	7	12/13/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/13/2022 15:00	41.8	0	NW	323	7	12/13/2022	(not specified)	3
12/13/2022 15:30	42.7	0	WNW	300	7	12/13/2022	(not specified)	3
12/13/2022 16:00	42.3	1	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 16:30	40.3	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 17:00	37.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 17:30	35.3	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 18:00	34.1	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 18:30	33.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 19:00	33.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 19:30	33.5	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 20:00	33.8	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 20:30	34.1	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 21:00	33.4	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 21:30	33.7	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 22:00	31.1	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 22:30	31.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 23:00	31.5	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 23:30	31.4	0	WSW	254	7	12/13/2022	(not specified)	3
9/28/2023 0:00	52.3	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 0:30	52.4	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 1:00	52.4	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 1:30	52.4	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 2:00	52.4	2	S	183	8	9/28/2023	(not specified)	5
9/28/2023 2:30	52.5	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 3:00	52.2	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 3:30	52.5	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 4:00	52.7	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 4:30	53.3	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 5:00	53.7	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 5:30	54	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 6:00	54.1	4	S	183	8	9/28/2023	(not specified)	5
9/28/2023 6:30	53.8	2	S	183	8	9/28/2023	(not specified)	5
9/28/2023 7:00	53.8	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 7:30	53.6	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 8:00	54.1	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 8:30	54.8	3	S	183	8	9/28/2023	(not specified)	5
9/28/2023 9:00	55.3	2	S	183	8	9/28/2023	(not specified)	5
9/28/2023 9:30	56.7	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 10:00	57.7	3	S	183	8	9/28/2023	(not specified)	5
9/28/2023 10:30	60.4	4	S	183	8	9/28/2023	(not specified)	5
9/28/2023 11:00	60.1	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 11:30	60.6	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 12:00	61.4	1	SSE	156	8	9/28/2023	(not specified)	5
9/28/2023 12:30	61.2	3	SSW	205	8	9/28/2023	(not specified)	5
9/28/2023 13:00	62.2	2	S	188	8	9/28/2023	(not specified)	5
9/28/2023 13:30	62.7	2	NNE	26	8	9/28/2023	(not specified)	5
9/28/2023 14:00	62.8	5	SSE	157	8	9/28/2023	(not specified)	5
9/28/2023 14:30	64.1	2	S	182	8	9/28/2023	(not specified)	5
9/28/2023 15:00	63.7	2	SSE	160	8	9/28/2023	(not specified)	5
9/28/2023 15:30	63.5	0	SSE	159	8	9/28/2023	(not specified)	5
9/28/2023 16:00	64.1	1	SSE	159	8	9/28/2023	(not specified)	5
9/28/2023 16:30	64.1	0	S	174	8	9/28/2023	(not specified)	5
9/28/2023 17:00	63.8	0	S	174	8	9/28/2023	(not specified)	5
9/28/2023 17:30	63.1	1	S	174	8	9/28/2023	(not specified)	5
9/28/2023 18:00	62.3	3	NNE	34	8	9/28/2023	(not specified)	5
9/28/2023 18:30	60.6	1	NNE	24	8	9/28/2023	(not specified)	5
9/28/2023 19:00	59.3	0	WNW	291	8	9/28/2023	(not specified)	5
9/28/2023 19:30	57.5	1	WNW	291	8	9/28/2023	(not specified)	5
9/28/2023 20:00	57.3	4	NNE	22	8	9/28/2023	(not specified)	5
9/28/2023 20:30	56.6	0	NNE	34	8	9/28/2023	(not specified)	5
9/28/2023 21:00	56.2	0	NNE	34	8	9/28/2023	(not specified)	5
9/28/2023 21:30	56	5	NNE	33	8	9/28/2023	(not specified)	5
9/28/2023 22:00	55.9	2	W	275	8	9/28/2023	(not specified)	5
9/28/2023 22:30	55.7	0	W	275	8	9/28/2023	(not specified)	5
9/28/2023 23:00	55.5	2	W	275	8	9/28/2023	(not specified)	5
9/28/2023 23:30	55.4	0	W	277	8	9/28/2023	(not specified)	5
11/21/2023 0:00	34.2	3	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 0:30	34.5	0	WSW	242	9	11/21/2023	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/21/2023 1:00	34.7	1	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 1:30	35	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 2:00	35.5	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 2:30	35.5	1	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 3:00	35.8	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 3:30	34.4	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 4:00	34.8	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 4:30	34.2	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 5:00	34.8	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 5:30	33.9	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 6:00	34.9	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 6:30	34.5	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 7:00	34.7	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 7:30	34.5	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 8:00	33.7	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 8:30	33.9	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 9:00	35.2	1	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 9:30	36.7	1	WSW	245	9	11/21/2023	(not specified)	3
11/21/2023 10:00	37.9	6	NNE	23	9	11/21/2023	(not specified)	3
11/21/2023 10:30	38.5	2	S	172	9	11/21/2023	(not specified)	3
11/21/2023 11:00	39.8	0	S	175	9	11/21/2023	(not specified)	3
11/21/2023 11:30	41.1	3	NNE	18	9	11/21/2023	(not specified)	3
11/21/2023 12:00	43.7	3	N	11	9	11/21/2023	(not specified)	3
11/21/2023 12:30	45.5	0	NNE	17	9	11/21/2023	(not specified)	3
11/21/2023 13:00	46.6	1	SSE	157	9	11/21/2023	(not specified)	3
11/21/2023 13:30	47.6	0	SSE	153	9	11/21/2023	(not specified)	3
11/21/2023 14:00	48.1	3	NNE	26	9	11/21/2023	(not specified)	3
11/21/2023 14:30	49.5	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 15:00	50.8	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 15:30	49.8	1	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 16:00	49.6	1	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 16:30	47.9	3	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 17:00	44.8	2	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 17:30	42.8	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 18:00	42.1	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 18:30	44.1	5	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 19:00	45	4	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 19:30	45.3	1	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 20:00	44.6	0	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 20:30	44.7	0	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 21:00	45.4	0	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 21:30	46.3	0	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 22:00	46.6	2	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 22:30	46.5	2	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 23:00	47.1	1	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 23:30	47.1	3	NNE	28	9	11/21/2023	(not specified)	3
11/29/2023 0:00	26.1	1	NNW	335				4
11/29/2023 0:30	25.3	0	NNW	335				4
11/29/2023 1:00	24	0	NNW	335				4
11/29/2023 1:30	26.3	0	NNW	335				4
11/29/2023 2:00	28.2	0	NNW	335				4
11/29/2023 2:30	27.6	0	NNW	335				4
11/29/2023 3:00	27	0	NNW	335				4
11/29/2023 3:30	27.4	0	NNW	334				4
11/29/2023 4:00	29	0	NNW	334				4
11/29/2023 4:30	29.1	0	NNW	334				4
11/29/2023 5:00	29.1	0	NNW	334				4
11/29/2023 5:30	29.8	0	NNW	334				4
11/29/2023 6:00	29.5	0	NNW	334				4
11/29/2023 6:30	29.6	0	NNW	334				4
11/29/2023 7:00	29.9	2	NNE	20				4
11/29/2023 7:30	30.1	2	NNE	20				4
11/29/2023 8:00	30.2	1	NNE	20				4
11/29/2023 8:30	30.6	2	NNE	19				4
11/29/2023 9:00	31	0	NNE	19				4
11/29/2023 9:30	31.7	0	NNE	19				4
11/29/2023 10:00	32.7	2	NNE	19				4
11/29/2023 10:30	33.2	2	NNE	20				4
11/29/2023 11:00	34.4	2	NNE	20				4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/29/2023 11:30	35.3	3	NNE	20				4
11/29/2023 12:00	36.7	4	NNE	22				4
11/29/2023 12:30	37.9	0	NNE	22	10	11/29/2023	12:40 PM	4
11/29/2023 13:00	39.2	0	NNE	18				4
11/29/2023 13:30	39.2	2	N	5				4
11/29/2023 14:00	39.3	3	N	5				4
11/29/2023 14:30	39.3	3	N	5				4
11/29/2023 15:00	39.6	0	N	5				4
11/29/2023 15:30	39.5	0	N	5				4
11/29/2023 16:00	39.3	0	N	5				4
11/29/2023 16:30	38.5	0	N	5				4
11/29/2023 17:00	37.4	0	N	5				4
11/29/2023 17:30	36.2	0	N	5				4
11/29/2023 18:00	35.7	0	N	5				4
11/29/2023 18:30	35.9	0	N	5				4
11/29/2023 19:00	35.5	0	N	5				4
11/29/2023 19:30	35.3	0	N	5				4
11/29/2023 20:00	35.6	0	N	5				4
11/29/2023 20:30	35.5	0	N	5				4
11/29/2023 21:00	35.1	0	N	5				4
11/29/2023 21:30	35.1	0	N	5				4
11/29/2023 22:00	34.6	0	N	5				4
11/29/2023 22:30	34.4	0	N	5				4
11/29/2023 23:00	33.9	0	N	5				4
11/29/2023 23:30	34.4	0	N	5				4
12/1/2023 0:00	41.6	3	S	190				6
12/1/2023 0:30	41.8	5	SW	215				6
12/1/2023 1:00	42.1	4	WSW	240				6
12/1/2023 1:30	42.2	7	S	171				6
12/1/2023 2:00	42.3	0	SSW	198				6
12/1/2023 2:30	42.3	2	S	181				6
12/1/2023 3:00	42.3	3	SW	223				6
12/1/2023 3:30	42.4	4	S	176				6
12/1/2023 4:00	42.3	2	S	175				6
12/1/2023 4:30	42.5	3	SSW	210				6
12/1/2023 5:00	42.7	8	SSW	212				6
12/1/2023 5:30	42.7	3	S	180				6
12/1/2023 6:00	43.3	3	SSW	200				6
12/1/2023 6:30	43.4	4	SSW	194				6
12/1/2023 7:00	43.3	7	S	173				6
12/1/2023 7:30	44.5	7	SSW	194				6
12/1/2023 8:00	46.7	5	S	173				6
12/1/2023 8:30	47.5	7	S	184				6
12/1/2023 9:00	47.4	10	SSW	202				6
12/1/2023 9:30	47.1	10	S	182				6
12/1/2023 10:00	47.6	11	SSE	165				6
12/1/2023 10:30	48.5	4	SSW	192				6
12/1/2023 11:00	48.3	8	S	170				6
12/1/2023 11:30	49	10	SSE	165				6
12/1/2023 12:00	50.6	7	S	177				6
12/1/2023 12:30	50.3	6	SSW	213				6
12/1/2023 13:00	51.3	6	S	182				6
12/1/2023 13:30	52	4	SW	225				6
12/1/2023 14:00	51.4	9	SE	138				6
12/1/2023 14:30	50.9	11	SSW	211				6
12/1/2023 15:00	50	5	SW	220				6
12/1/2023 15:30	49.6	6	S	180	11	12/1/2023	3:36 PM	6
12/1/2023 16:00	49	9	S	185				6
12/1/2023 16:30	48.8	5	S	190				6
12/1/2023 17:00	48.7	4	S	185				6
12/1/2023 17:30	48.1	0	SSW	204				6
12/1/2023 18:00	47.3	2	SW	219				6
12/1/2023 18:30	46.7	3	SW	215				6
12/1/2023 19:00	47.4	4	SSW	200				6
12/1/2023 19:30	46.7	4	SW	221				6
12/1/2023 20:00	46.1	6	SSE	166				6
12/1/2023 20:30	45.8	6	S	180				6
12/1/2023 21:00	45.6	7	SSW	199				6
12/1/2023 21:30	45.6	5	SSW	205				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/1/2023 22:00	45.8	6	SW	228				6
12/1/2023 22:30	46	6	SSE	167				6
12/1/2023 23:00	45.8	6	SSW	208				6
12/1/2023 23:30	46.3	6	SSW	203				6
12/12/2023 0:00	47.4	1	NE	55				3
12/12/2023 0:30	46.9	2	NNE	20				3
12/12/2023 1:00	46.6	0	ENE	68				3
12/12/2023 1:30	46.2	4	WSW	246				3
12/12/2023 2:00	45.8	0	SW	232				3
12/12/2023 2:30	45	0	SSE	166				3
12/12/2023 3:00	44.6	1	W	264				3
12/12/2023 3:30	44	3	W	262				3
12/12/2023 4:00	43.6	0	WSW	256				3
12/12/2023 4:30	43.2	6	W	273				3
12/12/2023 5:00	43.2	1	WSW	257				3
12/12/2023 5:30	42.7	1	W	270				3
12/12/2023 6:00	41.6	2	SSW	200				3
12/12/2023 6:30	41	0	SSW	200				3
12/12/2023 7:00	40.6	2	SSW	200				3
12/12/2023 7:30	41	0	SSW	200				3
12/12/2023 8:00	40.8	0	SSW	205				3
12/12/2023 8:30	40.6	2	SSW	205				3
12/12/2023 9:00	41.2	1	WSW	251				3
12/12/2023 9:30	41.9	2	W	261				3
12/12/2023 10:00	43.2	4	W	271				3
12/12/2023 10:30	45.1	3	W	274				3
12/12/2023 11:00	46.1	10	WSW	256				3
12/12/2023 11:30	47.1	8	W	266				3
12/12/2023 12:00	48	2	W	267				3
12/12/2023 12:30	49.3	2	NE	37				3
12/12/2023 13:00	49.7	2	WNW	299				3
12/12/2023 13:30	50	2	WNW	289	12	12/12/2023	1:35 PM	3
12/12/2023 14:00	50.9	5	WSW	256				3
12/12/2023 14:30	51.3	4	NW	275				3
12/12/2023 15:00	51.6	4	WSW	276				3
12/12/2023 15:30	51.6	2	W	261				3
12/12/2023 16:00	50.9	2	W	269				3
12/12/2023 16:30	47.9	3	W	266				3
12/12/2023 17:00	46.6	0	W	266				3
12/12/2023 17:30	45.1	1	W	266				3
12/12/2023 18:00	43.3	0	W	266				3
12/12/2023 18:30	44	0	W	266				3
12/12/2023 19:00	43.5	0	W	266				3
12/12/2023 19:30	42.8	0	W	266				3
12/12/2023 20:00	42.8	1	W	266				3
12/12/2023 20:30	42.5	0	W	266				3
12/12/2023 21:00	42.6	2	W	280				3
12/12/2023 21:30	40.8	2	W	281				3
12/12/2023 22:00	38.6	1	W	281				3
12/12/2023 22:30	36.8	0	W	281				3
12/12/2023 23:00	36.1	0	W	281				3
12/12/2023 23:30	35.5	0	W	281				3
12/14/2023 0:00	37.6	2	NNE	34	13	12/14/2023	(not specified)	5
12/14/2023 0:30	37.7	0	NE	42	13	12/14/2023	(not specified)	5
12/14/2023 1:00	37.6	0	NE	42	13	12/14/2023	(not specified)	5
12/14/2023 1:30	37.3	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 2:00	37.4	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 2:30	38	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 3:00	38.4	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 3:30	38.6	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 4:00	38.5	1	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 4:30	38.1	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 5:00	38.5	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 5:30	38.8	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 6:00	39.3	1	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 6:30	39.5	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 7:00	39.6	1	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 7:30	40.1	2	NE	47	13	12/14/2023	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/14/2023 8:00	40.4	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 8:30	40.7	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 9:00	41.3	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 9:30	41.8	2	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 10:00	42.5	0	ENE	59	13	12/14/2023	(not specified)	5
12/14/2023 10:30	43	1	E	85	13	12/14/2023	(not specified)	5
12/14/2023 11:00	43.5	0	NW	325	13	12/14/2023	(not specified)	5
12/14/2023 11:30	44	3	NW	325	13	12/14/2023	(not specified)	5
12/14/2023 12:00	44.5	1	NNW	327	13	12/14/2023	(not specified)	5
12/14/2023 12:30	45.5	0	NW	325	13	12/14/2023	(not specified)	5
12/14/2023 13:00	46.8	3	NW	313	13	12/14/2023	(not specified)	5
12/14/2023 13:30	46.6	1	WNW	284	13	12/14/2023	(not specified)	5
12/14/2023 14:00	47.2	1	WNW	284	13	12/14/2023	(not specified)	5
12/14/2023 14:30	47.5	1	WNW	287	13	12/14/2023	(not specified)	5
12/14/2023 15:00	47.5	1	WNW	287	13	12/14/2023	(not specified)	5
12/14/2023 15:30	47.6	0	WNW	288	13	12/14/2023	(not specified)	5
12/14/2023 16:00	47.6	0	WNW	288	13	12/14/2023	(not specified)	5
12/14/2023 16:30	47.3	1	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 17:00	47	1	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 17:30	46.8	0	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 18:00	45.3	0	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 18:30	44.2	0	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 19:00	42.5	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 19:30	42.3	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 20:00	42.2	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 20:30	41.4	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 21:00	40.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 21:30	39.8	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 22:00	38.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 22:30	38.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 23:00	37.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 23:30	37.2	0	WNW	285	13	12/14/2023	(not specified)	5
12/15/2023 0:00	37.8	0	WNW	285				6
12/15/2023 0:30	36.5	0	WNW	285				6
12/15/2023 1:00	35.9	0	WNW	285				6
12/15/2023 1:30	36.6	0	WNW	285				6
12/15/2023 2:00	37.1	0	WNW	285				6
12/15/2023 2:30	37.4	0	WNW	285				6
12/15/2023 3:00	37.5	0	WNW	285				6
12/15/2023 3:30	37.5	0	WNW	285				6
12/15/2023 4:00	37.6	0	WNW	285				6
12/15/2023 4:30	37.6	0	WNW	285				6
12/15/2023 5:00	37.4	0	WNW	285				6
12/15/2023 5:30	36.8	0	WNW	285				6
12/15/2023 6:00	36.1	0	WNW	285				6
12/15/2023 6:30	34.9	0	WNW	285				6
12/15/2023 7:00	34.5	2	WNW	286				6
12/15/2023 7:30	33.6	2	WNW	286				6
12/15/2023 8:00	33.4	0	WNW	286				6
12/15/2023 8:30	32.9	0	WNW	286				6
12/15/2023 9:00	33.7	2	WNW	286				6
12/15/2023 9:30	34.7	0	WNW	286				6
12/15/2023 10:00	36.4	2	WNW	286				6
12/15/2023 10:30	37.5	3	WNW	287				6
12/15/2023 11:00	37.6	1	WNW	287				6
12/15/2023 11:30	40.7	3	WNW	293				6
12/15/2023 12:00	42.2	1	WNW	293	14	12/15/2023	12:00 PM	6
12/15/2023 12:30	43.5	1	WNW	294				6
12/15/2023 13:00	45.2	1	NW	311				6
12/15/2023 13:30	46	2	W	268				6
12/15/2023 14:00	47	0	NE	55				6
12/15/2023 14:30	47.6	0	SSE	161				6
12/15/2023 15:00	48.3	3	WSW	253				6
12/15/2023 15:30	48.2	3	W	262				6
12/15/2023 16:00	46.6	0	W	262				6
12/15/2023 16:30	44.2	0	W	262				6
12/15/2023 17:00	41.2	0	W	262				6
12/15/2023 17:30	39.1	0	W	262				6
12/15/2023 18:00	38.2	1	W	262				6
12/15/2023 18:30	37.7	0	W	261				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/15/2023 19:00	37.1	0	W	262				6
12/15/2023 19:30	35.5	0	W	262				6
12/15/2023 20:00	35	0	W	262				6
12/15/2023 20:30	34.1	0	W	262				6
12/15/2023 21:00	33.2	0	W	262				6
12/15/2023 21:30	33	0	W	262				6
12/15/2023 22:00	32.1	0	W	261				6
12/15/2023 22:30	31.7	0	W	262				6
12/15/2023 23:00	32.9	1	W	262				6
12/15/2023 23:30	32.1	0	W	262				6
12/16/2023 0:00	31.7	0	W	262				7
12/16/2023 0:30	31.3	2	W	262				7
12/16/2023 1:00	32.3	0	W	262				7
12/16/2023 1:30	32.7	0	W	262				7
12/16/2023 2:00	31.1	3	NNE	30				7
12/16/2023 2:30	30.7	4	NNE	30				7
12/16/2023 3:00	30.8	0	NNE	30				7
12/16/2023 3:30	31	2	NNE	30				7
12/16/2023 4:00	30.5	0	NNE	30				7
12/16/2023 4:30	29.1	0	NNE	34				7
12/16/2023 5:00	29	0	NNE	34				7
12/16/2023 5:30	29.4	0	NNE	34				7
12/16/2023 6:00	30.4	0	NNE	34				7
12/16/2023 6:30	30.1	0	NNE	34				7
12/16/2023 7:00	30	0	NE	36				7
12/16/2023 7:30	29.6	0	E	94				7
12/16/2023 8:00	29.6	0	E	94				7
12/16/2023 8:30	30.3	0	E	94				7
12/16/2023 9:00	31	0	E	94				7
12/16/2023 9:30	31.1	1	SSE	166				7
12/16/2023 10:00	31.5	0	S	175				7
12/16/2023 10:30	32.6	0	S	175				7
12/16/2023 11:00	34.7	3	S	172				7
12/16/2023 11:30	35.9	4	SSE	169				7
12/16/2023 12:00	36.9	5	SSE	169				7
12/16/2023 12:30	38	4	NNE	24				7
12/16/2023 13:00	38.6	3	NNE	26				7
12/16/2023 13:30	39.8	4	NNE	19				7
12/16/2023 14:00	39.4	4	NNE	24	15	12/16/2023	2:00 PM	7
12/16/2023 14:30	39.3	4	NNE	20				7
12/16/2023 15:00	38.7	2	NNE	24				7
12/16/2023 15:30	38.6	2	NNE	24				7
12/16/2023 16:00	38.4	0	NNE	24				7
12/16/2023 16:30	37.7	0	NNE	24				7
12/16/2023 17:00	36.7	1	NNE	25				7
12/16/2023 17:30	36.4	0	NNE	25				7
12/16/2023 18:00	35.8	1	NNE	25				7
12/16/2023 18:30	35.2	0	NNE	25				7
12/16/2023 19:00	34.4	0	NNE	25				7
12/16/2023 19:30	34	0	NNE	31				7
12/16/2023 20:00	34.3	1	NNE	31				7
12/16/2023 20:30	33.9	0	NNE	30				7
12/16/2023 21:00	33.9	0	NNE	30				7
12/16/2023 21:30	33.7	1	NNE	30				7
12/16/2023 22:00	33.2	0	NNE	32				7
12/16/2023 22:30	32.9	1	NNE	32				7
12/16/2023 23:00	32.3	0	NNE	32				7
12/16/2023 23:30	31.7	1	ESE	105				7
12/25/2023 0:00	41.9	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 0:30	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 1:00	41.8	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 1:30	41.7	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 2:00	41.7	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 2:30	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 3:00	42.5	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 3:30	42.8	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 4:00	42.6	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 4:30	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 5:00	42	0	SW	234	16	12/25/2023	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/25/2023 5:30	41.9	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 6:00	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 6:30	42	4	NE	36	16	12/25/2023	(not specified)	2
12/25/2023 7:00	42.2	4	NNE	34	16	12/25/2023	(not specified)	2
12/25/2023 7:30	42.3	3	NNE	33	16	12/25/2023	(not specified)	2
12/25/2023 8:00	42.7	3	NNE	32	16	12/25/2023	(not specified)	2
12/25/2023 8:30	43.1	2	NNE	30	16	12/25/2023	(not specified)	2
12/25/2023 9:00	43.7	0	NNE	29	16	12/25/2023	(not specified)	2
12/25/2023 9:30	44	0	NNE	30	16	12/25/2023	(not specified)	2
12/25/2023 10:00	44.7	0	NNE	24	16	12/25/2023	(not specified)	2
12/25/2023 10:30	44.1	0	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 11:00	44.8	0	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 11:30	44.6	0	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 12:00	44.6	1	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 12:30	44.6	1	NW	323	16	12/25/2023	(not specified)	2
12/25/2023 13:00	44.6	1	NW	323	16	12/25/2023	(not specified)	2
12/25/2023 13:30	45.2	3	NW	325	16	12/25/2023	(not specified)	2
12/25/2023 14:00	45.2	0	NNE	22	16	12/25/2023	(not specified)	2
12/25/2023 14:30	45.5	0	NNE	22	16	12/25/2023	(not specified)	2
12/25/2023 15:00	45.4	0	NNE	22	16	12/25/2023	(not specified)	2
12/25/2023 15:30	45.3	1	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 16:00	45.1	0	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 16:30	45.2	0	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 17:00	45.2	3	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 17:30	45	1	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 18:00	45	3	NNE	32	16	12/25/2023	(not specified)	2
12/25/2023 18:30	44.8	2	NNE	27	16	12/25/2023	(not specified)	2
12/25/2023 19:00	45.3	2	NNE	27	16	12/25/2023	(not specified)	2
12/25/2023 19:30	47.1	3	NNE	32	16	12/25/2023	(not specified)	2
12/25/2023 20:00	48.8	4	SSW	194	16	12/25/2023	(not specified)	2
12/25/2023 20:30	50.7	5	S	190	16	12/25/2023	(not specified)	2
12/25/2023 21:00	50.8	9	SSW	192	16	12/25/2023	(not specified)	2
12/25/2023 21:30	51.1	4	SW	217	16	12/25/2023	(not specified)	2
12/25/2023 22:00	51.5	6	SSE	169	16	12/25/2023	(not specified)	2
12/25/2023 22:30	51.9	6	WSW	239	16	12/25/2023	(not specified)	2
12/25/2023 23:00	52	4	SW	236	16	12/25/2023	(not specified)	2
12/25/2023 23:30	52.1	5	SSW	192	16	12/25/2023	(not specified)	2
1/12/2024 0:00	42.1	7	S	188				6
1/12/2024 0:30	42.4	6	S	187				6
1/12/2024 1:00	41.6	5	S	188				6
1/12/2024 1:30	41.7	2	S	182				6
1/12/2024 2:00	41.7	4	S	184				6
1/12/2024 2:30	42.4	4	S	183				6
1/12/2024 3:00	42.2	3	SSW	192				6
1/12/2024 3:30	42.2	7	S	173				6
1/12/2024 4:00	42.4	3	S	182				6
1/12/2024 4:30	42.2	2	S	188				6
1/12/2024 5:00	42.5	12	S	189				6
1/12/2024 5:30	42.5	6	SSW	201				6
1/12/2024 6:00	42	3	S	190				6
1/12/2024 6:30	41.7	4	SSE	167				6
1/12/2024 7:00	41.6	3	SSE	167				6
1/12/2024 7:30	41.5	1	SSE	167				6
1/12/2024 8:00	41.3	4	SSE	167				6
1/12/2024 8:30	41.2	1	SSE	167				6
1/12/2024 9:00	41.3	1	SSE	167				6
1/12/2024 9:30	41.5	3	SSE	167				6
1/12/2024 10:00	41.9	4	S	184				6
1/12/2024 10:30	42.5	4	S	184				6
1/12/2024 11:00	43.3	3	S	178				6
1/12/2024 11:30	43.5	5	S	171				6
1/12/2024 12:00	41.1	6	NNE	22	17	1/12/2024	12:15 PM	6
1/12/2024 12:30	40.4	4	N	11				6
1/12/2024 13:00	40.4	2	NNE	27				6
1/12/2024 13:30	40.6	3	NE	39				6
1/12/2024 14:00	40.7	3	NNE	32				6
1/12/2024 14:30	40.5	2	NNE	32				6
1/12/2024 15:00	40.6	3	NNE	29				6
1/12/2024 15:30	40.2	0	NNE	26				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/12/2024 16:00	39.8	1	NNE	24				6
1/12/2024 16:30	39.7	1	NNE	24				6
1/12/2024 17:00	39.3	2	NNE	24				6
1/12/2024 17:30	39	4	NNE	23				6
1/12/2024 18:00	37.9	9	NNE	26				6
1/12/2024 18:30	35.8	5	NNE	28				6
1/12/2024 19:00	33.6	4	W	279				6
1/12/2024 19:30	32.3	4	WSW	258				6
1/12/2024 20:00	31.6	1	WNW	288				6
1/12/2024 20:30	31.3	2	W	271				6
1/12/2024 21:00	30.8	1	WSW	255				6
1/12/2024 21:30	30.3	3	SSW	208				6
1/12/2024 22:00	30	10	WSW	251				6
1/12/2024 22:30	29.4	1	NE	55				6
1/12/2024 23:00	28.1	0	SSW	209				6
1/12/2024 23:30	27	0	NNE	14				6
1/18/2024 0:00	44.2	0	SW	224				5
1/18/2024 0:30	44.7	2	SW	224				5
1/18/2024 1:00	42.7	4	SW	224				5
1/18/2024 1:30	40.8	3	SW	225				5
1/18/2024 2:00	43.1	1	SW	225				5
1/18/2024 2:30	44.2	2	SW	224				5
1/18/2024 3:00	45.4	3	SW	217				5
1/18/2024 3:30	45.5	6	SSW	208				5
1/18/2024 4:00	45.4	1	S	186				5
1/18/2024 4:30	45.7	2	S	190				5
1/18/2024 5:00	46.1	0	S	175				5
1/18/2024 5:30	43.7	6	NNE	31				5
1/18/2024 6:00	42.2	5	NNE	28				5
1/18/2024 6:30	41.5	3	NE	36				5
1/18/2024 7:00	41.1	0	NNE	34				5
1/18/2024 7:30	42.2	3	NNE	28				5
1/18/2024 8:00	42.1	3	NE	35				5
1/18/2024 8:30	41.7	2	NE	36				5
1/18/2024 9:00	42.5	3	NE	35				5
1/18/2024 9:30	43	3	NE	35				5
1/18/2024 10:00	43.4	1	NE	36				5
1/18/2024 10:30	42.3	3	NE	36				5
1/18/2024 11:00	42.5	0	NE	36				5
1/18/2024 11:30	42.5	0	NE	36				5
1/18/2024 12:00	42.4	0	NE	36	18 & 19	1/18/2024	12:00 PM	5
1/18/2024 12:30	42.7	3	WNW	298				5
1/18/2024 13:00	39.8	8	NW	325				5
1/18/2024 13:30	39.2	2	NNW	340	20	1/18/2024	1:30 PM	5
1/18/2024 14:00	38.9	2	NW	311				5
1/18/2024 14:30	38.3	8	NW	322				5
1/18/2024 15:00	38.3	1	WNW	292				5
1/18/2024 15:30	37.5	3	SW	236	21	1/18/2024	3:30 PM	5
1/18/2024 16:00	37.4	6	NW	316	22	1/18/2024	4:00 PM	5
1/18/2024 16:30	36.5	9	NW	305				5
1/18/2024 17:00	36.5	5	SW	231				5
1/18/2024 17:30	36	2	W	271				5
1/18/2024 18:00	35.4	3	WSW	238				5
1/18/2024 18:30	34.8	0	WSW	248				5
1/18/2024 19:00	34.5	2	WSW	257				5
1/18/2024 19:30	34.5	0	SW	225				5
1/18/2024 20:00	34.4	2	WSW	242				5
1/18/2024 20:30	34.2	0	W	265				5
1/18/2024 21:00	34.2	3	NNW	331				5
1/18/2024 21:30	34	0	W	275				5
1/18/2024 22:00	33.9	0	WNW	288				5
1/18/2024 22:30	34.1	1	WNW	301				5
1/18/2024 23:00	34.1	3	WNW	296				5
1/18/2024 23:30	34	3	WNW	295				5
1/19/2024 0:00	33.9	2	WNW	290				6
1/19/2024 0:30	33.7	3	WNW	290				6
1/19/2024 1:00	33.6	0	WNW	290				6
1/19/2024 1:30	33.5	2	W	276				6
1/19/2024 2:00	33.5	1	W	270				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/19/2024 2:30	33.6	0	WSW	259				6
1/19/2024 3:00	33.5	1	WSW	259				6
1/19/2024 3:30	33.6	1	W	264				6
1/19/2024 4:00	33.7	0	SW	232				6
1/19/2024 4:30	33.6	3	SW	232				6
1/19/2024 5:00	33.7	0	SW	228				6
1/19/2024 5:30	33.6	0	SW	228				6
1/19/2024 6:00	33.7	0	SW	229				6
1/19/2024 6:30	33.7	0	SW	229				6
1/19/2024 7:00	33.7	0	SW	229				6
1/19/2024 7:30	33.8	0	SW	229				6
1/19/2024 8:00	33.7	2	SW	229	23	1/19/2024	8:00 AM	6
1/19/2024 8:30	33.8	0	SW	229				6
1/19/2024 9:00	34.4	3	WNW	300				6
1/19/2024 9:30	35	1	WNW	288				6
1/19/2024 10:00	35.6	2	SW	227				6
1/19/2024 10:30	36.4	4	WSW	255				6
1/19/2024 11:00	36.8	3	W	277				6
1/19/2024 11:30	37	0	WSW	249				6
1/19/2024 12:00	37.3	5	WSW	255				6
1/19/2024 12:30	37.7	0	SW	215				6
1/19/2024 13:00	39.6	3	NW	312				6
1/19/2024 13:30	38.2	7	WSW	252				6
1/19/2024 14:00	37.9	3	WSW	263				6
1/19/2024 14:30	38.1	4	WSW	250				6
1/19/2024 15:00	38.6	10	W	264				6
1/19/2024 15:30	38.1	2	W	271				6
1/19/2024 16:00	37.8	8	WSW	246				6
1/19/2024 16:30	37.6	4	WSW	237				6
1/19/2024 17:00	37.2	3	WNW	292				6
1/19/2024 17:30	37.1	2	WSW	255				6
1/19/2024 18:00	37	4	SW	231				6
1/19/2024 18:30	37.1	2	SW	236				6
1/19/2024 19:00	36.9	2	SW	229				6
1/19/2024 19:30	36.9	2	SW	219				6
1/19/2024 20:00	37	4	SW	229				6
1/19/2024 20:30	36.7	0	SW	235				6
1/19/2024 21:00	36.3	2	SW	229				6
1/19/2024 21:30	35.7	5	SSW	213				6
1/19/2024 22:00	35.7	0	SSW	213				6
1/19/2024 22:30	35.8	0	SSW	213				6
1/19/2024 23:00	35.8	2	WSW	238				6
1/19/2024 23:30	35.8	1	WSW	238				6
2/3/2024 0:00	36.9	0	SSE	168	28	2/3/2024	(not specified)	7
2/3/2024 0:30	36.3	1	NNE	28	28	2/3/2024	(not specified)	7
2/3/2024 1:00	37.8	4	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 1:30	37.8	2	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 2:00	38.3	0	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 2:30	38.3	1	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 3:00	37.6	0	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 3:30	39.5	1	S	189	28	2/3/2024	(not specified)	7
2/3/2024 4:00	39	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 4:30	38.3	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 5:00	36.6	2	S	180	28	2/3/2024	(not specified)	7
2/3/2024 5:30	35.3	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 6:00	35.1	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 6:30	35.6	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 7:00	34	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 7:30	32.7	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 8:00	33.5	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 8:30	34	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 9:00	35.3	2	S	180	24	2/3/2024	9:00 AM	7
2/3/2024 9:30	36.3	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 10:00	37.9	0	S	180	25	2/3/2024	10:00 AM	7
2/3/2024 10:30	41.9	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 11:00	45.7	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 11:30	48	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 12:00	48.9	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 12:30	50.3	0	NNE	22	28	2/3/2024	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/3/2024 13:00	51.3	2	NNE	21	26	2/3/2024	1:00 PM	7
2/3/2024 13:30	52.5	1	N	360	28	2/3/2024	(not specified)	7
2/3/2024 14:00	52.7	4	NNE	15	28	2/3/2024	(not specified)	7
2/3/2024 14:30	52.8	1	NNE	33	28	2/3/2024	(not specified)	7
2/3/2024 15:00	53.6	0	NNE	19	27	2/3/2024	3:00 PM	7
2/3/2024 15:30	54.7	0	NNE	19	28	2/3/2024	(not specified)	7
2/3/2024 16:00	53.4	3	ENE	66	28	2/3/2024	(not specified)	7
2/3/2024 16:30	52	1	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 17:00	50.6	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 17:30	46.3	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 18:00	43.2	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 18:30	40.9	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 19:00	38.7	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 19:30	37.4	1	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 20:00	36.2	2	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 20:30	36.8	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 21:00	35.5	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 21:30	35.4	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 22:00	35.1	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 22:30	33.4	3	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 23:00	33.2	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 23:30	32.8	1	NNE	26	28	2/3/2024	(not specified)	7
2/8/2024 0:00	39.9	0	WSW	246				5
2/8/2024 0:30	39.8	0	WSW	246				5
2/8/2024 1:00	39.9	0	WSW	246				5
2/8/2024 1:30	39.6	0	WSW	246				5
2/8/2024 2:00	39.6	0	WSW	246				5
2/8/2024 2:30	39.8	0	WSW	246				5
2/8/2024 3:00	39.7	0	WSW	246				5
2/8/2024 3:30	39.4	0	WSW	246				5
2/8/2024 4:00	39.5	0	WSW	246				5
2/8/2024 4:30	40	0	WSW	246				5
2/8/2024 5:00	40.1	0	WSW	246				5
2/8/2024 5:30	39.8	0	WSW	246				5
2/8/2024 6:00	39.8	0	WSW	246				5
2/8/2024 6:30	39.7	0	WSW	246				5
2/8/2024 7:00	39.2	0	WSW	246				5
2/8/2024 7:30	38.7	0	WSW	246				5
2/8/2024 8:00	39.1	0	WSW	246				5
2/8/2024 8:30	39.7	0	WSW	246				5
2/8/2024 9:00	41.1	0	WSW	246				5
2/8/2024 9:30	42.2	0	WSW	246				5
2/8/2024 10:00	43.1	0	WSW	246				5
2/8/2024 10:30	45.2	0	WSW	246				5
2/8/2024 11:00	46.8	0	WSW	246				5
2/8/2024 11:30	48.4	0	WSW	246				5
2/8/2024 12:00	49.2	1	WSW	246				5
2/8/2024 12:30	47.1	5	NNE	20				5
2/8/2024 13:00	48.2	1	NNE	24	29	2/8/2024	12:46 PM	5
2/8/2024 13:30	49.7	2	NE	40				5
2/8/2024 14:00	50.6	4	NNW	344				5
2/8/2024 14:30	51	6	WSW	258				5
2/8/2024 15:00	50.9	8	SSW	213				5
2/8/2024 15:30	49.5	4	WSW	237				5
2/8/2024 16:00	48.3	1	WSW	237				5
2/8/2024 16:30	47.7	6	SSW	192				5
2/8/2024 17:00	46.7	2	WSW	240				5
2/8/2024 17:30	45.7	2	SSW	205				5
2/8/2024 18:00	44.6	1	S	186				5
2/8/2024 18:30	44.1	0	S	180				5
2/8/2024 19:00	43.5	0	S	180				5
2/8/2024 19:30	42.3	0	S	180				5
2/8/2024 20:00	42.2	0	S	180				5
2/8/2024 20:30	40.3	0	S	180				5
2/8/2024 21:00	39.2	0	S	180				5
2/8/2024 21:30	37.6	0	S	180				5
2/8/2024 22:00	37.2	0	S	180				5
2/8/2024 22:30	36.6	0	S	180				5
2/8/2024 23:00	36.9	0	S	180				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/8/2024 23:30	37.7	0	S	180				5
2/10/2024 0:00	41.7	0	S	178				7
2/10/2024 0:30	41.5	0	S	178				7
2/10/2024 1:00	41.1	0	S	178				7
2/10/2024 1:30	40.7	0	S	178				7
2/10/2024 2:00	41.4	0	S	178				7
2/10/2024 2:30	41.3	0	S	178				7
2/10/2024 3:00	40.2	0	S	178				7
2/10/2024 3:30	40.1	0	S	178				7
2/10/2024 4:00	40.4	0	S	178				7
2/10/2024 4:30	40.7	0	S	178				7
2/10/2024 5:00	40.8	0	S	178				7
2/10/2024 5:30	40.9	0	S	178				7
2/10/2024 6:00	40.8	0	S	178				7
2/10/2024 6:30	40.8	0	S	178				7
2/10/2024 7:00	40.7	0	S	178				7
2/10/2024 7:30	40.7	0	S	178	30	2/10/2024	7:30 AM	7
2/10/2024 8:00	40.7	0	S	178				7
2/10/2024 8:30	39.9	0	S	178	31	2/10/2024	8:30 AM	7
2/10/2024 9:00	40.5	0	S	178				7
2/10/2024 9:30	41.5	0	S	178	32	2/10/2024	9:29 AM	7
2/10/2024 10:00	41.7	0	S	178				7
2/10/2024 10:30	46.1	0	S	178				7
2/10/2024 11:00	48	1	NNE	22				7
2/10/2024 11:30	48.3	0	NE	40				7
2/10/2024 12:00	48.8	0	NE	39				7
2/10/2024 12:30	50.7	0	S	180				7
2/10/2024 13:00	52.1	0	SW	220				7
2/10/2024 13:30	51.5	0	NNE	19				7
2/10/2024 14:00	52.8	0	S	173				7
2/10/2024 14:30	51.3	0	S	190				7
2/10/2024 15:00	52.4	0	S	190				7
2/10/2024 15:30	54.4	0	S	190				7
2/10/2024 16:00	53.8	0	N	9				7
2/10/2024 16:30	52.9	1	N	11				7
2/10/2024 17:00	51.6	0	N	11				7
2/10/2024 17:30	48.6	0	N	11				7
2/10/2024 18:00	46	0	N	11				7
2/10/2024 18:30	45	0	N	11				7
2/10/2024 19:00	44.2	0	N	11				7
2/10/2024 19:30	43.3	0	N	11				7
2/10/2024 20:00	42.6	0	N	11				7
2/10/2024 20:30	42.5	0	N	11				7
2/10/2024 21:00	41.9	0	N	11				7
2/10/2024 21:30	41.7	0	N	11				7
2/10/2024 22:00	42.2	0	N	11				7
2/10/2024 22:30	42	0	N	11				7
2/10/2024 23:00	41.6	0	N	11				7
2/10/2024 23:30	41.3	0	N	11				7
2/13/2024 0:00	32.9	0	SW	217	33	2/13/2024	(not specified)	3
2/13/2024 0:30	33.3	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 1:00	32.7	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 1:30	33.4	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 2:00	34	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 2:30	34.8	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 3:00	34.8	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 3:30	34.4	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 4:00	34.6	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 4:30	35.1	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 5:00	35.8	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 5:30	36.4	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 6:00	37.2	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 6:30	38.2	0	ENE	64	33	2/13/2024	(not specified)	3
2/13/2024 7:00	39.1	0	ENE	64	33	2/13/2024	(not specified)	3
2/13/2024 7:30	38.9	3	NE	40	33	2/13/2024	(not specified)	3
2/13/2024 8:00	38.7	1	NE	36	33	2/13/2024	(not specified)	3
2/13/2024 8:30	38.9	0	NNE	30	33	2/13/2024	(not specified)	3
2/13/2024 9:00	38.6	4	NNE	24	33	2/13/2024	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/13/2024 9:30	37.9	1	NNE	26	33	2/13/2024	(not specified)	3
2/13/2024 10:00	37.7	2	NNE	22	33	2/13/2024	(not specified)	3
2/13/2024 10:30	38.4	0	NNE	22	33	2/13/2024	(not specified)	3
2/13/2024 11:00	38.7	0	NNE	21	33	2/13/2024	(not specified)	3
2/13/2024 11:30	39.6	0	SSE	157	33	2/13/2024	(not specified)	3
2/13/2024 12:00	40.3	0	NNE	25	33	2/13/2024	(not specified)	3
2/13/2024 12:30	41.2	0	NNE	23	33	2/13/2024	(not specified)	3
2/13/2024 13:00	42.5	0	NNE	21	33	2/13/2024	(not specified)	3
2/13/2024 13:30	44.3	4	SSE	161	33	2/13/2024	(not specified)	3
2/13/2024 14:00	44.5	6	N	9	33	2/13/2024	(not specified)	3
2/13/2024 14:30	43.4	1	NNE	18	33	2/13/2024	(not specified)	3
2/13/2024 15:00	42.7	3	NNE	18	33	2/13/2024	(not specified)	3
2/13/2024 15:30	42.2	4	NNE	19	33	2/13/2024	(not specified)	3
2/13/2024 16:00	41.7	5	NNE	31	33	2/13/2024	(not specified)	3
2/13/2024 16:30	41.6	1	NNE	24	33	2/13/2024	(not specified)	3
2/13/2024 17:00	41.5	3	NNE	28	33	2/13/2024	(not specified)	3
2/13/2024 17:30	41.2	0	NNE	28	33	2/13/2024	(not specified)	3
2/13/2024 18:00	40.6	4	NNE	24	33	2/13/2024	(not specified)	3
2/13/2024 18:30	40.1	0	NNE	27	33	2/13/2024	(not specified)	3
2/13/2024 19:00	40.1	0	NNE	27	33	2/13/2024	(not specified)	3
2/13/2024 19:30	40	0	NNE	27	33	2/13/2024	(not specified)	3
2/13/2024 20:00	39.8	0	NNE	26	33	2/13/2024	(not specified)	3
2/13/2024 20:30	39.6	0	SE	125	33	2/13/2024	(not specified)	3
2/13/2024 21:00	39.3	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 21:30	39.4	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 22:00	39.1	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 22:30	38.6	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 23:00	38.4	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 23:30	38	0	N	9	33	2/13/2024	(not specified)	3
2/14/2024 0:00	37.6	0	NNE	21				4
2/14/2024 0:30	37.4	0	NNE	22				4
2/14/2024 1:00	37.3	0	NNE	22				4
2/14/2024 1:30	37	2	NNE	25				4
2/14/2024 2:00	36.6	0	NNE	26				4
2/14/2024 2:30	36.6	0	NNE	26				4
2/14/2024 3:00	36.5	0	NNE	26				4
2/14/2024 3:30	36.1	2	NNE	27				4
2/14/2024 4:00	36	0	NNE	27				4
2/14/2024 4:30	36.1	0	NNE	27				4
2/14/2024 5:00	36	2	NNE	27				4
2/14/2024 5:30	35.7	1	NNE	30				4
2/14/2024 6:00	35.9	0	SW	228				4
2/14/2024 6:30	35.8	4	SW	231				4
2/14/2024 7:00	35.3	0	S	173				4
2/14/2024 7:30	35.4	0	SSE	157				4
2/14/2024 8:00	35.6	0	SSE	157				4
2/14/2024 8:30	35.9	0	NNE	25	34	2/14/2024	8:30 AM	4
2/14/2024 9:00	36.2	0	NNE	25				4
2/14/2024 9:30	36.4	0	NNE	24				4
2/14/2024 10:00	36.5	0	SSE	162				4
2/14/2024 10:30	36.5	0	SSE	161				4
2/14/2024 11:00	36.6	0	NNE	33	35	2/14/2024	11:00 AM	4
2/14/2024 11:30	36.6	0	NNE	28				4
2/14/2024 12:00	36.7	0	NNE	20				4
2/14/2024 12:30	37.1	0	NNE	22				4
2/14/2024 13:00	37.7	0	N	11				4
2/14/2024 13:30	37.9	0	WNW	300				4
2/14/2024 14:00	38.6	2	NW	313				4
2/14/2024 14:30	38.8	0	NW	306				4
2/14/2024 15:00	39	1	W	271				4
2/14/2024 15:30	39.1	0	W	281				4
2/14/2024 16:00	39.3	0	W	281				4
2/14/2024 16:30	39.3	0	W	281				4
2/14/2024 17:00	39.2	0	W	281				4
2/14/2024 17:30	39.2	0	SW	232				4
2/14/2024 18:00	39.2	0	SW	232				4
2/14/2024 18:30	39.2	0	SW	232				4
2/14/2024 19:00	39.3	1	WSW	252				4
2/14/2024 19:30	39.6	0	NNE	30				4
2/14/2024 20:00	41.9	0	S	170				4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/14/2024 20:30	44.2	2	S	170				4
2/14/2024 21:00	44.9	1	SSW	192				4
2/14/2024 21:30	44.9	6	S	185				4
2/14/2024 22:00	45	3	S	177				4
2/14/2024 22:30	45.1	6	SSW	213				4
2/14/2024 23:00	45.1	6	SSW	213				4
2/14/2024 23:30	44.9	10	SSW	211				4
2/15/2024 0:00	45.1	9	SE	136				5
2/15/2024 0:30	45.2	7	SE	126				5
2/15/2024 1:00	45	9	SSE	159				5
2/15/2024 1:30	45.1	7	SE	138				5
2/15/2024 2:00	44.9	8	SE	142				5
2/15/2024 2:30	44.8	11	ESE	105				5
2/15/2024 3:00	44.8	7	S	172				5
2/15/2024 3:30	44.7	5	SSW	214				5
2/15/2024 4:00	44.8	3	SSW	193				5
2/15/2024 4:30	44.9	0	SSE	162				5
2/15/2024 5:00	44.9	1	SSE	159				5
2/15/2024 5:30	44.8	1	SSE	157				5
2/15/2024 6:00	44.6	1	SSE	157				5
2/15/2024 6:30	44	2	SSE	157				5
2/15/2024 7:00	43.8	0	SSE	157				5
2/15/2024 7:30	43.7	0	SSE	157				5
2/15/2024 8:00	43.4	0	SSE	157				5
2/15/2024 8:30	44	2	SSE	157				5
2/15/2024 9:00	44.3	0	SSE	157				5
2/15/2024 9:30	45.3	1	SSE	157				5
2/15/2024 10:00	46	1	SSE	158				5
2/15/2024 10:30	46.7	1	SSE	158				5
2/15/2024 11:00	48	2	SSE	158				5
2/15/2024 11:30	48.5	3	SSE	158				5
2/15/2024 12:00	48.6	2	SSE	159				5
2/15/2024 12:30	48.3	0	SSE	159				5
2/15/2024 13:00	47.9	0	SSE	159				5
2/15/2024 13:30	47.9	0	SSE	159				5
2/15/2024 14:00	47.6	1	SSE	159				5
2/15/2024 14:30	47.3	0	SSE	159				5
2/15/2024 15:00	47.6	1	SSE	159				5
2/15/2024 15:30	47.2	2	SSE	159				5
2/15/2024 16:00	46.7	0	NNE	30				5
2/15/2024 16:30	46.4	2	NNE	29				5
2/15/2024 17:00	46.3	0	NNE	29				5
2/15/2024 17:30	46.1	0	NNE	29				5
2/15/2024 18:00	46	0	NNE	29				5
2/15/2024 18:30	46	0	NNE	29				5
2/15/2024 19:00	45.8	0	NNE	29				5
2/15/2024 19:30	45.8	0	NNE	29				5
2/15/2024 20:00	46	0	NW	318				5
2/15/2024 20:30	44.4	1	NW	306				5
2/15/2024 21:00	43.7	5	N	5				5
2/15/2024 21:30	43.4	2	NW	311				5
2/15/2024 22:00	43.2	1	N	11				5
2/15/2024 22:30	43.3	0	NE	36				5
2/15/2024 23:00	43.4	3	WSW	257	36	2/15/2024	10:51 PM	5
2/15/2024 23:30	42.7	4	NNE	18				5
2/16/2024 0:00	41.6	4	NW	311				6
2/16/2024 0:30	41.1	10	NNW	346				6
2/16/2024 1:00	40.6	2	NNW	331				6
2/16/2024 1:30	40.1	2	NW	313				6
2/16/2024 2:00	40.2	7	WNW	298				6
2/16/2024 2:30	39.6	2	NE	42				6
2/16/2024 3:00	39.4	8	W	267				6
2/16/2024 3:30	39.1	0	W	269				6
2/16/2024 4:00	38.8	10	W	270				6
2/16/2024 4:30	38.5	6	W	261				6
2/16/2024 5:00	38.5	4	W	265				6
2/16/2024 5:30	38.2	10	WSW	256				6
2/16/2024 6:00	37.9	6	W	270				6
2/16/2024 6:30	37.7	7	WNW	296				6
2/16/2024 7:00	37.7	4	WNW	290				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/16/2024 7:30	37.4	3	W	278				6
2/16/2024 8:00	37.3	4	NNW	338				6
2/16/2024 8:30	37.4	4	NW	316				6
2/16/2024 9:00	37.7	8	W	275				6
2/16/2024 9:30	38.3	3	NW	307				6
2/16/2024 10:00	38.5	8	WSW	257				6
2/16/2024 10:30	38.9	8	WSW	252				6
2/16/2024 11:00	39.8	3	WNW	301				6
2/16/2024 11:30	41.1	3	W	261				6
2/16/2024 12:00	43	4	WSW	242				6
2/20/2024 0:00	43.8	1	WSW	241				3
2/20/2024 0:30	43.7	1	WSW	241				3
2/20/2024 1:00	44.2	5	SSE	163				3
2/20/2024 1:30	43.5	1	SSE	162				3
2/20/2024 2:00	43.1	1	SSE	162				3
2/20/2024 2:30	43.8	0	SSE	162				3
2/20/2024 3:00	43.3	0	SSE	162				3
2/20/2024 3:30	42.5	0	SSE	162				3
2/20/2024 4:00	41.1	0	SSE	162				3
2/20/2024 4:30	41.6	0	SSE	162				3
2/20/2024 5:00	42.4	0	SSE	162				3
2/20/2024 5:30	43	0	SSE	162				3
2/20/2024 6:00	43.2	4	SSE	162				3
2/20/2024 6:30	43.2	1	NNE	30				3
2/20/2024 7:00	42.9	3	ENE	65				3
2/20/2024 7:30	42.9	1	ENE	60				3
2/20/2024 8:00	43.1	2	ENE	60				3
2/20/2024 8:30	43.3	0	ENE	63				3
2/20/2024 9:00	44	3	S	180	37	2/20/2024	9:00 AM	3
2/20/2024 9:30	44.1	1	SSW	207				3
2/20/2024 10:00	44.3	1	SSW	207				3
2/20/2024 10:30	45	2	SSW	207				3
2/20/2024 11:00	45.9	1	SSW	210				3
2/20/2024 11:30	46.5	0	SSW	210				3
2/20/2024 12:00	47	2	SSW	210				3
2/20/2024 12:30	48.1	0	SSW	210				3
2/20/2024 13:00	49.9	2	SSW	213				3
2/20/2024 13:30	50.4	0	NNE	25				3
2/20/2024 14:00	50.3	0	NNE	22				3
2/20/2024 14:30	50.6	4	NNE	18				3
2/20/2024 15:00	51	0	NNE	19	38	2/20/2024	3:00 PM	3
2/20/2024 15:30	51.5	0	NNE	20	39	2/20/2024	3:37 PM	3
2/20/2024 16:00	51.5	0	NNE	19				3
2/20/2024 16:30	50.7	0	SW	224				3
2/20/2024 17:00	49.9	0	SW	224				3
2/20/2024 17:30	49.6	1	SW	224				3
2/20/2024 18:00	49.1	3	SW	221				3
2/20/2024 18:30	48.7	5	SW	219				3
2/20/2024 19:00	48.9	2	SW	217				3
2/20/2024 19:30	48.7	1	SSW	207				3
2/20/2024 20:00	48	2	SSW	207				3
2/20/2024 20:30	47.9	4	SSW	213				3
2/20/2024 21:00	48.2	4	SW	219				3
2/20/2024 21:30	48.2	2	S	180				3
2/20/2024 22:00	47.4	0	ENE	72				3
2/20/2024 22:30	47.1	2	SSE	150				3
2/20/2024 23:00	46.9	1	SSE	161				3
2/20/2024 23:30	46.7	0	SSE	161				3
2/22/2024 0:00	45.3	0	S	190				5
2/22/2024 0:30	45.4	0	S	190				5
2/22/2024 1:00	45.7	0	S	190				5
2/22/2024 1:30	45.4	0	S	190				5
2/22/2024 2:00	44.8	0	S	190				5
2/22/2024 2:30	42.9	0	S	190				5
2/22/2024 3:00	43	0	S	190				5
2/22/2024 3:30	42.7	0	S	190				5
2/22/2024 4:00	43.6	3	S	190				5
2/22/2024 4:30	43.4	0	S	190				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/22/2024 5:00	43.3	0	S	190				5
2/22/2024 5:30	43.2	0	S	190				5
2/22/2024 6:00	42.4	0	S	190				5
2/22/2024 6:30	40.6	0	S	190				5
2/22/2024 7:00	40.9	0	S	190				5
2/22/2024 7:30	40.6	0	S	190				5
2/22/2024 8:00	41.7	0	S	190				5
2/22/2024 8:30	44.1	0	S	190				5
2/22/2024 9:00	45.3	0	S	190				5
2/22/2024 9:30	46	1	S	190				5
2/22/2024 10:00	46.7	0	S	189				5
2/22/2024 10:30	48.4	0	S	190				5
2/22/2024 11:00	50.9	3	W	261	40	2/22/2024	10:48 AM	5
2/22/2024 11:30	51.4	0	NNW	337				5
2/22/2024 12:00	52.8	4	WNW	286				5
2/22/2024 12:30	54.1	1	WNW	284				5
2/22/2024 13:00	55.7	6	S	188				5
2/22/2024 13:30	56	0	NE	51				5
2/22/2024 14:00	56.7	2	NNE	24				5
2/22/2024 14:30	57.8	5	NNW	348				5
2/22/2024 15:00	58.4	5	WSW	255				5
2/22/2024 15:30	58.4	2	WSW	256				5
2/22/2024 16:00	57.6	2	WNW	294				5
2/22/2024 16:30	56.7	2	SW	232				5
2/22/2024 17:00	55.1	0	SW	232				5
2/22/2024 17:30	53.5	0	SW	232				5
2/22/2024 18:00	51.6	0	SW	232				5
2/22/2024 18:30	49.6	0	SW	232				5
2/22/2024 19:00	48	0	SW	232				5
2/22/2024 19:30	46.7	1	SW	232				5
2/22/2024 20:00	45.6	0	SW	232				5
2/22/2024 20:30	44.3	0	SW	232				5
2/22/2024 21:00	44	1	SW	232				5
2/22/2024 21:30	42.7	0	SW	232				5
2/22/2024 22:00	41.9	0	SW	232				5
2/22/2024 22:30	40.7	0	SW	232				5
2/22/2024 23:00	40.8	0	SW	232				5
2/22/2024 23:30	40.5	1	SW	232				5
2/24/2024 0:00	39.3	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 0:30	40.4	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 1:00	39.8	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 1:30	37.9	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 2:00	37.3	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 2:30	38	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 3:00	38.8	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 3:30	37.5	2	S	173	42	2/24/2024	(not specified)	7
2/24/2024 4:00	36.5	2	S	173	42	2/24/2024	(not specified)	7
2/24/2024 4:30	35.2	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 5:00	37.6	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 5:30	37.5	0	E	86	42	2/24/2024	(not specified)	7
2/24/2024 6:00	36	0	E	86	42	2/24/2024	(not specified)	7
2/24/2024 6:30	35.8	1	E	86	42	2/24/2024	(not specified)	7
2/24/2024 7:00	34.6	1	E	87	42	2/24/2024	(not specified)	7
2/24/2024 7:30	34.3	0	E	87	42	2/24/2024	(not specified)	7
2/24/2024 8:00	35.7	0	E	80	42	2/24/2024	(not specified)	7
2/24/2024 8:30	36.7	0	E	80	42	2/24/2024	(not specified)	7
2/24/2024 9:00	39.5	2	E	80	42	2/24/2024	(not specified)	7
2/24/2024 9:30	42	0	E	80	42	2/24/2024	(not specified)	7
2/24/2024 10:00	44.9	3	WNW	282	42	2/24/2024	(not specified)	7
2/24/2024 10:30	46.2	0	W	277	42	2/24/2024	(not specified)	7
2/24/2024 11:00	48.6	0	NW	308	42	2/24/2024	(not specified)	7
2/24/2024 11:30	50.2	4	NNE	13	42	2/24/2024	(not specified)	7
2/24/2024 12:00	51.7	3	NNW	330	42	2/24/2024	(not specified)	7
2/24/2024 12:30	52.6	3	NNW	339	42	2/24/2024	(not specified)	7
2/24/2024 13:00	53.9	3	NNE	32	41	2/24/2024	1:00 PM	7
2/24/2024 13:30	54.6	3	NNE	24	42	2/24/2024	(not specified)	7
2/24/2024 14:00	55.2	5	NNE	15	42	2/24/2024	(not specified)	7
2/24/2024 14:30	55.5	3	NNW	346	42	2/24/2024	(not specified)	7
2/24/2024 15:00	56.3	4	NNE	13	42	2/24/2024	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/24/2024 15:30	56.6	3	NNE	16	42	2/24/2024	(not specified)	7
2/24/2024 16:00	56.8	1	N	5	42	2/24/2024	(not specified)	7
2/24/2024 16:30	56.6	1	NNE	30	42	2/24/2024	(not specified)	7
2/24/2024 17:00	55.8	1	NE	38	42	2/24/2024	(not specified)	7
2/24/2024 17:30	53.8	1	NE	38	42	2/24/2024	(not specified)	7
2/24/2024 18:00	50.2	0	NE	38	42	2/24/2024	(not specified)	7
2/24/2024 18:30	48.8	0	NE	40	42	2/24/2024	(not specified)	7
2/24/2024 19:00	48	0	NE	51	42	2/24/2024	(not specified)	7
2/24/2024 19:30	47	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 20:00	46.1	1	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 20:30	45.6	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 21:00	45.6	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 21:30	45.4	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 22:00	44.7	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 22:30	44.1	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 23:00	44.2	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 23:30	44.4	0	ENE	69	42	2/24/2024	(not specified)	7
3/6/2024 0:00	32.2	0	WSW	259				4
3/6/2024 0:30	33.6	0	WSW	259				4
3/6/2024 1:00	32.1	0	WSW	259				4
3/6/2024 1:30	35.2	0	WSW	259				4
3/6/2024 2:00	34.5	0	SE	130				4
3/6/2024 2:30	32.7	0	SSE	147				4
3/6/2024 3:00	29.4	0	NNW	330				4
3/6/2024 3:30	28	0	NNW	329				4
3/6/2024 4:00	26.8	0	NNW	329				4
3/6/2024 4:30	27.5	0	NNW	329				4
3/6/2024 5:00	26.4	0	NE	55				4
3/6/2024 5:30	26.5	0	SSE	163				4
3/6/2024 6:00	26.7	0	SSE	163				4
3/6/2024 6:30	25.9	0	SSE	163				4
3/6/2024 7:00	26.5	0	SSE	163				4
3/6/2024 7:30	27.6	0	SSE	163	43	3/6/2024	7:30 AM	4
3/6/2024 8:00	28.5	0	SSE	163				4
3/6/2024 8:30	29.3	0	SSE	163				4
3/6/2024 9:00	31.3	0	SSE	163				4
3/6/2024 9:30	34.5	0	NW	326				4
3/6/2024 10:00	37.8	4	SW	232				4
3/6/2024 10:30	40.1	0	NNE	28				4
3/6/2024 11:00	41.6	0	WNW	297				4
3/6/2024 11:30	43.5	4	NE	39				4
3/6/2024 12:00	43.7	0	S	175				4
3/6/2024 12:30	44.5	3	NNE	24				4
3/6/2024 13:00	45.3	3	W	275				4
3/6/2024 13:30	46.7	3	NNW	338				4
3/6/2024 14:00	46.1	1	N	360				4
3/6/2024 14:30	45.9	10	NNE	30				4
3/6/2024 15:00	46.8	5	NNE	28				4
3/6/2024 15:30	45.4	1	NE	41				4
3/6/2024 16:00	46.4	2	NNE	20				4
3/6/2024 16:30	45.7	2	NE	40				4
3/6/2024 17:00	45.3	0	NNE	24				4
3/6/2024 17:30	46.4	0	NNE	22				4
3/6/2024 18:00	43.8	0	NNE	30				4
3/6/2024 18:30	41.6	0	NNE	30				4
3/6/2024 19:00	40.6	0	NNE	30				4
3/6/2024 19:30	39.5	0	NNE	30				4
3/6/2024 20:00	38.6	0	NNE	30				4
3/6/2024 20:30	38.2	0	NNE	29				4
3/6/2024 21:00	37	0	NNE	29				4
3/6/2024 21:30	35.5	0	NNE	29				4
3/6/2024 22:00	34	0	NNE	29				4
3/6/2024 22:30	33.2	0	NNE	29				4
3/6/2024 23:00	32.4	0	NNE	29				4
3/6/2024 23:30	31.9	0	NNE	29				4
3/8/2024 0:00	30.3	0	SSE	147				6
3/8/2024 0:30	31.4	0	SSE	147				6
3/8/2024 1:00	30.5	0	SSE	147				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
3/8/2024 1:30	29.8	0	SSE	147				6
3/8/2024 2:00	29.2	0	SSE	147				6
3/8/2024 2:30	28.7	0	SSE	147				6
3/8/2024 3:00	28.5	0	SSE	147				6
3/8/2024 3:30	28.9	0	SSE	147				6
3/8/2024 4:00	28.8	0	SSE	147				6
3/8/2024 4:30	29.4	0	SSE	147				6
3/8/2024 5:00	29.5	0	SSE	147				6
3/8/2024 5:30	29.1	0	SSE	147				6
3/8/2024 6:00	29.1	0	SSE	147				6
3/8/2024 6:30	29.4	0	SSE	147				6
3/8/2024 7:00	29.6	0	SSE	147				6
3/8/2024 7:30	30.8	0	SSE	147				6
3/8/2024 8:00	31.8	0	SSE	147				6
3/8/2024 8:30	33.2	0	SSE	147	44	3/8/2024	8:30 AM	6
3/8/2024 9:00	35.7	0	SSE	147				6
3/8/2024 9:30	38.4	0	SE	146				6
3/8/2024 10:00	41.6	0	ESE	119				6
3/8/2024 10:30	44	0	NNE	22				6
3/8/2024 11:00	46.2	0	NNE	34				6
3/8/2024 11:30	48.1	0	NNE	21				6
3/8/2024 12:00	49.9	2	NNE	23				6
3/8/2024 12:30	51.3	0	NNE	13				6
3/8/2024 13:00	52.9	1	NNE	25	45	3/8/2024	1:00 PM	6
3/8/2024 13:30	54.1	9	NNE	24				6
3/8/2024 14:00	55.3	3	NNE	28				6
3/8/2024 14:30	56.8	6	SSW	200				6
3/8/2024 15:00	58	0	SE	134				6
3/8/2024 15:30	58.7	0	S	178				6
3/8/2024 16:00	59.9	5	SSE	159				6
3/8/2024 16:30	59.7	0	S	172				6
3/8/2024 17:00	59	0	SE	140				6
3/8/2024 17:30	55.5	0	SE	140				6
3/8/2024 18:00	52.2	0	SE	140				6
3/8/2024 18:30	48.4	0	SE	140				6
3/8/2024 19:00	46.7	0	SE	140				6
3/8/2024 19:30	44.6	0	SE	140				6
3/8/2024 20:00	43.6	0	SE	140				6
3/8/2024 20:30	42.7	0	S	185				6
3/8/2024 21:00	41.8	0	SSE	163				6
3/8/2024 21:30	41.3	0	SSE	163				6
3/8/2024 22:00	41	0	S	186				6
3/8/2024 22:30	41	0	NW	320				6
3/8/2024 23:00	39.7	0	W	262				6
3/8/2024 23:30	39	0	W	276				6
3/12/2024 0:00	45.4	7	SSE	165				3
3/12/2024 0:30	45.3	14	SSW	207				3
3/12/2024 1:00	45.6	3	SSE	147				3
3/12/2024 1:30	45.3	6	S	185				3
3/12/2024 2:00	45.7	4	SSW	198				3
3/12/2024 2:30	45.7	5	SSE	163				3
3/12/2024 3:00	45.8	8	S	172				3
3/12/2024 3:30	45.7	7	S	174				3
3/12/2024 4:00	45.2	4	S	189				3
3/12/2024 4:30	44.8	4	SSW	198				3
3/12/2024 5:00	44.7	2	SSW	213				3
3/12/2024 5:30	45.3	3	SSW	206				3
3/12/2024 6:00	44.7	7	SSW	192				3
3/12/2024 6:30	44	3	S	187				3
3/12/2024 7:00	44	1	S	187				3
3/12/2024 7:30	43.9	6	S	177				3
3/12/2024 8:00	42.7	3	S	191				3
3/12/2024 8:30	42.8	4	SSW	196				3
3/12/2024 9:00	43.8	6	SW	227				3
3/12/2024 9:30	44.3	5	SSW	197				3
3/12/2024 10:00	44.8	5	S	191				3
3/12/2024 10:30	46.2	7	SSW	209				3
3/12/2024 11:00	46.2	7	SSW	209				3
3/12/2024 11:30	46.2	7	SSW	209				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
3/12/2024 12:00	48.4	11	SSW	197				3
3/12/2024 12:30	49.9	9	SW	234				3
3/12/2024 13:00	51	10	W	281				3
3/12/2024 13:30	51.9	9	SSW	198				3
3/12/2024 14:00	49.2	6	SW	221				3
3/12/2024 14:30	50.1	9	SSW	196	46	3/12/2024	2:30 PM	3
3/12/2024 15:00	50.3	8	SSW	194				3
3/12/2024 15:30	52.6	10	WSW	248				3
3/12/2024 16:00	51.9	10	SSW	192				3
3/12/2024 16:30	49.7	9	SSW	197				3
3/12/2024 17:00	49.4	10	SSW	206				3
3/12/2024 17:30	49.9	8	SW	232				3
3/12/2024 18:00	45	8	SW	231				3
3/12/2024 18:30	44.3	4	SSW	193				3
3/12/2024 19:00	43.6	0	SSW	192				3
3/12/2024 19:30	42	0	SSW	192				3
3/12/2024 20:00	40.3	0	SSW	192				3
3/12/2024 20:30	39.5	0	SSW	192				3
3/12/2024 21:00	39.1	0	SSW	210				3
3/12/2024 21:30	38.9	0	SSW	210				3
3/12/2024 22:00	40.3	0	SSW	210				3
3/12/2024 22:30	40.2	0	SSW	207				3
3/12/2024 23:00	39.9	0	SSW	207				3
3/12/2024 23:30	39.8	0	SSW	202				3
3/23/2024 0:00	45.9	0	S	180				7
3/23/2024 0:30	45.3	0	S	180				7
3/23/2024 1:00	44.8	0	S	180				7
3/23/2024 1:30	45	1	S	180				7
3/23/2024 2:00	45.3	0	S	180				7
3/23/2024 2:30	44.7	0	S	180				7
3/23/2024 3:00	45	0	NNE	34				7
3/23/2024 3:30	45.1	0	SE	132				7
3/23/2024 4:00	44.6	0	ESE	115				7
3/23/2024 4:30	43.6	2	ENE	57				7
3/23/2024 5:00	43.3	2	NE	44				7
3/23/2024 5:30	43.3	0	NE	38				7
3/23/2024 6:00	43.4	0	NE	38				7
3/23/2024 6:30	42.9	0	NE	37				7
3/23/2024 7:00	42.7	1	NE	37				7
3/23/2024 7:30	44	0	NE	37				7
3/23/2024 8:00	44.7	0	NE	40	47	3/23/2024	8:00 AM	7
3/23/2024 8:30	45.3	6	SSW	194				7
3/23/2024 9:00	46.4	6	SW	219				7
3/23/2024 9:30	47.9	4	SW	236				7
3/23/2024 10:00	47.9	4	SW	220				7
3/23/2024 10:30	47.4	4	SSE	166				7
3/23/2024 11:00	48	2	SSE	161				7
3/23/2024 11:30	48.6	4	SW	223				7
3/23/2024 12:00	48.7	4	SSW	195				7
3/23/2024 12:30	50.3	2	SE	144				7
3/23/2024 13:00	50.3	2	SSE	169				7
3/23/2024 13:30	50.5	9	S	188				7
3/23/2024 14:00	50.7	11	S	177				7
3/23/2024 14:30	50.3	3	S	176				7
3/23/2024 15:00	50.3	4	SSE	161				7
3/23/2024 15:30	50.1	2	S	173				7
3/23/2024 16:00	51	1	SSE	157				7
3/23/2024 16:30	52.2	6	SSE	164				7
3/23/2024 17:00	49.7	0	SSW	207				7
3/23/2024 17:30	50.3	0	SSW	195				7
3/23/2024 18:00	52.1	0	S	178				7
3/23/2024 18:30	50.5	0	SSE	168				7
3/23/2024 19:00	50.2	0	SSE	168				7
3/23/2024 19:30	49	0	SSE	168				7
3/23/2024 20:00	47.9	0	SSE	168				7
3/23/2024 20:30	47.1	1	SSE	168				7
3/23/2024 21:00	46.5	0	SSE	168				7
3/23/2024 21:30	45.2	0	SSE	168				7
3/23/2024 22:00	44.2	0	SSE	168				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
3/23/2024 22:30	42.9	0	SSE	168				7
3/23/2024 23:00	42.1	0	SSE	168				7
3/23/2024 23:30	41.7	0	SSE	168				7
4/1/2024 0:00	44.9	0	SSW	213				2
4/1/2024 0:30	44.6	0	SSW	213				2
4/1/2024 1:00	44.8	0	SSW	213				2
4/1/2024 1:30	44.1	0	SSW	213				2
4/1/2024 2:00	41.8	0	SSW	213				2
4/1/2024 2:30	40.7	0	SSW	213				2
4/1/2024 3:00	41	0	SSW	213				2
4/1/2024 3:30	41.3	0	SSW	213				2
4/1/2024 4:00	40	1	SSW	213				2
4/1/2024 4:30	40.2	0	SSW	213				2
4/1/2024 5:00	37.9	0	SSW	212				2
4/1/2024 5:30	37.4	0	SSW	212				2
4/1/2024 6:00	38.7	0	SSW	212				2
4/1/2024 6:30	37.2	0	SSW	212				2
4/1/2024 7:00	36.7	0	SSW	212				2
4/1/2024 7:30	37	0	SSW	212				2
4/1/2024 8:00	37.9	0	SSW	213	48	4/1/2024	8:00 AM	2
4/1/2024 8:30	39.8	0	SSW	213				2
4/1/2024 9:00	42.3	0	SSW	213	49	4/1/2024	9:00 AM	2
4/1/2024 9:30	43.9	0	SSW	213				2
4/1/2024 10:00	46.8	0	SSW	213				2
4/1/2024 10:30	52.2	2	N	9				2
4/1/2024 11:00	56	0	NNE	22				2
4/1/2024 11:30	58.1	0	S	183				2
4/1/2024 12:00	58.8	0	S	180				2
4/1/2024 12:30	60.6	2	SSE	168				2
4/1/2024 13:00	62.2	2	SSE	150				2
4/1/2024 13:30	63.8	1	ENE	59				2
4/1/2024 14:00	64.6	3	NNE	29				2
4/1/2024 14:30	65.8	4	N	5				2
4/1/2024 15:00	66.8	0	NNE	29				2
4/1/2024 15:30	68.1	3	NNE	23				2
4/1/2024 16:00	68.6	5	NNE	23				2
4/1/2024 16:30	69.1	4	NNE	22				2
4/1/2024 17:00	69.6	0	SSE	163				2
4/1/2024 17:30	69.3	2	NNE	18				2
4/1/2024 18:00	70.1	1	NNE	17				2
4/1/2024 18:30	69.2	0	NNE	17				2
4/1/2024 19:00	67.8	0	NNE	17				2
4/1/2024 19:30	64.7	0	NNE	17				2
4/1/2024 20:00	59.6	0	NNE	17				2
4/1/2024 20:30	57.2	0	NNE	17				2
4/1/2024 21:00	56.1	0	NNE	17				2
4/1/2024 21:30	55	0	ESE	111				2
4/1/2024 22:00	52.2	0	ESE	111				2
4/1/2024 22:30	50.9	0	ESE	111				2
4/1/2024 23:00	51	1	ESE	111				2
4/1/2024 23:30	50.9	0	SE	126	50	4/1/2024	11:30 PM	2
4/2/2024 0:00	50.3	0	SE	144				3
4/2/2024 0:30	48.5	0	SSW	192				3
4/2/2024 1:00	47.1	0	NW	306				3
4/2/2024 1:30	46.7	0	NW	306				3
4/2/2024 2:00	46.7	0	NW	306				3
4/2/2024 2:30	45.8	0	NW	306				3
4/2/2024 3:00	44.8	0	NW	306				3
4/2/2024 3:30	44	0	NW	306				3
4/2/2024 4:00	45	0	NW	306				3
4/2/2024 4:30	44.1	0	NW	306				3
4/2/2024 5:00	43.4	0	NW	306				3
4/2/2024 5:30	43.7	0	NW	306				3
4/2/2024 6:00	41.5	0	NW	306				3
4/2/2024 6:30	41.4	0	NW	306				3
4/2/2024 7:00	42	0	NW	306				3
4/2/2024 7:30	40.7	0	NW	306				3
4/2/2024 8:00	42.4	0	NW	306				3
4/2/2024 8:30	45.8	0	NW	306				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
4/2/2024 9:00	48	1	NNE	21				3
4/2/2024 9:30	50.2	2	NNE	23				3
4/2/2024 10:00	52.6	0	N	360				3
4/2/2024 10:30	57.4	1	NW	321				3
4/2/2024 11:00	61.3	2	SSE	165				3
4/2/2024 11:30	64.1	0	S	171				3
4/2/2024 12:00	65.8	1	S	182				3
4/12/2024 0:00	46.7	0	SSW	196				6
4/12/2024 0:30	46.6	0	SSW	196				6
4/12/2024 1:00	46.5	0	SSW	196				6
4/12/2024 1:30	46.3	0	SSW	196				6
4/12/2024 2:00	46.2	0	SSW	196				6
4/12/2024 2:30	46.2	0	SSW	196				6
4/12/2024 3:00	46.2	0	WNW	282				6
4/12/2024 3:30	46.2	0	WNW	282				6
4/12/2024 4:00	46.1	0	WNW	282				6
4/12/2024 4:30	46	0	WNW	282				6
4/12/2024 5:00	46.3	0	WNW	282				6
4/12/2024 5:30	46.3	0	WNW	282				6
4/12/2024 6:00	46.4	0	NNE	31				6
4/12/2024 6:30	46.2	1	NNE	34				6
4/12/2024 7:00	46.3	0	NNE	34	51	4/12/2024	7:00 AM	6
4/12/2024 7:30	46.6	0	W	268				6
4/12/2024 8:00	46.7	1	W	265				6
4/12/2024 8:30	46.8	3	WSW	248				6
4/12/2024 9:00	47.3	4	W	267				6
4/12/2024 9:30	48.7	0	NE	36				6
4/12/2024 10:00	50.1	1	ENE	65				6
4/12/2024 10:30	50.1	0	SW	215				6
4/12/2024 11:00	52.1	1	SSW	198				6
4/12/2024 11:30	53.9	1	S	179				6
4/12/2024 12:00	54.9	0	W	262				6
4/12/2024 12:30	56	0	SSE	166				6
4/12/2024 13:00	56.8	7	SW	217				6
4/12/2024 13:30	56.9	2	WSW	249				6
4/12/2024 14:00	58.6	4	SSW	212				6
4/12/2024 14:30	59.6	0	SE	128				6
4/12/2024 15:00	61.3	2	NNE	32				6
4/12/2024 15:30	60.7	0	N	11				6
4/12/2024 16:00	62.8	5	NW	312				6
4/12/2024 16:30	62.9	0	ENE	78				6
4/12/2024 17:00	62.9	1	WSW	257				6
4/12/2024 17:30	62.3	1	WSW	241				6
4/12/2024 18:00	62.4	0	SW	234				6
4/12/2024 18:30	62.2	0	WSW	237				6
4/12/2024 19:00	61.4	0	WSW	240				6
4/12/2024 19:30	60.9	0	WSW	240				6
4/12/2024 20:00	59.8	0	WSW	240				6
4/12/2024 20:30	58.4	0	WSW	240				6
4/12/2024 21:00	57.6	0	WSW	240				6
4/12/2024 21:30	56.6	0	WSW	240				6
4/12/2024 22:00	56.3	0	WSW	240				6
4/12/2024 22:30	58.3	0	WSW	240				6
4/12/2024 23:00	57.8	0	WSW	240				6
4/12/2024 23:30	58	0	ESE	115				6
5/2/2024 0:00	45.1	0	WSW	240				5
5/2/2024 0:30	44.7	0	SW	215				5
5/2/2024 1:00	44.7	0	NNW	327				5
5/2/2024 1:30	44.6	0	NNW	336				5
5/2/2024 2:00	44.9	0	W	281				5
5/2/2024 2:30	45.3	2	NNE	17				5
5/2/2024 3:00	45.7	0	NNE	20				5
5/2/2024 3:30	46	0	NNE	20				5
5/2/2024 4:00	46.1	1	NNE	19				5
5/2/2024 4:30	46.2	0	NNE	19				5
5/2/2024 5:00	45.9	1	NNE	26				5
5/2/2024 5:30	45.6	0	NE	38				5
5/2/2024 6:00	45.4	2	N	10				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
5/2/2024 6:30	45.4	0	NNE	34				5
5/2/2024 7:00	45.2	2	W	264				5
5/2/2024 7:30	45.2	0	W	263				5
5/2/2024 8:00	45.4	1	W	264				5
5/2/2024 8:30	45.6	1	WSW	252				5
5/2/2024 9:00	46.1	0	WSW	252				5
5/2/2024 9:30	46.4	0	WSW	252				5
5/2/2024 10:00	46.2	6	W	262				5
5/2/2024 10:30	46.7	1	WSW	249				5
5/2/2024 11:00	47.8	2	WSW	250				5
5/2/2024 11:30	48.9	0	WSW	255				5
5/2/2024 12:00	49.2	0	W	263				5
5/2/2024 12:30	51.1	3	NNW	341				5
5/2/2024 13:00	53.3	2	W	268				5
5/2/2024 13:30	56.4	4	NNE	13				5
5/2/2024 14:00	55.1	0	N	11				5
5/2/2024 14:30	53.7	1	ENE	68				5
5/2/2024 15:00	53.7	0	ENE	69				5
5/2/2024 15:30	53.7	0	ENE	69				5
5/2/2024 16:00	53.7	0	ENE	69				5
5/2/2024 16:30	53.7	0	ENE	69				5
5/2/2024 17:00	53.7	0	ENE	69				5
5/2/2024 17:30	53.7	0	ENE	69				5
5/2/2024 18:00	53.7	0	ENE	69				5
5/2/2024 18:30	53.7	0	ENE	69				5
5/2/2024 19:00	53.7	0	ENE	69	52	5/2/2024	7:00 PM	5
5/2/2024 19:30	53.7	0	ENE	69				5
5/2/2024 20:00	53.7	0	ENE	69				5
5/2/2024 20:30	53.7	0	ENE	69				5
5/2/2024 21:00	53.7	0	ENE	69				5
5/2/2024 21:30	53.7	0	ENE	69				5
5/2/2024 22:00	53.7	0	ENE	69				5
5/2/2024 22:30	53.7	0	ENE	69				5
5/2/2024 23:00	53.7	0	ENE	69				5
5/2/2024 23:30	53.7	0	ENE	69				5
5/23/2024 0:00	50	0	S	184				5
5/23/2024 0:30	48.4	0	SSE	167				5
5/23/2024 1:00	46.2	0	SSE	167				5
5/23/2024 1:30	45.4	0	SSE	167				5
5/23/2024 2:00	43.2	1	SSE	167				5
5/23/2024 2:30	42.5	0	SSE	167				5
5/23/2024 3:00	42.2	0	S	184				5
5/23/2024 3:30	42.7	0	S	184				5
5/23/2024 4:00	44	0	S	184				5
5/23/2024 4:30	43.9	0	S	184				5
5/23/2024 5:00	43.2	0	S	184				5
5/23/2024 5:30	42.1	0	S	184				5
5/23/2024 6:00	40.3	0	S	184				5
5/23/2024 6:30	41.1	0	S	185				5
5/23/2024 7:00	42.1	0	S	185				5
5/23/2024 7:30	45.7	4	NNE	24	53	5/23/2024	7:30 AM	5
5/23/2024 8:00	47.9	3	NNE	13	54	5/23/2024	7:50 AM	5
5/23/2024 8:30	50.1	0	NNE	13				5
5/23/2024 9:00	53.9	2	NNE	22				5
5/23/2024 9:30	56	3	NNE	24	55	5/23/2024	9:30 AM	5
5/23/2024 10:00	56.3	0	NNE	22				5
5/23/2024 10:30	55.5	4	SSW	201				5
5/23/2024 11:00	56	3	SSW	199				5
5/23/2024 11:30	57.7	1	SSW	203				5
5/23/2024 12:00	60.1	5	N	11				5
5/23/2024 12:30	59.9	0	E	90				5
5/23/2024 13:00	60.5	6	NE	35				5
5/23/2024 13:30	62	2	ENE	79				5
5/23/2024 14:00	61.7	2	NE	46				5
5/23/2024 14:30	63.3	1	WSW	238				5
5/23/2024 15:00	62.9	5	NNW	345				5
5/23/2024 15:30	63.2	6	NNE	34				5
5/23/2024 16:00	64.4	0	NE	45				5
5/23/2024 16:30	64.6	1	ENE	74				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
5/23/2024 17:00	64.4	5	NE	39				5
5/23/2024 17:30	64.2	5	NE	37				5
5/23/2024 18:00	64.2	10	NE	36	56	5/23/2024	6:00 PM	5
5/23/2024 18:30	63.6	7	NE	38				5
5/23/2024 19:00	63.6	6	NE	51				5
5/23/2024 19:30	62.9	8	NNE	31				5
5/23/2024 20:00	60.9	3	N	355				5
5/23/2024 20:30	59.2	3	N	5				5
5/23/2024 21:00	57.4	0	N	5				5
5/23/2024 21:30	52.1	0	N	5				5
5/23/2024 22:00	50.1	0	N	5				5
5/23/2024 22:30	48.7	0	N	5				5
5/23/2024 23:00	48.2	0	N	5				5
5/23/2024 23:30	47.4	0	N	5				5
7/11/2024 0:00	69.9	6	W	273				5
7/11/2024 0:30	69	0	WSW	252				5
7/11/2024 1:00	67.8	0	NNW	346				5
7/11/2024 1:30	67.2	1	NNW	340				5
7/11/2024 2:00	60.2	1	NW	322				5
7/11/2024 2:30	56.1	2	NW	315				5
7/11/2024 3:00	54.7	2	WNW	300				5
7/11/2024 3:30	54.4	3	WNW	282				5
7/11/2024 4:00	53.3	3	WNW	282				5
7/11/2024 4:30	53.2	1	WNW	282				5
7/11/2024 5:00	52.4	1	WNW	282				5
7/11/2024 5:30	52.1	0	WNW	282				5
7/11/2024 6:00	51	2	WNW	282				5
7/11/2024 6:30	52.6	1	W	281				5
7/11/2024 7:00	53.7	2	W	281				5
7/11/2024 7:30	55.9	2	W	264				5
7/11/2024 8:00	61.5	6	W	269				5
7/11/2024 8:30	63.7	3	WSW	259				5
7/11/2024 9:00	66.9	4	NW	314				5
7/11/2024 9:30	68.3	4	WNW	294				5
7/11/2024 10:00	70.7	2	NNW	342				5
7/11/2024 10:30	72.5	1	NNW	341				5
7/11/2024 11:00	73.5	4	WNW	302				5
7/11/2024 11:30	76	2	NNE	24				5
7/11/2024 12:00	77.5	8	W	270				5
7/11/2024 12:30	78.8	3	SW	225				5
7/11/2024 13:00	80.9	5	N	351				5
7/11/2024 13:30	81.2	6	SW	221				5
7/11/2024 14:00	82.9	5	NNE	17				5
7/11/2024 14:30	83.4	3	W	262				5
7/11/2024 15:00	84	2	W	280				5
7/11/2024 15:30	85.9	9	NNE	28				5
7/11/2024 16:00	86	4	ENE	76				5
7/11/2024 16:30	86.2	4	NNE	28				5
7/11/2024 17:00	86.5	12	NE	40				5
7/11/2024 17:30	86.6	3	NE	56				5
7/11/2024 18:00	85.8	3	N	5				5
7/11/2024 18:30	85.4	10	ENE	59				5
7/11/2024 19:00	85.1	7	WNW	285				5
7/11/2024 19:30	83.5	2	WNW	301				5
7/11/2024 20:00	81	2	SW	234				5
7/11/2024 20:30	78.1	1	S	191				5
7/11/2024 21:00	75.6	5	NW	314				5
7/11/2024 21:30	73.4	5	NE	37				5
7/11/2024 22:00	70.5	0	NNW	327				5
7/11/2024 22:30	68.7	6	N	5				5
7/11/2024 23:00	65.9	2	NW	315				5
7/11/2024 23:30	62.2	1	NW	311				5
7/12/2024 0:00	60.4	3	WSW	257	57	7/12/2024	12:06 AM	6
7/12/2024 0:30	58.9	3	WSW	257				6
7/12/2024 1:00	57.6	4	SSE	165				6
7/12/2024 1:30	56.9	4	SSE	165				6
7/12/2024 2:00	56.6	5	SSE	164				6
7/12/2024 2:30	55.8	3	SSE	153				6
7/12/2024 3:00	52.3	3	SSE	153				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/12/2024 3:30	53	3	SSE	153				6
7/12/2024 4:00	51.8	3	SSE	153				6
7/12/2024 4:30	51.8	3	SSE	153				6
7/12/2024 5:00	50.8	2	SSE	153				6
7/12/2024 5:30	50.3	1	SSE	153				6
7/12/2024 6:00	51	4	SSE	159				6
7/12/2024 6:30	51.2	5	SSE	161				6
7/12/2024 7:00	52	2	SSE	163				6
7/12/2024 7:30	54.5	4	NW	321				6
7/12/2024 8:00	58.1	4	NW	317				6
7/12/2024 8:30	60	3	WNW	299				6
7/12/2024 9:00	62.2	4	WSW	259				6
7/12/2024 9:30	64.6	5	W	300				6
7/12/2024 10:00	66.7	3	W	271				6
7/12/2024 10:30	69.1	5	N	350				6
7/12/2024 11:00	71	7	W	275				6
7/12/2024 11:30	73.4	5	SW	235				6
7/12/2024 12:00	75.4	6	ENE	57				6
7/24/2024 0:00	60.2	2	SSW	199				4
7/24/2024 0:30	57.6	2	SSW	199				4
7/24/2024 1:00	56.3	1	SSE	163				4
7/24/2024 1:30	55.7	1	SSE	163				4
7/24/2024 2:00	53.3	0	SW	231				4
7/24/2024 2:30	52.6	2	S	188				4
7/24/2024 3:00	52.9	0	S	188				4
7/24/2024 3:30	52.2	1	S	188				4
7/24/2024 4:00	51.6	2	S	188				4
7/24/2024 4:30	50.3	0	SSW	194				4
7/24/2024 5:00	50.2	1	SSW	194				4
7/24/2024 5:30	50.3	1	SSW	194				4
7/24/2024 6:00	48.8	2	SSW	194				4
7/24/2024 6:30	49.6	2	SSW	194				4
7/24/2024 7:00	50.3	2	SSW	194				4
7/24/2024 7:30	53.3	3	SSW	194				4
7/24/2024 8:00	57	1	SSW	194				4
7/24/2024 8:30	62.9	1	SSW	195				4
7/24/2024 9:00	64.5	3	W	267				4
7/24/2024 9:30	67.1	2	WSW	244				4
7/24/2024 10:00	68.8	2	WNW	298				4
7/24/2024 10:30	70.2	5	WSW	238				4
7/24/2024 11:00	71.8	5	WNW	296				4
7/24/2024 11:30	74.3	4	NNE	12				4
7/24/2024 12:00	75.7	1	WNW	301				4
7/24/2024 12:30	77.8	4	NW	306				4
7/24/2024 13:00	78.3	6	S	175	58	7/24/2024	1:00 PM	4
7/24/2024 13:30	80	2	NNW	329				4
7/24/2024 14:00	81.2	4	NE	40				4
7/24/2024 14:30	82	8	NNE	16				4
7/24/2024 15:00	82.1	9	WNW	290				4
7/24/2024 15:30	82.3	2	SSW	202				4
7/24/2024 16:00	81.6	6	SSW	194				4
7/24/2024 16:30	81.8	5	WSW	254				4
7/24/2024 17:00	81.2	8	WSW	242				4
7/24/2024 17:30	79.2	5	SSW	209				4
7/24/2024 18:00	77.6	7	W	279				4
7/24/2024 18:30	74.1	5	WSW	254				4
7/24/2024 19:00	72.9	14	WSW	248				4
7/24/2024 19:30	71.2	6	WSW	238				4
7/24/2024 20:00	70.2	3	SW	226				4
7/24/2024 20:30	66.9	4	SW	223				4
7/24/2024 21:00	65.1	1	SW	234				4
7/24/2024 21:30	62.8	3	SW	227				4
7/24/2024 22:00	61.3	2	SW	227				4
7/24/2024 22:30	60	2	SW	222				4
7/24/2024 23:00	58.8	1	SW	221				4
7/24/2024 23:30	57.5	0	SW	221				4
7/30/2024 0:00	63	0	SW	229				3
7/30/2024 0:30	63.2	0	SW	229				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/30/2024 1:00	62.8	3	SW	229				3
7/30/2024 1:30	62.7	2	SW	229				3
7/30/2024 2:00	62.4	3	SW	227				3
7/30/2024 2:30	62.5	0	SW	227				3
7/30/2024 3:00	62.3	0	SW	227				3
7/30/2024 3:30	62.1	0	SW	227				3
7/30/2024 4:00	62	0	SW	227				3
7/30/2024 4:30	61.4	0	SW	227				3
7/30/2024 5:00	61	0	SW	227				3
7/30/2024 5:30	60.8	0	SW	227				3
7/30/2024 6:00	61.2	0	SW	227				3
7/30/2024 6:30	60.8	0	SW	227				3
7/30/2024 7:00	61.4	0	SW	227				3
7/30/2024 7:30	61.7	0	SW	227				3
7/30/2024 8:00	62.5	0	SW	227				3
7/30/2024 8:30	64.1	0	SW	227				3
7/30/2024 9:00	65.2	0	SW	227				3
7/30/2024 9:30	67.6	0	S	180				3
7/30/2024 10:00	67.4	5	S	189				3
7/30/2024 10:30	68.3	0	SW	225				3
7/30/2024 11:00	69.7	4	SSW	211				3
7/30/2024 11:30	70.6	4	SW	216				3
7/30/2024 12:00	70.6	1	SSW	194				3
7/30/2024 12:30	71.7	5	SSW	212				3
7/30/2024 13:00	72.8	5	SSW	201				3
7/30/2024 13:30	73.3	4	SSW	205				3
7/30/2024 14:00	74.2	3	SSW	211				3
7/30/2024 14:30	75.4	6	S	181				3
7/30/2024 15:00	75.8	4	NE	41				3
7/30/2024 15:30	75.7	2	SW	231				3
7/30/2024 16:00	77.9	3	WSW	257				3
7/30/2024 16:30	78.4	5	SW	234				3
7/30/2024 17:00	78.1	3	SSW	214				3
7/30/2024 17:30	78.4	6	SW	223	59	7/30/2024	5:30 PM	3
7/30/2024 18:00	78.3	2	WSW	242				3
7/30/2024 18:30	78.2	4	WSW	250				3
7/30/2024 19:00	76.9	4	WSW	241				3
7/30/2024 19:30	75.8	4	WSW	250				3
7/30/2024 20:00	73.1	2	SSW	200				3
7/30/2024 20:30	70	2	S	190				3
7/30/2024 21:00	67.8	3	SSW	193				3
7/30/2024 21:30	66.5	4	SSW	193				3
7/30/2024 22:00	65.6	0	SSW	194				3
7/30/2024 22:30	64.9	2	SSW	194				3
7/30/2024 23:00	64.1	0	SSW	194				3
7/30/2024 23:30	63.6	2	SSW	194				3
8/4/2024 0:00	62.3	1	S	184				1
8/4/2024 0:30	62.6	2	S	184				1
8/4/2024 1:00	62.1	3	S	182				1
8/4/2024 1:30	58.7	1	S	182				1
8/4/2024 2:00	58.2	0	S	182				1
8/4/2024 2:30	57	0	S	182				1
8/4/2024 3:00	56.2	1	S	182				1
8/4/2024 3:30	55.9	0	S	182				1
8/4/2024 4:00	56	0	S	182				1
8/4/2024 4:30	55.2	0	S	182				1
8/4/2024 5:00	54.2	0	S	182				1
8/4/2024 5:30	53.7	1	S	182				1
8/4/2024 6:00	53	0	S	182				1
8/4/2024 6:30	52.8	0	S	182				1
8/4/2024 7:00	54	0	S	182				1
8/4/2024 7:30	55.8	0	S	182				1
8/4/2024 8:00	57.3	0	S	182				1
8/4/2024 8:30	59.4	0	S	182	60	8/4/2024	8:30 AM	1
8/4/2024 9:00	64.1	1	S	178				1
8/4/2024 9:30	68.4	0	N	9				1
8/4/2024 10:00	71.6	5	N	360				1
8/4/2024 10:30	73.3	3	W	278				1
8/4/2024 11:00	75.3	2	WSW	248				1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/4/2024 11:30	78.2	2	N	9				1
8/4/2024 12:00	79.7	4	WSW	258				1
8/4/2024 12:30	81.8	4	SE	136				1
8/4/2024 13:00	83.8	3	WSW	254				1
8/4/2024 13:30	85.9	4	ESE	121				1
8/4/2024 14:00	87.8	3	NNW	327				1
8/4/2024 14:30	88.9	4	WNW	289				1
8/4/2024 15:00	89.7	5	SSW	205				1
8/4/2024 15:30	90.9	5	NW	321				1
8/4/2024 16:00	91.4	3	WNW	282				1
8/4/2024 16:30	91.6	2	NW	315				1
8/4/2024 17:00	92.1	3	WSW	238				1
8/4/2024 17:30	91.9	3	W	263				1
8/4/2024 18:00	90.6	4	SW	236				1
8/4/2024 18:30	89.8	4	WSW	247				1
8/4/2024 19:00	86.7	4	SSW	195				1
8/4/2024 19:30	82.5	6	SSW	196				1
8/4/2024 20:00	78.1	6	SW	227				1
8/4/2024 20:30	74.4	7	SSW	202				1
8/4/2024 21:00	71.7	7	SSW	210				1
8/4/2024 21:30	69.9	3	SSW	199				1
8/4/2024 22:00	68.2	10	SSW	192				1
8/4/2024 22:30	66.8	4	SSW	200				1
8/4/2024 23:00	66	5	SSW	204				1
8/4/2024 23:30	64.4	3	SSW	207				1
8/8/2024 0:00	64.7	3	SSW	208				5
8/8/2024 0:30	63.5	0	SSW	208				5
8/8/2024 1:00	61.5	1	SSW	208				5
8/8/2024 1:30	60.2	3	SSW	208				5
8/8/2024 2:00	61	2	SSW	208				5
8/8/2024 2:30	59.8	2	SSW	208				5
8/8/2024 3:00	58.6	2	SSW	208				5
8/8/2024 3:30	57.2	2	WSW	245				5
8/8/2024 4:00	57.5	2	WSW	245				5
8/8/2024 4:30	56.8	3	WSW	245				5
8/8/2024 5:00	55.8	1	WSW	245				5
8/8/2024 5:30	56.2	0	WSW	245				5
8/8/2024 6:00	55.6	2	WSW	245				5
8/8/2024 6:30	55.2	2	WSW	245				5
8/8/2024 7:00	55.7	2	WSW	245				5
8/8/2024 7:30	58.6	0	WSW	245	61	8/8/2024	7:40 AM	5
8/8/2024 8:00	61	0	WSW	245	62	8/8/2024	7:45 AM	5
8/8/2024 8:30	62.3	0	WSW	245				5
8/8/2024 9:00	67.8	3	WSW	258				5
8/8/2024 9:30	72	3	NW	307				5
8/8/2024 10:00	73.6	1	NNW	331				5
8/8/2024 10:30	76.1	3	WSW	240				5
8/8/2024 11:00	79	2	SW	227				5
8/8/2024 11:30	80.3	3	NW	310				5
8/8/2024 12:00	81.8	3	WNW	302				5
8/8/2024 12:30	82.4	1	NW	313				5
8/8/2024 13:00	83.7	4	S	182				5
8/8/2024 13:30	85.4	3	SW	229				5
8/8/2024 14:00	86.3	4	WSW	255				5
8/8/2024 14:30	87.9	4	NNE	17				5
8/8/2024 15:00	89.4	3	SW	223				5
8/8/2024 15:30	90.5	6	NW	311				5
8/8/2024 16:00	90.9	4	W	261				5
8/8/2024 16:30	91.6	2	NW	309				5
8/8/2024 17:00	91.8	7	SW	223				5
8/8/2024 17:30	90.1	4	SW	230				5
8/8/2024 18:00	87.3	6	SSW	198				5
8/8/2024 18:30	84.3	7	SSW	209				5
8/8/2024 19:00	81.6	7	S	183				5
8/8/2024 19:30	78.6	6	SSW	202				5
8/8/2024 20:00	75.5	7	SW	217				5
8/8/2024 20:30	72.3	6	SSW	207				5
8/8/2024 21:00	70.2	5	SSW	208				5
8/8/2024 21:30	68.7	4	SW	225				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/8/2024 22:00	66.9	3	SW	219				5
8/8/2024 22:30	65.5	4	SW	221				5
8/8/2024 23:00	64.7	0	SW	221				5
8/8/2024 23:30	63.1	2	SW	215				5
8/9/2024 0:00	61.9	1	SW	215				6
8/9/2024 0:30	61.6	2	SW	218				6
8/9/2024 1:00	60.2	0	SW	218				6
8/9/2024 1:30	60	1	SW	218				6
8/9/2024 2:00	59.5	2	SW	218				6
8/9/2024 2:30	58.1	0	SW	218				6
8/9/2024 3:00	56.9	0	SW	218				6
8/9/2024 3:30	57.9	2	SW	218				6
8/9/2024 4:00	56.4	0	SW	218				6
8/9/2024 4:30	55.4	0	SW	218				6
8/9/2024 5:00	54.7	0	SW	218				6
8/9/2024 5:30	54.2	0	SW	218				6
8/9/2024 6:00	53.4	0	SW	218				6
8/9/2024 6:30	53.1	0	SW	218				6
8/9/2024 7:00	53.7	0	SW	218				6
8/9/2024 7:30	54.8	0	SW	218				6
8/9/2024 8:00	56.5	0	SW	218				6
8/9/2024 8:30	58.5	0	SW	218				6
8/9/2024 9:00	62.5	0	SW	218				6
8/9/2024 9:30	66.8	1	SW	218				6
8/9/2024 10:00	69.1	1	NE	36				6
8/9/2024 10:30	70.9	2	N	360				6
8/9/2024 11:00	73.8	5	NNE	24				6
8/9/2024 11:30	76.8	7	N	10				6
8/9/2024 12:00	78.5	2	NE	43				6
8/9/2024 12:30	80.1	4	WSW	244				6
8/9/2024 13:00	80.9	7	WSW	257				6
8/9/2024 13:30	83.3	5	WSW	246				6
8/9/2024 14:00	84.8	0	NNE	31				6
8/9/2024 14:30	86.2	2	NNE	30				6
8/9/2024 15:00	86.5	2	WNW	304	63	8/9/2024	3:15 PM	6
8/9/2024 15:30	87.5	2	NE	35				6
8/9/2024 16:00	88.7	3	SW	227				6
8/9/2024 16:30	88.8	3	NW	326				6
8/9/2024 17:00	88.4	3	WSW	248				6
8/9/2024 17:30	86.1	7	S	184				6
8/9/2024 18:00	83.4	10	SW	224	64	8/9/2024	5:53 PM	6
8/9/2024 18:30	82	7	S	189				6
8/9/2024 19:00	80	4	SSW	210				6
8/9/2024 19:30	77.5	10	SSW	212				6
8/9/2024 20:00	74.4	5	S	182				6
8/9/2024 20:30	71.3	6	S	178				6
8/9/2024 21:00	68.8	5	SSW	207				6
8/9/2024 21:30	67.2	8	SSW	205				6
8/9/2024 22:00	65.9	2	SSW	200				6
8/9/2024 22:30	64.8	4	SSW	205				6
8/9/2024 23:00	63.8	2	SSW	200				6
8/9/2024 23:30	62.8	1	SSW	200				6
8/18/2024 0:00	59.1	3	S	188				1
8/18/2024 0:30	58.6	2	S	188				1
8/18/2024 1:00	57.9	0	S	188				1
8/18/2024 1:30	58.4	1	S	188				1
8/18/2024 2:00	58.5	1	S	188				1
8/18/2024 2:30	58.9	0	S	188				1
8/18/2024 3:00	58.9	0	S	188				1
8/18/2024 3:30	58.4	2	S	188				1
8/18/2024 4:00	58.1	0	S	188				1
8/18/2024 4:30	59	4	S	188				1
8/18/2024 5:00	58.5	0	S	188				1
8/18/2024 5:30	58	0	S	188				1
8/18/2024 6:00	58.4	0	S	188				1
8/18/2024 6:30	58.1	2	S	188				1
8/18/2024 7:00	56.4	0	S	188				1
8/18/2024 7:30	57.8	0	S	188	65	8/18/2024	7:30 AM	1
8/18/2024 8:00	58.9	0	S	188				1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/18/2024 8:30	59.2	0	S	188				1
8/18/2024 9:00	58.9	1	S	188				1
8/18/2024 9:30	59.6	2	S	179				1
8/18/2024 10:00	60.2	1	WSW	248				1
8/18/2024 10:30	61	2	WSW	246				1
8/18/2024 11:00	62.4	3	WSW	243				1
8/18/2024 11:30	63.8	3	SSW	192				1
8/18/2024 12:00	67.9	10	WSW	244				1
8/18/2024 12:30	70.1	7	SW	217				1
8/18/2024 13:00	71.2	6	SSW	213				1
8/18/2024 13:30	71.6	8	SSW	199				1
8/18/2024 14:00	73.2	6	WSW	239				1
8/18/2024 14:30	73.6	2	SSW	196				1
8/18/2024 15:00	73.8	5	SSW	206				1
8/18/2024 15:30	74.5	3	SW	223				1
8/18/2024 16:00	74.9	4	SW	229				1
8/18/2024 16:30	74.3	3	SSW	212				1
8/18/2024 17:00	75.5	5	SSW	207				1
8/18/2024 17:30	74.1	6	SSW	204				1
8/18/2024 18:00	74.1	5	WSW	244				1
8/18/2024 18:30	73.2	2	WSW	250				1
8/18/2024 19:00	72.5	3	WSW	252				1
8/18/2024 19:30	70.9	2	W	263				1
8/18/2024 20:00	68.2	1	WSW	244				1
8/18/2024 20:30	65.4	4	SSW	200				1
8/18/2024 21:00	63.2	3	SSW	200				1
8/18/2024 21:30	61.5	3	SSW	200				1
8/18/2024 22:00	60.2	3	SSW	200				1
8/18/2024 22:30	59.8	2	SSW	200				1
8/18/2024 23:00	59.6	0	SSW	200				1
8/18/2024 23:30	60	1	SSW	200				1
8/23/2024 0:00	58.4	0	SW	227				6
8/23/2024 0:30	57.3	0	SW	227				6
8/23/2024 1:00	57.5	1	SW	227				6
8/23/2024 1:30	57.3	0	S	184				6
8/23/2024 2:00	57.2	0	S	184				6
8/23/2024 2:30	56.6	2	S	184				6
8/23/2024 3:00	55.6	0	S	184				6
8/23/2024 3:30	54.2	0	S	184				6
8/23/2024 4:00	53	0	S	184				6
8/23/2024 4:30	52.4	0	S	184				6
8/23/2024 5:00	51.6	0	S	184				6
8/23/2024 5:30	51.2	0	S	184				6
8/23/2024 6:00	49.8	0	S	184				6
8/23/2024 6:30	50	3	S	191				6
8/23/2024 7:00	50.8	0	S	191				6
8/23/2024 7:30	51.3	0	S	191				6
8/23/2024 8:00	52.6	0	S	191				6
8/23/2024 8:30	55.3	2	NNE	30				6
8/23/2024 9:00	56.1	0	SSW	192				6
8/23/2024 9:30	58.4	5	S	174				6
8/23/2024 10:00	60.4	2	SSE	158				6
8/23/2024 10:30	61.3	2	WSW	255				6
8/23/2024 11:00	62	6	S	173				6
8/23/2024 11:30	64.5	4	SE	140				6
8/23/2024 12:00	64.7	3	SW	219				6
8/23/2024 12:30	64.1	11	SSW	213				6
8/23/2024 13:00	65.6	4	SW	221				6
8/23/2024 13:30	65.7	10	S	185				6
8/23/2024 14:00	61.7	3	S	185				6
8/23/2024 14:30	58.7	6	S	188				6
8/23/2024 15:00	60.1	5	SSW	209				6
8/23/2024 15:30	61.6	7	S	190				6
8/23/2024 16:00	65.9	9	SW	222				6
8/23/2024 16:30	66.3	7	SE	188				6
8/23/2024 17:00	63.3	5	SW	234				6
8/23/2024 17:30	60.5	3	WSW	244				6
8/23/2024 18:00	63.4	1	WSW	254				6
8/23/2024 18:30	62.6	1	NW	311	66	8/23/2024	6:30 PM	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/23/2024 19:00	62.3	0	NW	313				6
8/23/2024 19:30	62.1	0	NW	313				6
8/23/2024 20:00	60.8	0	NW	315				6
8/23/2024 20:30	59.7	0	NW	315				6
8/23/2024 21:00	58.4	0	NW	315				6
8/23/2024 21:30	57.4	0	NW	315				6
8/23/2024 22:00	57.1	0	NW	315				6
8/23/2024 22:30	56.6	0	NW	315				6
8/23/2024 23:00	56.3	1	NW	315				6
8/23/2024 23:30	56.3	1	NW	315				6
11/26/2024 0:00	34.9	1	SSE	152				3
11/26/2024 0:30	35.1	0	SSE	148				3
11/26/2024 1:00	35.3	1	SSE	148				3
11/26/2024 1:30	36.2	1	SSE	148				3
11/26/2024 2:00	37	1	SSE	148				3
11/26/2024 2:30	35.9	1	SSE	148				3
11/26/2024 3:00	35.3	1	SSE	148				3
11/26/2024 3:30	36.8	0	SSE	148				3
11/26/2024 4:00	36.1	0	SSE	148				3
11/26/2024 4:30	37.7	0	SSE	148				3
11/26/2024 5:00	37.7	0	SSE	148				3
11/26/2024 5:30	38.6	3	SSE	147				3
11/26/2024 6:00	38.7	2	SE	146				3
11/26/2024 6:30	39.3	0	SE	146				3
11/26/2024 7:00	39.7	0	SE	146				3
11/26/2024 7:30	39.8	0	SE	146				3
11/26/2024 8:00	40.1	0	SE	146				3
11/26/2024 8:30	40.5	0	SE	146				3
11/26/2024 9:00	41.1	2	SE	146				3
11/26/2024 9:30	41.6	0	SE	146				3
11/26/2024 10:00	42.4	0	SE	146				3
11/26/2024 10:30	43	2	SE	146				3
11/26/2024 11:00	43.4	2	SE	146				3
11/26/2024 11:30	44.3	2	SE	143	67	11/26/2024	11:30 AM	3
11/26/2024 12:00	45	3	SE	138				3
11/26/2024 12:30	46.7	0	NNE	28				3
11/26/2024 13:00	46.9	5	SSE	169				3
11/26/2024 13:30	48.5	6	SSE	165				3
11/26/2024 14:00	48.8	7	SSE	165				3
11/26/2024 14:30	49	0	SSE	167				3
11/26/2024 15:00	50.1	0	SSE	169				3
11/26/2024 15:30	49.3	5	S	171				3
11/26/2024 16:00	48.3	0	S	171				3
11/26/2024 16:30	46.6	0	S	171				3
11/26/2024 17:00	45.4	0	S	171				3
11/26/2024 17:30	44.5	0	S	171				3
11/26/2024 18:00	44.4	0	S	171				3
11/26/2024 18:30	44.3	0	S	171				3
11/26/2024 19:00	43.8	0	S	171				3
11/26/2024 19:30	43.6	0	S	171				3
11/26/2024 20:00	43.5	0	S	171				3
11/26/2024 20:30	43.2	0	S	171				3
11/26/2024 21:00	43.7	0	S	171				3
11/26/2024 21:30	43.9	1	S	171				3
11/26/2024 22:00	43.6	0	S	171				3
11/26/2024 22:30	43.3	0	S	171				3
11/26/2024 23:00	43.3	2	S	171				3
11/26/2024 23:30	42.9	0	S	171				3
11/27/2024 0:00	42.9	0	S	171				4
11/27/2024 0:30	42.4	0	S	171				4
11/27/2024 1:00	41.7	0	S	171				4
11/27/2024 1:30	41.1	0	S	171				4
11/27/2024 2:00	40.9	0	S	171				4
11/27/2024 2:30	40.8	0	S	171				4
11/27/2024 3:00	41	1	S	171				4
11/27/2024 3:30	41.5	1	S	171				4
11/27/2024 4:00	41.2	0	S	171				4
11/27/2024 4:30	41.2	0	S	171				4
11/27/2024 5:00	41.4	0	S	171				4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/27/2024 5:30	41.4	0	S	171				4
11/27/2024 6:00	41.4	0	S	171				4
11/27/2024 6:30	41.2	0	S	171				4
11/27/2024 7:00	41	1	S	171	68	11/27/2024	7:15 AM	4
11/27/2024 7:30	40.8	0	S	171				4
11/27/2024 8:00	41.1	1	S	173				4
11/27/2024 8:30	40.6	4	S	179				4
11/27/2024 9:00	40.3	0	S	180				4
11/27/2024 9:30	40.3	2	S	180				4
11/27/2024 10:00	40.3	1	S	181				4
11/27/2024 10:30	40.1	1	SSE	164				4
11/27/2024 11:00	41.3	0	SSE	164				4
11/27/2024 11:30	41.5	4	SSE	165				4
11/27/2024 12:00	41.7	1	SSE	168				4
11/27/2024 12:30	41.4	1	NNW	342				4
11/27/2024 13:00	41.4	1	NNW	331				4
11/27/2024 13:30	41.7	0	NNW	336				4
11/27/2024 14:00	41.8	0	NNW	333				4
11/27/2024 14:30	42	2	NNW	336				4
11/27/2024 15:00	42.4	1	NNE	34				4
11/27/2024 15:30	42.1	2	WSW	252				4
11/27/2024 16:00	41.7	2	WSW	252				4
11/27/2024 16:30	41.6	0	WSW	252				4
11/27/2024 17:00	41.1	0	WSW	252				4
11/27/2024 17:30	40.2	0	WSW	252				4
11/27/2024 18:00	39.3	0	WSW	252				4
11/27/2024 18:30	36.6	0	WSW	252				4
11/27/2024 19:00	35.5	1	WSW	252				4
11/27/2024 19:30	35	1	WSW	252				4
11/27/2024 20:00	34.8	1	WSW	252				4
11/27/2024 20:30	33.5	0	WSW	252				4
11/27/2024 21:00	34.1	0	WSW	252				4
11/27/2024 21:30	34.5	0	WSW	252				4
11/27/2024 22:00	34.3	1	WSW	252				4
11/27/2024 22:30	33.9	0	WSW	252				4
11/27/2024 23:00	33.4	0	WSW	252				4
11/27/2024 23:30	32.3	0	WSW	252				4
11/30/2024 0:00	37.7	3	NNE	26				7
11/30/2024 0:30	37.6	4	NE	36				7
11/30/2024 1:00	37.5	1	NNE	29				7
11/30/2024 1:30	37.5	5	NE	37				7
11/30/2024 2:00	37.6	4	NE	38				7
11/30/2024 2:30	37.4	3	NE	36				7
11/30/2024 3:00	37.4	4	NE	41				7
11/30/2024 3:30	37.4	5	NE	42				7
11/30/2024 4:00	37.4	3	NNE	32				7
11/30/2024 4:30	37.3	5	NNE	31				7
11/30/2024 5:00	37.2	2	NE	44				7
11/30/2024 5:30	37.1	0	NE	44				7
11/30/2024 6:00	37.1	3	NE	40				7
11/30/2024 6:30	37.1	1	NE	42				7
11/30/2024 7:00	37.1	0	NE	43				7
11/30/2024 7:30	37.1	2	N	355				7
11/30/2024 8:00	37.1	6	NE	38				7
11/30/2024 8:30	37.1	0	NNE	32				7
11/30/2024 9:00	37.2	2	NE	40				7
11/30/2024 9:30	37.1	2	NNE	23				7
11/30/2024 10:00	37.2	1	NNE	22	69	11/30/2024	10:00 AM	7
11/30/2024 10:30	37.5	4	NNE	19				7
11/30/2024 11:00	37.5	4	NE	48				7
11/30/2024 11:30	37.7	2	NE	37				7
11/30/2024 12:00	38	1	ENE	61	70	11/30/2024	12:00 PM	7
11/30/2024 12:30	38.3	0	NNW	336				7
11/30/2024 13:00	38.6	5	NNE	26				7
11/30/2024 13:30	38.7	1	WSW	258				7
11/30/2024 14:00	38.9	3	WSW	258				7
11/30/2024 14:30	39.5	2	SE	128				7
11/30/2024 15:00	39.8	2	WSW	255				7
11/30/2024 15:30	40.5	1	WSW	239				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/30/2024 16:00	40.3	1	WSW	239				7
11/30/2024 16:30	38.5	0	WSW	239				7
11/30/2024 17:00	36	0	WSW	239				7
11/30/2024 17:30	33.7	0	WSW	239				7
11/30/2024 18:00	33.2	1	WSW	239				7
11/30/2024 18:30	32.2	0	WSW	239				7
11/30/2024 19:00	31.9	0	SSW	205				7
11/30/2024 19:30	31.1	0	SSW	205				7
11/30/2024 20:00	31.1	0	SSW	205				7
11/30/2024 20:30	30.9	0	SSW	205				7
11/30/2024 21:00	30.3	0	SSW	205				7
11/30/2024 21:30	31	0	SSW	205				7
11/30/2024 22:00	29	0	SSW	205				7
11/30/2024 22:30	29.8	0	SSW	205				7
11/30/2024 23:00	28.3	0	SSW	205				7
11/30/2024 23:30	27.8	0	SSW	205				7
12/1/2024 0:00	27.9	0	SSW	205				1
12/1/2024 0:30	27.5	0	SSW	205				1
12/1/2024 1:00	28.2	3	SSW	205				1
12/1/2024 1:30	28.4	3	SSW	205				1
12/1/2024 2:00	28.6	0	SSW	205				1
12/1/2024 2:30	28.7	0	SSW	205				1
12/1/2024 3:00	28.5	0	SSW	205				1
12/1/2024 3:30	28.4	0	SSW	205				1
12/1/2024 4:00	28.1	0	SSW	205				1
12/1/2024 4:30	28.1	0	SSW	205				1
12/1/2024 5:00	27.9	0	SSW	205				1
12/1/2024 5:30	27.9	0	SSW	205				1
12/1/2024 6:00	27.6	0	SSW	205				1
12/1/2024 6:30	27.2	0	SSW	205				1
12/1/2024 7:00	27.5	0	SSW	205				1
12/1/2024 7:30	27.6	0	SSW	205				1
12/1/2024 8:00	27.7	0	SSW	205				1
12/1/2024 8:30	28.2	0	SSW	205	71	12/1/2024	8:30 AM	1
12/1/2024 9:00	29.4	0	SSW	205				1
12/1/2024 9:30	30.3	0	SSW	205				1
12/1/2024 10:00	30.3	1	SSW	205	72 & 73	12/1/2024	10:00 AM	1
12/1/2024 10:30	31	0	SSW	205				1
12/1/2024 11:00	31.9	2	SSW	207				1
12/1/2024 11:30	32.7	0	SSW	209				1
12/1/2024 12:00	33.2	3	N	5	74	12/1/2024	11:52 AM	1
12/1/2024 12:30	34.6	3	N	5				1
12/1/2024 13:00	34.9	3	NNE	26				1
12/1/2024 13:30	35.6	3	NNE	24				1
12/1/2024 14:00	35.9	0	NNE	20				1
12/1/2024 14:30	36.1	3	NNE	21				1
12/1/2024 15:00	36.4	0	NNE	30				1
12/1/2024 15:30	35.8	0	NNE	30				1
12/1/2024 16:00	35.4	0	NNE	30				1
12/1/2024 16:30	34.2	0	NNE	30				1
12/1/2024 17:00	33.2	0	NNE	30				1
12/1/2024 17:30	32.7	0	NE	49				1
12/1/2024 18:00	32.6	0	NE	48				1
12/1/2024 18:30	32.6	0	NE	48				1
12/1/2024 19:00	32.6	0	NE	49				1
12/1/2024 19:30	31.9	0	NE	49				1
12/1/2024 20:00	31.9	0	NE	49				1
12/1/2024 20:30	32.2	0	NE	49				1
12/1/2024 21:00	31.3	0	NE	49				1
12/1/2024 21:30	31.1	0	NE	50				1
12/1/2024 22:00	31.1	0	NE	50				1
12/1/2024 22:30	31.3	0	NE	50				1
12/1/2024 23:00	31.3	0	NE	50				1
12/1/2024 23:30	31.3	0	NE	50				1
12/6/2024 0:00	30.1	0	SSE	161				6
12/6/2024 0:30	29.3	0	SSE	161				6
12/6/2024 1:00	30.7	1	NE	40				6
12/6/2024 1:30	30.6	0	NE	43				6
12/6/2024 2:00	31.1	0	NE	43				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/6/2024 2:30	30.3	0	NE	43				6
12/6/2024 3:00	29.8	0	NE	43				6
12/6/2024 3:30	28.7	0	NE	44				6
12/6/2024 4:00	28.5	3	S	184				6
12/6/2024 4:30	27.9	0	S	184				6
12/6/2024 5:00	29.1	3	NE	35				6
12/6/2024 5:30	29.1	0	NNE	34				6
12/6/2024 6:00	29.2	0	NNE	34				6
12/6/2024 6:30	28.9	0	NNE	34				6
12/6/2024 7:00	28.7	0	NNE	34				6
12/6/2024 7:30	28.3	2	NNE	34				6
12/6/2024 8:00	27.9	0	NE	35				6
12/6/2024 8:30	29.3	4	NNE	32				6
12/6/2024 9:00	29.7	1	NNE	32				6
12/6/2024 9:30	29.7	0	NNE	32	75	12/6/2024	9:45 AM	6
12/6/2024 10:00	30	0	NNE	33				6
12/6/2024 10:30	31.6	0	NNE	33				6
12/6/2024 11:00	34	2	NNE	33				6
12/6/2024 11:30	34.2	0	NNE	33				6
12/6/2024 12:00	35.7	3	NNE	33				6
12/6/2024 12:30	36.1	0	NNE	33				6
12/6/2024 13:00	37	2	NNE	33				6
12/6/2024 13:30	37.2	3	NNE	32				6
12/6/2024 14:00	38	1	NNE	32				6
12/6/2024 14:30	39.2	3	NNE	31				6
12/6/2024 15:00	38.5	0	NNE	31				6
12/6/2024 15:30	38.4	0	NNE	31				6
12/6/2024 16:00	37.5	1	NNE	31				6
12/6/2024 16:30	36.8	0	NNE	31				6
12/6/2024 17:00	36.4	0	NNE	31				6
12/6/2024 17:30	35.7	0	NNE	31				6
12/6/2024 18:00	34	0	NNE	31				6
12/6/2024 18:30	34.9	0	NNE	32				6
12/6/2024 19:00	35	0	NNE	32				6
12/6/2024 19:30	35.2	0	NNE	32				6
12/6/2024 20:00	34.6	0	NNE	32				6
12/6/2024 20:30	34.4	0	NNE	32				6
12/6/2024 21:00	34.2	0	NE	39				6
12/6/2024 21:30	33.1	0	NE	39				6
12/6/2024 22:00	33	3	NE	38				6
12/6/2024 22:30	33.5	0	N	5				6
12/6/2024 23:00	33.2	0	NNE	34				6
12/6/2024 23:30	33.2	0	NNE	15				6
12/14/2024 0:00	46.5	6	S	188				7
12/14/2024 0:30	46.4	5	S	188				7
12/14/2024 1:00	46.3	9	S	191				7
12/14/2024 1:30	46.4	2	NW	311				7
12/14/2024 2:00	46.1	9	S	176				7
12/14/2024 2:30	45.6	2	SSE	169				7
12/14/2024 3:00	45.7	2	SSW	202				7
12/14/2024 3:30	45.5	9	SW	236				7
12/14/2024 4:00	45.4	6	SW	220				7
12/14/2024 4:30	45.4	7	SW	233				7
12/14/2024 5:00	45.4	6	SW	225				7
12/14/2024 5:30	45.2	9	SSW	212				7
12/14/2024 6:00	45	8	SSW	192				7
12/14/2024 6:30	45.2	7	SE	126				7
12/14/2024 7:00	45.4	12	SSE	167				7
12/14/2024 7:30	45.1	9	SSE	152				7
12/14/2024 8:00	45	3	S	186				7
12/14/2024 8:30	45.1	4	S	188				7
12/14/2024 9:00	45.1	0	S	185				7
12/14/2024 9:30	45.5	8	S	175				7
12/14/2024 10:00	45.7	3	S	182				7
12/14/2024 10:30	45.8	0	SSW	193				7
12/14/2024 11:00	46	3	SSW	194				7
12/14/2024 11:30	46.3	3	SSW	198				7
12/14/2024 12:00	45.6	0	SSW	198				7
12/14/2024 12:30	46.5	0	SSW	198				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/14/2024 13:00	47.2	0	SSW	198				7
12/14/2024 13:30	47	3	SSW	198	76	12/14/2024	1:30 PM	7
12/14/2024 14:00	47.1	2	SSW	196				7
12/14/2024 14:30	48	4	SSW	196				7
12/14/2024 15:00	47.1	3	S	181				7
12/14/2024 15:30	47.2	2	SSW	200				7
12/14/2024 16:00	46.9	1	SSE	159				7
12/14/2024 16:30	44.9	0	SSE	159				7
12/14/2024 17:00	43.2	0	SSE	159				7
12/14/2024 17:30	42.7	0	SSE	159				7
12/14/2024 18:00	42.4	4	SSE	159				7
12/14/2024 18:30	41.4	5	SSE	159				7
12/14/2024 19:00	42.5	5	SSW	205				7
12/14/2024 19:30	42.3	4	SSW	205				7
12/14/2024 20:00	41.2	2	SSW	192				7
12/14/2024 20:30	41.4	5	SSW	200				7
12/14/2024 21:00	41.3	4	S	184				7
12/14/2024 21:30	41.2	2	S	184				7
12/14/2024 22:00	41	3	S	181				7
12/14/2024 22:30	41.4	3	S	178				7
12/14/2024 23:00	41	5	SSW	214				7
12/14/2024 23:30	40.7	3	SSW	201				7
12/20/2024 0:00	45.5	0	NE	43				6
12/20/2024 0:30	46.9	0	SE	129				6
12/20/2024 1:00	45.2	1	SE	129				6
12/20/2024 1:30	45.4	0	SE	131				6
12/20/2024 2:00	45.2	0	SE	131				6
12/20/2024 2:30	44.6	0	SE	131				6
12/20/2024 3:00	44.8	0	SE	131				6
12/20/2024 3:30	45.8	0	SE	131				6
12/20/2024 4:00	45.9	0	SE	131				6
12/20/2024 4:30	46.2	0	SE	131				6
12/20/2024 5:00	46	0	SE	131				6
12/20/2024 5:30	45.2	0	SE	131				6
12/20/2024 6:00	46.1	2	ESE	106				6
12/20/2024 6:30	45.7	0	ESE	106				6
12/20/2024 7:00	45.6	2	ESE	106				6
12/20/2024 7:30	45.4	0	ESE	106				6
12/20/2024 8:00	45	0	ESE	106				6
12/20/2024 8:30	44.9	0	ESE	106				6
12/20/2024 9:00	45.5	0	ESE	106				6
12/20/2024 9:30	46.3	0	ESE	102				6
12/20/2024 10:00	46.6	1	E	95				6
12/20/2024 10:30	47.1	0	E	87				6
12/20/2024 11:00	47.5	0	E	88				6
12/20/2024 11:30	47.7	0	E	88				6
12/20/2024 12:00	47	1	ENE	63				6
12/20/2024 12:30	47.4	2	NE	50				6
12/20/2024 13:00	48.5	0	NE	41				6
12/20/2024 13:30	48.9	4	W	269				6
12/20/2024 14:00	49	1	W	267				6
12/20/2024 14:30	49.7	0	W	267				6
12/20/2024 15:00	50.2	0	W	267	77	12/20/2024	3:00 PM	6
12/20/2024 15:30	49.8	1	W	271				6
12/20/2024 16:00	49.6	2	W	271				6
12/20/2024 16:30	49	0	W	271				6
12/20/2024 17:00	48.1	0	W	271				6
12/20/2024 17:30	47.6	2	W	269				6
12/20/2024 18:00	46	2	W	267				6
12/20/2024 18:30	43.8	2	W	267				6
12/20/2024 19:00	45.3	1	W	267				6
12/20/2024 19:30	45.7	0	W	267				6
12/20/2024 20:00	45.7	3	W	267				6
12/20/2024 20:30	46	2	SSE	163				6
12/20/2024 21:00	45.5	0	SSE	165				6
12/20/2024 21:30	46.2	0	SSE	165				6
12/20/2024 22:00	45	2	SE	132				6
12/20/2024 22:30	44.9	0	SE	132				6
12/20/2024 23:00	45	2	SE	132				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/20/2024 23:30	45	0	SE	132				6
12/23/2024 0:00	46.3	0	SSW	193				2
12/23/2024 0:30	44.8	2	SSW	193				2
12/23/2024 1:00	45.9	5	NE	39				2
12/23/2024 1:30	45.6	0	NE	41				2
12/23/2024 2:00	44	2	NE	41				2
12/23/2024 2:30	44	0	NE	43				2
12/23/2024 3:00	43	1	NE	43				2
12/23/2024 3:30	43.1	0	N	5				2
12/23/2024 4:00	42.4	0	NE	41				2
12/23/2024 4:30	42.9	0	NE	40				2
12/23/2024 5:00	41.3	0	NE	40				2
12/23/2024 5:30	41.1	0	NE	40				2
12/23/2024 6:00	39.3	0	NE	40				2
12/23/2024 6:30	38.3	0	NE	40				2
12/23/2024 7:00	38.5	0	NE	42				2
12/23/2024 7:30	36.6	0	NE	42				2
12/23/2024 8:00	36.3	0	NE	42				2
12/23/2024 8:30	36.9	0	NE	42				2
12/23/2024 9:00	38.1	0	NE	42				2
12/23/2024 9:30	40.1	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 10:00	41.4	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 10:30	42.2	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 11:00	43.2	2	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 11:30	43.6	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 12:00	44.3	4	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 12:30	44.8	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 13:00	45.1	0	NE	42				2
12/23/2024 13:30	45.1	0	NE	42				2
12/23/2024 14:00	44.9	0	NE	42	79	12/23/2024	2:00 PM	2
12/23/2024 14:30	44.5	1	NE	42				2
12/23/2024 15:00	44.5	0	S	184				2
12/23/2024 15:30	44.7	0	S	184				2
12/23/2024 16:00	44.6	5	SW	219				2
12/23/2024 16:30	44.5	1	SW	215				2
12/23/2024 17:00	44.5	0	SW	215				2
12/23/2024 17:30	44.7	1	NNE	25				2
12/23/2024 18:00	44.6	1	NNE	29				2
12/23/2024 18:30	44.7	0	W	269				2
12/23/2024 19:00	44.6	0	W	269				2
12/23/2024 19:30	44.8	0	SSE	161				2
12/23/2024 20:00	46	0	SSE	157				2
12/23/2024 20:30	46	0	SE	131				2
12/23/2024 21:00	45.8	0	E	94				2
12/23/2024 21:30	47.6	6	SSW	211				2
12/23/2024 22:00	48.8	5	WSW	238				2
12/23/2024 22:30	49.7	4	SW	215				2
12/23/2024 23:00	49	0	WSW	256				2
12/23/2024 23:30	48.7	0	SW	231				2
12/29/2024 0:00	44.9	2	W	274				1
12/29/2024 0:30	44.9	1	W	273				1
12/29/2024 1:00	44.8	0	W	273				1
12/29/2024 1:30	44.8	0	W	272				1
12/29/2024 2:00	44.7	2	W	271				1
12/29/2024 2:30	44.6	0	W	271				1
12/29/2024 3:00	44.5	1	W	271				1
12/29/2024 3:30	44.6	4	SSE	167				1
12/29/2024 4:00	44.6	0	SSE	167				1
12/29/2024 4:30	44.6	0	SSE	167				1
12/29/2024 5:00	44.8	2	S	184				1
12/29/2024 5:30	44.8	1	S	181				1
12/29/2024 6:00	44.9	6	S	163				1
12/29/2024 6:30	45	6	SSE	161				1
12/29/2024 7:00	45	0	SSE	161				1
12/29/2024 7:30	45	0	SSE	159				1
12/29/2024 8:00	45	0	SSE	159				1
12/29/2024 8:30	45.2	0	SSE	159				1
12/29/2024 9:00	45.5	0	SSE	159				1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/29/2024 9:30	46.4	2	SSE	161	80 & 81	12/29/2024	9:29 AM	1
12/29/2024 10:00	46.5	1	SSE	161				1
12/29/2024 10:30	47.8	6	SSE	165				1
12/29/2024 11:00	47.7	7	SW	216				1
12/29/2024 11:30	48.1	14	WSW	241				1
12/29/2024 12:00	48.8	4	SSW	199				1
12/29/2024 12:30	49	7	S	185				1
12/29/2024 13:00	47.9	7	SW	234				1
12/29/2024 13:30	49	7	S	186				1
12/29/2024 14:00	50	9	SSW	200				1
12/29/2024 14:30	49.4	6	SSW	200				1
12/29/2024 15:00	48.9	4	SSW	207				1
12/29/2024 15:30	46.4	7	SSW	199				1
12/29/2024 16:00	44.8	2	S	182				1
12/29/2024 16:30	44.1	2	S	182	82	12/29/2024	4:45 PM	1
12/29/2024 17:00	44.1	2	S	182				1
12/29/2024 17:30	44.3	1	S	182				1
12/29/2024 18:00	44	2	S	182				1
12/29/2024 18:30	44.3	2	S	184	81	12/29/2024	6:30 PM	1
12/29/2024 19:00	44	7	SSE	165				1
12/29/2024 19:30	43.6	2	SSW	192				1
12/29/2024 20:00	43.8	5	S	178				1
12/29/2024 20:30	43.2	4	SSW	193				1
12/29/2024 21:00	43	4	SSW	193				1
12/29/2024 21:30	42.4	0	SSW	210				1
12/29/2024 22:00	42.4	0	S	188				1
12/29/2024 22:30	42.2	2	S	185				1
12/29/2024 23:00	41.7	4	E	95				1
12/29/2024 23:30	41.5	0	NE	36				1
12/31/2024 0:00	35.7	0	SSE	169				3
12/31/2024 0:30	35.9	0	SSE	169				3
12/31/2024 1:00	37.2	0	SSE	169				3
12/31/2024 1:30	36	1	NE	51				3
12/31/2024 2:00	35.3	0	NE	51				3
12/31/2024 2:30	36.4	2	NE	51				3
12/31/2024 3:00	36.6	0	NE	51				3
12/31/2024 3:30	36.9	0	NE	51				3
12/31/2024 4:00	37	0	NE	51				3
12/31/2024 4:30	37.2	0	NE	51				3
12/31/2024 5:00	37.5	0	NE	51				3
12/31/2024 5:30	37.6	0	NE	51				3
12/31/2024 6:00	37.8	2	NE	51				3
12/31/2024 6:30	37.8	0	NE	51				3
12/31/2024 7:00	37.9	0	NE	51				3
12/31/2024 7:30	37.7	0	NE	51				3
12/31/2024 8:00	37.5	0	NE	51				3
12/31/2024 8:30	37.2	0	SE	139				3
12/31/2024 9:00	36.8	0	SE	142				3
12/31/2024 9:30	37.1	0	SE	142				3
12/31/2024 10:00	37.2	0	SE	142				3
12/31/2024 10:30	37.3	2	SSE	161				3
12/31/2024 11:00	36.7	2	S	175				3
12/31/2024 11:30	36.4	2	S	175				3
12/31/2024 12:00	36.4	5	S	173				3
12/31/2024 12:30	36.7	5	ENE	62				3
12/31/2024 13:00	37.4	0	S	174				3
12/31/2024 13:30	38.3	3	S	174				3
12/31/2024 14:00	38.5	0	S	174				3
12/31/2024 14:30	38.7	1	S	175				3
12/31/2024 15:00	38.7	2	S	175				3
12/31/2024 15:30	38.3	2	S	175	83	12/31/2024	3:45 PM	3
12/31/2024 16:00	37.9	3	S	174				3
12/31/2024 16:30	37.7	1	NE	42				3
12/31/2024 17:00	37.7	3	NNE	19				3
12/31/2024 17:30	37.7	0	NNE	25				3
12/31/2024 18:00	38	0	NNE	32				3
12/31/2024 18:30	38.1	2	NNE	32				3
12/31/2024 19:00	38.4	0	NE	35				3
12/31/2024 19:30	39.4	4	S	171				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/31/2024 20:00	40.3	8	SSW	207				3
12/31/2024 20:30	40.7	6	S	190				3
12/31/2024 21:00	40.8	12	SW	235				3
12/31/2024 21:30	41	4	S	181				3
12/31/2024 22:00	40.8	6	S	188				3
12/31/2024 22:30	40.6	4	SW	215				3
12/31/2024 23:00	40.4	3	SW	227				3
12/31/2024 23:30	40.4	0	SSW	211				3
1/1/2025 0:00	40.4	1	SW	234	84	1/1/2025	12:00 AM	4
1/1/2025 0:30	40.4	2	SW	232				
1/1/2025 1:00	40.1	0	SW	232				
1/1/2025 1:30	39.6	0	SW	232				
1/1/2025 2:00	39.7	0	SW	232				
1/1/2025 2:30	39.7	0	SW	232				
1/1/2025 3:00	39.8	0	SW	232				
1/1/2025 3:30	40.1	0	SW	232				
1/1/2025 4:00	40.2	0	SW	232				
1/1/2025 4:30	40.4	0	SW	232				
1/1/2025 5:00	40.4	0	SW	232				
1/1/2025 5:30	40.5	0	SW	232				
1/1/2025 6:00	39.9	0	SW	232				
1/1/2025 6:30	40.2	0	SW	232				
1/1/2025 7:00	39.8	0	SW	232				
1/1/2025 7:30	39.1	0	SW	232				
1/1/2025 8:00	39	0	SW	232				
1/1/2025 8:30	40.2	0	SW	232				
1/1/2025 9:00	41	0	SW	232				
1/1/2025 9:30	41.7	0	SW	232				
1/1/2025 10:00	42.4	0	SW	232				
1/1/2025 10:30	43	0	SW	232				
1/1/2025 11:00	43.2	0	SW	232				
1/1/2025 11:30	43.4	2	SW	231				
1/1/2025 12:00	43.7	0	SW	232				
1/1/2025 12:30	44.1	0	SW	232				
1/1/2025 13:00	44.3	0	SW	232				
1/1/2025 13:30	44.4	2	SW	232				
1/1/2025 14:00	44.5	0	SW	232				
1/1/2025 14:30	44.5	2	SW	235				
1/1/2025 15:00	44.5	0	SW	236				
1/1/2025 15:30	44.8	1	NE	48				
1/1/2025 16:00	44.7	0	NE	47				
1/1/2025 16:30	44.5	1	NE	45				
1/1/2025 17:00	44.3	0	NE	45				
1/1/2025 17:30	44.3	3	NE	45				
1/1/2025 18:00	44.3	0	NE	44				
1/1/2025 18:30	44.2	0	NE	44				
1/1/2025 19:00	44.2	1	NE	43				
1/1/2025 19:30	44	0	NE	43				
1/1/2025 20:00	43.8	0	NE	43				
1/1/2025 20:30	43.8	0	NE	43				
1/1/2025 21:00	43.7	0	NE	43				
1/1/2025 21:30	43.6	0	NE	43				
1/1/2025 22:00	43.6	0	NE	43				
1/1/2025 22:30	43.6	0	NE	43				
1/1/2025 23:00	43.7	0	NE	43				
1/1/2025 23:30	43.6	0	NE	43				

Appendix B

Odor Pollutant Screening

Odor Pollutant Screening Based on 2023 Emission Inventory

CAS No.	Pollutant	2023 Emissions (lb/yr)	2023 Emissions (g/s)	Odor Threshold (g/m3)	Odor Emission Rate (m3/s)	Odor Emission Rate Percent (%)
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	9.866E+01	1.419E-03	5.293E-03	2.681E-01	0.0%
79-34-5	1,1,2,2-Tetrachloroethane	2.871E+02	4.129E-03	1.600E-03	2.581E+00	0.0%
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.583E+02	5.154E-03	4.857E-01	1.061E-02	0.0%
78-87-5	1,2-Dichloropropane (propylene dichloride)	3.134E+01	4.507E-04	1.155E-03	3.901E-01	0.0%
106-99-0	1,3-Butadiene	3.630E-01	1.374E-05	2.190E-04	6.275E-02	0.0%
78-93-3	2-Butanone (methyl ethyl ketone)	7.877E+02	1.133E-02	2.064E-04	5.489E+01	0.4%
83-32-9	Acenaphthene	1.318E-02	4.991E-07	0.000E+00	0.000E+00	0.0%
208-96-8	Acenaphthylene	4.698E-02	1.778E-06	0.000E+00	0.000E+00	0.0%
75-07-0	Acetaldehyde	7.122E+00	2.696E-04	2.703E-06	9.973E+01	0.7%
67-64-1	Acetone	6.273E+02	9.023E-03	9.502E-04	9.496E+00	0.1%
107-02-8	Acrolein	8.589E-01	3.251E-05	6.191E-06	5.252E+00	0.0%
107-13-1	Acrylonitrile	5.175E+02	7.443E-03	3.472E-03	2.144E+00	0.0%
120-12-7	Anthracene	1.736E-02	6.573E-07	0.000E+00	0.000E+00	0.0%
56-55-3	Benz[a]anthracene	1.560E-02	5.905E-07	0.000E+00	0.000E+00	0.0%
71-43-2	Benzene	2.385E+02	3.634E-03	1.502E-03	2.420E+00	0.0%
50-32-8	Benzo[a]pyrene	1.746E-03	6.608E-08	0.000E+00	0.000E+00	0.0%
205-99-2	Benzo[b]fluoranthene	9.201E-04	3.483E-08	0.000E+00	0.000E+00	0.0%
191-24-2	Benzo[g,h,i]perylene	4.540E-03	1.719E-07	0.000E+00	0.000E+00	0.0%
75-27-4	Bromodichloromethane	7.901E+02	1.136E-02	0.000E+00	0.000E+00	0.0%
106-97-8	Butane	4.274E+02	6.147E-03	1.001E-03	6.143E+00	0.0%
124-38-9	Carbon dioxide	3.040E+07	4.373E+02	7.020E+01	6.229E+00	0.0%
75-15-0	Carbon disulfide	6.803E+01	9.786E-04	4.983E-05	1.964E+01	0.1%
630-08-0	Carbon monoxide	1.135E+05	1.841E+00	0.000E+00	0.000E+00	0.0%
56-23-5	Carbon tetrachloride	9.481E-01	1.364E-05	1.057E-02	1.290E-03	0.0%
463-58-1	Carbonyl sulfide	4.535E+01	6.523E-04	1.401E-04	4.657E+00	0.0%
108-90-7	Chlorobenzene	4.336E+01	6.236E-04	4.005E-04	1.557E+00	0.0%
75-45-6	Chlorodifluoromethane (Freon 22)	1.732E+02	2.491E-03	7.080E+02	3.519E-06	0.0%
75-00-3	Chloroethane (ethyl chloride)	1.243E+02	1.787E-03	1.003E-02	1.782E-01	0.0%
67-66-3	Chloroform	5.519E+00	7.938E-05	4.980E-04	1.594E-01	0.0%
74-87-3	Chloromethane (methyl chloride)	9.413E+01	1.354E-03	2.065E-02	6.556E-02	0.0%
218-01-9	Chrysene	3.278E-03	1.241E-07	0.000E+00	0.000E+00	0.0%
53-70-3	Dibenz[a,h]anthracene	5.413E-03	2.049E-07	0.000E+00	0.000E+00	0.0%
75-71-8	Dichlorodifluoromethane (Freon 12)	2.925E+03	4.207E-02	9.880E+02	4.258E-05	0.0%
75-43-4	Dichlorofluoromethane (Freon 21)	4.155E+02	5.976E-03	0.000E+00	0.000E+00	0.0%
75-09-2	Dichloromethane (methylene chloride)	1.871E+03	2.692E-02	4.168E-03	6.458E+00	0.0%
75-18-3	Dimethyl sulfide (methyl sulfide)	7.127E+02	1.025E-02	2.541E-06	4.034E+03	28.4%
74-84-0	Ethane	3.936E+04	5.661E-01	0.000E+00	0.000E+00	0.0%
64-17-5	Ethanol	1.830E+03	2.632E-02	1.696E-04	1.552E+02	1.1%
100-41-4	Ethyl benzene	7.540E+02	1.085E-02	8.684E-06	1.249E+03	8.8%
75-08-1	Ethyl mercaptan (ethanethiol)	2.102E+02	3.023E-03	2.541E-06	1.189E+03	8.4%
106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	2.895E-01	4.164E-06	7.683E-02	5.419E-05	0.0%
107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	6.251E+01	8.992E-04	1.740E-02	5.166E-02	0.0%
206-44-0	Fluoranthene	7.066E-02	2.675E-06	0.000E+00	0.000E+00	0.0%
86-73-7	Fluorene	2.711E-01	1.026E-05	0.000E+00	0.000E+00	0.0%
50-00-0	Formaldehyde	1.096E+01	4.147E-04	3.316E-05	1.251E+01	0.1%
110-54-3	Hexane	8.724E+02	1.255E-02	5.287E-03	2.374E+00	0.0%
7783-06-4	Hydrogen sulfide	1.864E+03	2.681E-02	6.551E-06	4.093E+03	28.8%
193-39-5	Indeno[1,2,3-cd]pyrene	3.482E-03	1.318E-07	0.000E+00	0.000E+00	0.0%
67-63-0	Isopropyl alcohol	4.640E+03	6.674E-02	2.458E-03	2.715E+01	0.2%
7439-97-6	Mercury and compounds	9.025E-02	1.298E-06	0.000E+00	0.000E+00	0.0%
74-82-8	Methane	1.251E+07	1.799E+02	0.000E+00	0.000E+00	0.0%
108-10-1	Methyl isobutyl ketone (MIBK, hexone)	2.886E+02	4.151E-03	1.229E-04	3.378E+01	0.2%
74-93-1	Methyl mercaptan	1.769E+02	2.544E-03	4.132E-06	6.157E+02	4.3%
91-20-3	Naphthalene	7.874E-01	2.981E-05	6.816E-06	4.373E+00	0.0%
N/A	NMOC	8.602E+04	1.316E+00	0.000E+00	0.000E+00	0.0%
10102-44-0	NOx (as NO2)	6.138E+04	1.848E+00	1.882E-03	9.821E+02	6.9%
106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	4.756E+01	6.841E-04	7.276E-04	9.403E-01	0.0%
109-66-0	Pentane	3.502E+02	5.037E-03	3.807E-03	1.323E+00	0.0%
85-01-8	Phenanthrene	2.730E-01	1.033E-05	0.000E+00	0.000E+00	0.0%
N/A	PM	3.908E+04	6.306E-01	0.000E+00	0.000E+00	0.0%
N/A	PM10	1.656E+04	3.067E-01	0.000E+00	0.000E+00	0.0%
74-98-6	Propane	7.133E+02	1.026E-02	2.700E+00	3.800E-03	0.0%
7446-09-5	Sulfur dioxide	9.380E+03	1.988E-01	8.646E-04	2.299E+02	1.6%
127-18-4	Tetrachloroethene (perchloroethylene)	9.530E+02	1.371E-02	5.202E-03	2.635E+00	0.0%
108-88-3	Toluene	5.582E+03	8.038E-02	9.799E-05	8.203E+02	5.8%
N/A	Total landfill gas	4.291E+07	6.172E+02	0.000E+00	0.000E+00	0.0%
156-60-5	trans-1,2-Dichloroethene	4.242E+02	6.101E-03	1.098E+00	5.555E-03	0.0%
79-01-6	Trichloroethene (TCE, trichloroethylene)	5.709E+02	8.212E-03	2.687E-03	3.056E+00	0.0%
75-69-4	Trichlorofluoromethane (Freon 11)	1.609E+02	2.314E-03	2.809E-02	8.237E-02	0.0%
75-01-4	Vinyl chloride	7.068E+02	1.017E-02	5.189E-01	1.959E-02	0.0%

Odor Pollutant Screening Based on 2023 Emission Inventory

CAS No.	Pollutant	2023 Emissions (lb/yr)	2023 Emissions (g/s)	Odor Threshold (g/m3)	Odor Emission Rate (m3/s)	Odor Emission Rate Percent (%)
75-35-4	Vinylidene chloride	2.155E+01	3.100E-04	1.983E-01	1.564E-03	0.0%
N/A	VOC	3.698E+04	6.103E-01	0.000E+00	0.000E+00	0.0%
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.982E+03	2.857E-02	5.210E-05	5.483E+02	3.9%
				Total:	1.423E+04	100.0%

Appendix C

Scenario #1 Emission Rates

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
ATEI	F-LFG1	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	3.483E+00	8760	5.009E-05
ATEI	F-LFG2	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	9.320E+01	8760	1.340E-03
ATEI	OPEN FLARE-1	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	9.464E-01	8760	1.361E-05
ATEI	OPEN FLARE-2	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	1.039E+00	8760	1.495E-05
ATEI	F-LFG1	79-34-5	1,1,2,2-Tetrachloroethane	1.013E+01	8760	1.457E-04
ATEI	F-LFG2	79-34-5	1,1,2,2-Tetrachloroethane	2.712E+02	8760	3.900E-03
ATEI	OPEN FLARE-1	79-34-5	1,1,2,2-Tetrachloroethane	2.753E+00	8760	3.960E-05
ATEI	OPEN FLARE-2	79-34-5	1,1,2,2-Tetrachloroethane	3.024E+00	8760	4.350E-05
ATEI	F-LFG1	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	1.265E+01	8760	1.819E-04
ATEI	F-LFG2	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.385E+02	8760	4.869E-03
ATEI	OPEN FLARE-1	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.437E+00	8760	4.944E-05
ATEI	OPEN FLARE-2	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.775E+00	8760	5.430E-05
ATEI	F-LFG1	78-87-5	1,2-Dichloropropane (propylene dichloride)	1.106E+00	8760	1.591E-05
ATEI	F-LFG2	78-87-5	1,2-Dichloropropane (propylene dichloride)	2.960E+01	8760	4.257E-04
ATEI	OPEN FLARE-1	78-87-5	1,2-Dichloropropane (propylene dichloride)	3.006E-01	8760	4.323E-06
ATEI	OPEN FLARE-2	78-87-5	1,2-Dichloropropane (propylene dichloride)	3.301E-01	8760	4.748E-06
ATEI	TIP-2	106-99-0	1,3-Butadiene	2.046E-01	3322	7.759E-06
ATEI	TIP-3	106-99-0	1,3-Butadiene	1.585E-01	3337	5.983E-06
ATEI	F-LFG1	78-93-3	2-Butanone (methyl ethyl ketone)	2.780E+01	8760	3.999E-04
ATEI	F-LFG2	78-93-3	2-Butanone (methyl ethyl ketone)	7.441E+02	8760	1.070E-02
ATEI	OPEN FLARE-1	78-93-3	2-Butanone (methyl ethyl ketone)	7.556E+00	8760	1.087E-04
ATEI	OPEN FLARE-2	78-93-3	2-Butanone (methyl ethyl ketone)	8.299E+00	8760	1.194E-04
ATEI	TIP-2	83-32-9	Acenaphthene	7.430E-03	3322	2.818E-07
ATEI	TIP-3	83-32-9	Acenaphthene	5.755E-03	3337	2.173E-07
ATEI	TIP-2	208-96-8	Acenaphthylene	2.647E-02	3322	1.004E-06
ATEI	TIP-3	208-96-8	Acenaphthylene	2.051E-02	3337	7.743E-07
ATEI	TIP-2	75-07-0	Acetaldehyde	4.013E+00	3322	1.522E-04
ATEI	TIP-3	75-07-0	Acetaldehyde	3.108E+00	3337	1.174E-04
ATEI	F-LFG1	67-64-1	Acetone	2.214E+01	8760	3.185E-04
ATEI	F-LFG2	67-64-1	Acetone	5.925E+02	8760	8.523E-03
ATEI	OPEN FLARE-1	67-64-1	Acetone	6.017E+00	8760	8.654E-05
ATEI	OPEN FLARE-2	67-64-1	Acetone	6.609E+00	8760	9.506E-05
ATEI	TIP-2	107-02-8	Acrolein	4.840E-01	3322	1.836E-05
ATEI	TIP-3	107-02-8	Acrolein	3.749E-01	3337	1.415E-05
ATEI	F-LFG1	107-13-1	Acrylonitrile	1.827E+01	8760	2.627E-04
ATEI	F-LFG2	107-13-1	Acrylonitrile	4.888E+02	8760	7.031E-03
ATEI	OPEN FLARE-1	107-13-1	Acrylonitrile	4.964E+00	8760	7.139E-05
ATEI	OPEN FLARE-2	107-13-1	Acrylonitrile	5.452E+00	8760	7.842E-05
ATEI	TIP-2	120-12-7	Anthracene	9.784E-03	3322	3.711E-07
ATEI	TIP-3	120-12-7	Anthracene	7.579E-03	3337	2.862E-07
ATEI	TIP-2	56-55-3	Benz[a]anthracene	8.790E-03	3322	3.334E-07
ATEI	TIP-3	56-55-3	Benz[a]anthracene	6.809E-03	3337	2.571E-07
ATEI	F-LFG1	71-43-2	Benzene	8.114E+00	8760	1.167E-04
ATEI	F-LFG2	71-43-2	Benzene	2.171E+02	8760	3.123E-03
ATEI	OPEN FLARE-1	71-43-2	Benzene	2.205E+00	8760	3.171E-05
ATEI	OPEN FLARE-2	71-43-2	Benzene	2.422E+00	8760	3.483E-05
ATEI	TIP-2	71-43-2	Benzene	4.882E+00	3322	1.852E-04
ATEI	TIP-3	71-43-2	Benzene	3.781E+00	3337	1.428E-04
ATEI	TIP-2	50-32-8	Benzo[a]pyrene	9.836E-04	3322	3.731E-08
ATEI	TIP-3	50-32-8	Benzo[a]pyrene	7.619E-04	3337	2.877E-08
ATEI	TIP-2	205-99-2	Benzo[b]fluoranthene	5.185E-04	3322	1.967E-08
ATEI	TIP-3	205-99-2	Benzo[b]fluoranthene	4.016E-04	3337	1.516E-08
ATEI	TIP-2	191-24-2	Benzo[g,h,i]perylene	2.559E-03	3322	9.704E-08
ATEI	TIP-3	191-24-2	Benzo[g,h,i]perylene	1.982E-03	3337	7.483E-08
ATEI	F-LFG1	75-27-4	Bromodichloromethane	2.789E+01	8760	4.011E-04
ATEI	F-LFG2	75-27-4	Bromodichloromethane	7.463E+02	8760	1.073E-02
ATEI	OPEN FLARE-1	75-27-4	Bromodichloromethane	7.578E+00	8760	1.090E-04
ATEI	OPEN FLARE-2	75-27-4	Bromodichloromethane	8.324E+00	8760	1.197E-04
LandGem	F-LFG (FUG)	106-97-8	Butane	4.032E+02	8760	5.799E-03
LandGem	OPEN FLARE-1	106-97-8	Butane	1.210E+01	8760	1.740E-04
LandGem	OPEN FLARE-2	106-97-8	Butane	1.210E+01	8760	1.740E-04
LandGem	F-LFG (FUG)	124-38-9	Carbon dioxide	2.868E+07	8760	4.125E+02
LandGem	OPEN FLARE-1	124-38-9	Carbon dioxide	8.604E+05	8760	1.238E+01
LandGem	OPEN FLARE-2	124-38-9	Carbon dioxide	8.604E+05	8760	1.238E+01
ATEI	F-LFG1	75-15-0	Carbon disulfide	2.401E+00	8760	3.454E-05
ATEI	F-LFG2	75-15-0	Carbon disulfide	6.426E+01	8760	9.243E-04
ATEI	OPEN FLARE-1	75-15-0	Carbon disulfide	6.525E-01	8760	9.386E-06
ATEI	OPEN FLARE-2	75-15-0	Carbon disulfide	7.167E-01	8760	1.031E-05
Annual TV	AIA	630-08-0	Carbon monoxide	2.000E+03	8760	2.877E-02
Annual TV	F-LFG1	630-08-0	Carbon monoxide	2.200E+02	8760	3.164E-03
Annual TV	F-LFG2	630-08-0	Carbon monoxide	5.880E+03	8760	8.458E-02

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
Annual TV	OPEN FLARE-1	630-08-0	Carbon monoxide	3.184E+04	8760	4.580E-01
Annual TV	OPEN FLARE-2	630-08-0	Carbon monoxide	6.472E+04	8760	9.309E-01
Annual TV	TIP-2	630-08-0	Carbon monoxide	5.000E+03	3322	1.896E-01
Annual TV	TIP-3	630-08-0	Carbon monoxide	3.860E+03	3337	1.457E-01
ATEI	F-LFG1	56-23-5	Carbon tetrachloride	3.347E-02	8760	4.814E-07
ATEI	F-LFG2	56-23-5	Carbon tetrachloride	8.956E-01	8760	1.288E-05
ATEI	OPEN FLARE-1	56-23-5	Carbon tetrachloride	9.094E-03	8760	1.308E-07
ATEI	OPEN FLARE-2	56-23-5	Carbon tetrachloride	9.989E-03	8760	1.437E-07
ATEI	F-LFG1	463-58-1	Carbonyl sulfide	1.601E+00	8760	2.302E-05
ATEI	F-LFG2	463-58-1	Carbonyl sulfide	4.284E+01	8760	6.162E-04
ATEI	OPEN FLARE-1	463-58-1	Carbonyl sulfide	4.350E-01	8760	6.257E-06
ATEI	OPEN FLARE-2	463-58-1	Carbonyl sulfide	4.778E-01	8760	6.872E-06
ATEI	F-LFG1	108-90-7	Chlorobenzene	1.530E+00	8760	2.201E-05
ATEI	F-LFG2	108-90-7	Chlorobenzene	4.095E+01	8760	5.891E-04
ATEI	OPEN FLARE-1	108-90-7	Chlorobenzene	4.159E-01	8760	5.982E-06
ATEI	OPEN FLARE-2	108-90-7	Chlorobenzene	4.568E-01	8760	6.570E-06
ATEI	F-LFG1	75-45-6	Chlorodifluoromethane (Freon 22)	6.113E+00	8760	8.793E-05
ATEI	F-LFG2	75-45-6	Chlorodifluoromethane (Freon 22)	1.636E+02	8760	2.353E-03
ATEI	OPEN FLARE-1	75-45-6	Chlorodifluoromethane (Freon 22)	1.661E+00	8760	2.389E-05
ATEI	OPEN FLARE-2	75-45-6	Chlorodifluoromethane (Freon 22)	1.825E+00	8760	2.625E-05
ATEI	F-LFG1	75-00-3	Chloroethane (ethyl chloride)	4.386E+00	8760	6.309E-05
ATEI	F-LFG2	75-00-3	Chloroethane (ethyl chloride)	1.174E+02	8760	1.688E-03
ATEI	OPEN FLARE-1	75-00-3	Chloroethane (ethyl chloride)	1.192E+00	8760	1.714E-05
ATEI	OPEN FLARE-2	75-00-3	Chloroethane (ethyl chloride)	1.309E+00	8760	1.883E-05
ATEI	F-LFG1	67-66-3	Chloroform	1.948E-01	8760	2.802E-06
ATEI	F-LFG2	67-66-3	Chloroform	5.213E+00	8760	7.498E-05
ATEI	OPEN FLARE-1	67-66-3	Chloroform	5.293E-02	8760	7.613E-07
ATEI	OPEN FLARE-2	67-66-3	Chloroform	5.814E-02	8760	8.362E-07
ATEI	F-LFG1	74-87-3	Chloromethane (methyl chloride)	3.322E+00	8760	4.779E-05
ATEI	F-LFG2	74-87-3	Chloromethane (methyl chloride)	8.891E+01	8760	1.279E-03
ATEI	OPEN FLARE-1	74-87-3	Chloromethane (methyl chloride)	9.029E-01	8760	1.299E-05
ATEI	OPEN FLARE-2	74-87-3	Chloromethane (methyl chloride)	9.917E-01	8760	1.426E-05
ATEI	TIP-2	218-01-9	Chrysene	1.847E-03	3322	7.005E-08
ATEI	TIP-3	218-01-9	Chrysene	1.431E-03	3337	5.402E-08
ATEI	TIP-2	53-70-3	Dibenz[a,h]anthracene	3.050E-03	3322	1.157E-07
ATEI	TIP-3	53-70-3	Dibenz[a,h]anthracene	2.363E-03	3337	8.921E-08
ATEI	F-LFG1	75-71-8	Dichlorodifluoromethane (Freon 12)	1.032E+02	8760	1.485E-03
ATEI	F-LFG2	75-71-8	Dichlorodifluoromethane (Freon 12)	2.763E+03	8760	3.974E-02
ATEI	OPEN FLARE-1	75-71-8	Dichlorodifluoromethane (Freon 12)	2.805E+01	8760	4.035E-04
ATEI	OPEN FLARE-2	75-71-8	Dichlorodifluoromethane (Freon 12)	3.081E+01	8760	4.432E-04
ATEI	F-LFG1	75-43-4	Dichlorofluoromethane (Freon 21)	1.466E+01	8760	2.109E-04
ATEI	F-LFG2	75-43-4	Dichlorofluoromethane (Freon 21)	3.924E+02	8760	5.645E-03
ATEI	OPEN FLARE-1	75-43-4	Dichlorofluoromethane (Freon 21)	3.985E+00	8760	5.732E-05
ATEI	OPEN FLARE-2	75-43-4	Dichlorofluoromethane (Freon 21)	4.377E+00	8760	6.296E-05
ATEI	F-LFG1	75-09-2	Dichloromethane (methylene chloride)	6.606E+01	8760	9.501E-04
ATEI	F-LFG2	75-09-2	Dichloromethane (methylene chloride)	1.768E+03	8760	2.543E-02
ATEI	OPEN FLARE-1	75-09-2	Dichloromethane (methylene chloride)	1.795E+01	8760	2.582E-04
ATEI	OPEN FLARE-2	75-09-2	Dichloromethane (methylene chloride)	1.972E+01	8760	2.836E-04
LandGem	F-LFG (FUG)	75-18-3	Dimethyl sulfide (methyl sulfide)	6.724E+02	8760	9.671E-03
LandGem	OPEN FLARE-1	75-18-3	Dimethyl sulfide (methyl sulfide)	2.017E+01	8760	2.901E-04
LandGem	OPEN FLARE-2	75-18-3	Dimethyl sulfide (methyl sulfide)	2.017E+01	8760	2.901E-04
LandGem	F-LFG (FUG)	74-84-0	Ethane	3.713E+04	8760	5.341E-01
LandGem	OPEN FLARE-1	74-84-0	Ethane	1.114E+03	8760	1.602E-02
LandGem	OPEN FLARE-2	74-84-0	Ethane	1.114E+03	8760	1.602E-02
LandGem	F-LFG (FUG)	64-17-5	Ethanol	1.726E+03	8760	2.483E-02
LandGem	OPEN FLARE-1	64-17-5	Ethanol	5.179E+01	8760	7.449E-04
LandGem	OPEN FLARE-2	64-17-5	Ethanol	5.179E+01	8760	7.449E-04
ATEI	F-LFG1	100-41-4	Ethyl benzene	2.662E+01	8760	3.828E-04
ATEI	F-LFG2	100-41-4	Ethyl benzene	7.122E+02	8760	1.024E-02
ATEI	OPEN FLARE-1	100-41-4	Ethyl benzene	7.233E+00	8760	1.040E-04
ATEI	OPEN FLARE-2	100-41-4	Ethyl benzene	7.944E+00	8760	1.143E-04
LandGem	F-LFG (FUG)	75-08-1	Ethyl mercaptan (ethanethiol)	1.983E+02	8760	2.852E-03
LandGem	OPEN FLARE-1	75-08-1	Ethyl mercaptan (ethanethiol)	5.948E+00	8760	8.555E-05
LandGem	OPEN FLARE-2	75-08-1	Ethyl mercaptan (ethanethiol)	5.948E+00	8760	8.555E-05
ATEI	F-LFG1	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	1.022E-02	8760	1.470E-07
ATEI	F-LFG2	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	2.734E-01	8760	3.933E-06
ATEI	OPEN FLARE-1	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	2.777E-03	8760	3.994E-08
ATEI	OPEN FLARE-2	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	3.050E-03	8760	4.387E-08
ATEI	F-LFG1	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	2.207E+00	8760	3.174E-05
ATEI	F-LFG2	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	5.905E+01	8760	8.493E-04
ATEI	OPEN FLARE-1	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	5.996E-01	8760	8.625E-06

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
ATEI	OPEN FLARE-2	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	6.586E-01	8760	9.473E-06
ATEI	TIP-2	206-44-0	Fluoranthene	3.982E-02	3322	1.510E-06
ATEI	TIP-3	206-44-0	Fluoranthene	3.084E-02	3337	1.165E-06
ATEI	TIP-2	86-73-7	Fluorene	1.528E-01	3322	5.795E-06
ATEI	TIP-3	86-73-7	Fluorene	1.183E-01	3337	4.468E-06
ATEI	TIP-2	50-00-0	Formaldehyde	6.174E+00	3322	2.342E-04
ATEI	TIP-3	50-00-0	Formaldehyde	4.782E+00	3337	1.806E-04
ATEI	F-LFG1	110-54-3	Hexane	3.079E+01	8760	4.429E-04
ATEI	F-LFG2	110-54-3	Hexane	8.240E+02	8760	1.185E-02
ATEI	OPEN FLARE-1	110-54-3	Hexane	8.368E+00	8760	1.204E-04
ATEI	OPEN FLARE-2	110-54-3	Hexane	9.191E+00	8760	1.322E-04
ATEI	F-LFG1	7783-06-4	Hydrogen sulfide	6.580E+01	8760	9.464E-04
ATEI	F-LFG2	7783-06-4	Hydrogen sulfide	1.761E+03	8760	2.533E-02
ATEI	OPEN FLARE-1	7783-06-4	Hydrogen sulfide	1.788E+01	8760	2.572E-04
ATEI	OPEN FLARE-2	7783-06-4	Hydrogen sulfide	1.964E+01	8760	2.825E-04
ATEI	TIP-2	193-39-5	Indeno[1,2,3-cd]pyrene	1.962E-03	3322	7.442E-08
ATEI	TIP-3	193-39-5	Indeno[1,2,3-cd]pyrene	1.520E-03	3337	5.739E-08
ATEI	F-LFG1	67-63-0	Isopropyl alcohol	1.638E+02	8760	2.356E-03
ATEI	F-LFG2	67-63-0	Isopropyl alcohol	4.383E+03	8760	6.304E-02
ATEI	OPEN FLARE-1	67-63-0	Isopropyl alcohol	4.451E+01	8760	6.401E-04
ATEI	OPEN FLARE-2	67-63-0	Isopropyl alcohol	4.888E+01	8760	7.031E-04
ATEI	F-LFG1	7439-97-6	Mercury and compounds	3.186E-03	8760	4.582E-08
ATEI	F-LFG2	7439-97-6	Mercury and compounds	8.525E-02	8760	1.226E-06
ATEI	OPEN FLARE-1	7439-97-6	Mercury and compounds	8.657E-04	8760	1.245E-08
ATEI	OPEN FLARE-2	7439-97-6	Mercury and compounds	9.508E-04	8760	1.368E-08
LandGem	F-LFG (FUG)	74-82-8	Methane	1.180E+07	8760	1.697E+02
LandGem	OPEN FLARE-1	74-82-8	Methane	3.540E+05	8760	5.092E+00
LandGem	OPEN FLARE-2	74-82-8	Methane	3.540E+05	8760	5.092E+00
ATEI	F-LFG1	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	1.019E+01	8760	1.465E-04
ATEI	F-LFG2	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	2.726E+02	8760	3.921E-03
ATEI	OPEN FLARE-1	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	2.768E+00	8760	3.981E-05
ATEI	OPEN FLARE-2	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	3.040E+00	8760	4.373E-05
LandGem	F-LFG (FUG)	74-93-1	Methyl mercaptan	1.669E+02	8760	2.400E-03
LandGem	OPEN FLARE-1	74-93-1	Methyl mercaptan	5.006E+00	8760	7.201E-05
LandGem	OPEN FLARE-2	74-93-1	Methyl mercaptan	5.006E+00	8760	7.201E-05
ATEI	TIP-2	91-20-3	Naphthalene	4.437E-01	3322	1.683E-05
ATEI	TIP-3	91-20-3	Naphthalene	3.437E-01	3337	1.298E-05
Annual TV	AIA	N/A	NMOC	2.000E+03	8760	2.877E-02
Annual TV	F-LFG1	N/A	NMOC	2.840E+03	8760	4.085E-02
Annual TV	F-LFG2	N/A	NMOC	7.596E+04	8760	1.093E+00
Annual TV	OPEN FLARE-1	N/A	NMOC	7.800E+02	8760	1.122E-02
Annual TV	OPEN FLARE-2	N/A	NMOC	8.600E+02	8760	1.237E-02
Annual TV	PCS	N/A	NMOC	2.400E+02	8760	3.452E-03
Annual TV	TIP-2	N/A	NMOC	1.880E+03	3322	7.131E-02
Annual TV	TIP-3	N/A	NMOC	1.460E+03	3337	5.513E-02
Annual TV	AIA	10102-44-0	NOx (as NO2)	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	10102-44-0	NOx (as NO2)	6.360E+03	8760	9.148E-02
Annual TV	OPEN FLARE-2	10102-44-0	NOx (as NO2)	1.190E+04	8760	1.712E-01
Annual TV	TIP-2	10102-44-0	NOx (as NO2)	2.318E+04	3322	8.792E-01
Annual TV	TIP-3	10102-44-0	NOx (as NO2)	1.794E+04	3337	6.774E-01
ATEI	F-LFG1	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	1.679E+00	8760	2.415E-05
ATEI	F-LFG2	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	4.493E+01	8760	6.462E-04
ATEI	OPEN FLARE-1	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	4.562E-01	8760	6.562E-06
ATEI	OPEN FLARE-2	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	5.011E-01	8760	7.207E-06
LandGem	F-LFG (FUG)	109-66-0	Pentane	3.303E+02	8760	4.751E-03
LandGem	OPEN FLARE-1	109-66-0	Pentane	9.910E+00	8760	1.425E-04
LandGem	OPEN FLARE-2	109-66-0	Pentane	9.910E+00	8760	1.425E-04
ATEI	TIP-2	85-01-8	Phenanthrene	1.538E-01	3322	5.834E-06
ATEI	TIP-3	85-01-8	Phenanthrene	1.192E-01	3337	4.499E-06
Annual TV	AIA	N/A	PM	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	N/A	PM	2.700E+03	8760	3.884E-02
Annual TV	OPEN FLARE-2	N/A	PM	2.980E+03	8760	4.286E-02
Annual TV	PIR	N/A	PM	1.768E+04	8760	2.543E-01
Annual TV	TIP-2	N/A	PM	1.640E+03	3322	6.220E-02
Annual TV	TIP-3	N/A	PM	1.280E+03	3337	4.833E-02
Annual TV	UPR-1	N/A	PM	1.260E+03	8760	1.812E-02
Annual TV	UPR-2	N/A	PM	9.540E+03	8760	1.372E-01
Annual TV	AIA	N/A	PM10	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	N/A	PM10	2.700E+03	8760	3.884E-02
Annual TV	OPEN FLARE-2	N/A	PM10	2.980E+03	8760	4.286E-02
Annual TV	PIR	N/A	PM10	3.420E+03	8760	4.919E-02

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
Annual TV	TIP-2	N/A	PM10	1.640E+03	3322	6.220E-02
Annual TV	TIP-3	N/A	PM10	1.280E+03	3337	4.833E-02
Annual TV	UPR-1	N/A	PM10	5.000E+02	8760	7.192E-03
Annual TV	UPR-2	N/A	PM10	2.040E+03	8760	2.934E-02
LandGem	F-LFG (FUG)	74-98-6	Propane	6.729E+02	8760	9.679E-03
LandGem	OPEN FLARE-1	74-98-6	Propane	2.019E+01	8760	2.904E-04
LandGem	OPEN FLARE-2	74-98-6	Propane	2.019E+01	8760	2.904E-04
Annual TV	AIA	7446-09-5	Sulfur dioxide	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	7446-09-5	Sulfur dioxide	2.220E+03	8760	3.193E-02
Annual TV	OPEN FLARE-2	7446-09-5	Sulfur dioxide	2.440E+03	8760	3.510E-02
Annual TV	TIP-2	7446-09-5	Sulfur dioxide	1.540E+03	3322	5.841E-02
Annual TV	TIP-3	7446-09-5	Sulfur dioxide	1.180E+03	3337	4.455E-02
ATEI	F-LFG1	127-18-4	Tetrachloroethene (perchloroethylene)	3.364E+01	8760	4.839E-04
ATEI	F-LFG2	127-18-4	Tetrachloroethene (perchloroethylene)	9.002E+02	8760	1.295E-02
ATEI	OPEN FLARE-1	127-18-4	Tetrachloroethene (perchloroethylene)	9.141E+00	8760	1.315E-04
ATEI	OPEN FLARE-2	127-18-4	Tetrachloroethene (perchloroethylene)	1.004E+01	8760	1.444E-04
ATEI	F-LFG1	108-88-3	Toluene	1.969E+02	8760	2.832E-03
ATEI	F-LFG2	108-88-3	Toluene	5.269E+03	8760	7.579E-02
ATEI	OPEN FLARE-1	108-88-3	Toluene	5.351E+01	8760	7.696E-04
ATEI	OPEN FLARE-2	108-88-3	Toluene	5.877E+01	8760	8.453E-04
ATEI	TIP-2	108-88-3	Toluene	2.140E+00	3322	8.117E-05
ATEI	TIP-3	108-88-3	Toluene	1.658E+00	3337	6.259E-05
LandGem	F-LFG (FUG)	N/A	Total landfill gas	4.048E+07	8760	5.823E+02
LandGem	OPEN FLARE-1	N/A	Total landfill gas	1.214E+06	8760	1.747E+01
LandGem	OPEN FLARE-2	N/A	Total landfill gas	1.214E+06	8760	1.747E+01
ATEI	F-LFG1	156-60-5	trans-1,2-Dichloroethene	1.497E+01	8760	2.154E-04
ATEI	F-LFG2	156-60-5	trans-1,2-Dichloroethene	4.007E+02	8760	5.763E-03
ATEI	OPEN FLARE-1	156-60-5	trans-1,2-Dichloroethene	4.069E+00	8760	5.852E-05
ATEI	OPEN FLARE-2	156-60-5	trans-1,2-Dichloroethene	4.469E+00	8760	6.428E-05
ATEI	F-LFG1	79-01-6	Trichloroethene (TCE, trichloroethylene)	2.015E+01	8760	2.899E-04
ATEI	F-LFG2	79-01-6	Trichloroethene (TCE, trichloroethylene)	5.393E+02	8760	7.757E-03
ATEI	OPEN FLARE-1	79-01-6	Trichloroethene (TCE, trichloroethylene)	5.476E+00	8760	7.877E-05
ATEI	OPEN FLARE-2	79-01-6	Trichloroethene (TCE, trichloroethylene)	6.015E+00	8760	8.651E-05
ATEI	F-LFG1	75-69-4	Trichlorofluoromethane (Freon 11)	5.678E+00	8760	8.167E-05
ATEI	F-LFG2	75-69-4	Trichlorofluoromethane (Freon 11)	1.520E+02	8760	2.186E-03
ATEI	OPEN FLARE-1	75-69-4	Trichlorofluoromethane (Freon 11)	1.543E+00	8760	2.219E-05
ATEI	OPEN FLARE-2	75-69-4	Trichlorofluoromethane (Freon 11)	1.695E+00	8760	2.438E-05
ATEI	F-LFG1	75-01-4	Vinyl chloride	2.495E+01	8760	3.589E-04
ATEI	F-LFG2	75-01-4	Vinyl chloride	6.676E+02	8760	9.603E-03
ATEI	OPEN FLARE-1	75-01-4	Vinyl chloride	6.780E+00	8760	9.751E-05
ATEI	OPEN FLARE-2	75-01-4	Vinyl chloride	7.446E+00	8760	1.071E-04
ATEI	F-LFG1	75-35-4	Vinylidene chloride	7.607E-01	8760	1.094E-05
ATEI	F-LFG2	75-35-4	Vinylidene chloride	2.036E+01	8760	2.928E-04
ATEI	OPEN FLARE-1	75-35-4	Vinylidene chloride	2.067E-01	8760	2.973E-06
ATEI	OPEN FLARE-2	75-35-4	Vinylidene chloride	2.271E-01	8760	3.266E-06
Annual TV	AIA	N/A	VOC	2.000E+03	8760	2.877E-02
Annual TV	F-LFG1	N/A	VOC	1.100E+03	8760	1.582E-02
Annual TV	F-LFG2	N/A	VOC	2.960E+04	8760	4.258E-01
Annual TV	OPEN FLARE-1	N/A	VOC	3.400E+02	8760	4.890E-03
Annual TV	OPEN FLARE-2	N/A	VOC	3.600E+02	8760	5.178E-03
Annual TV	PCS	N/A	VOC	2.400E+02	8760	3.452E-03
Annual TV	TIP-2	N/A	VOC	1.880E+03	3322	7.131E-02
Annual TV	TIP-3	N/A	VOC	1.460E+03	3337	5.513E-02
ATEI	F-LFG1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	6.986E+01	8760	1.005E-03
ATEI	F-LFG2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.869E+03	8760	2.689E-02
ATEI	OPEN FLARE-1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.898E+01	8760	2.730E-04
ATEI	OPEN FLARE-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	2.085E+01	8760	2.999E-04
ATEI	TIP-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.491E+00	3322	5.656E-05
ATEI	TIP-3	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.155E+00	3337	4.361E-05

Pollutants Added from 2023 LandGem Inventory

Pollutant	2023 LandGem Gas Generated (tons/yr)	2023 LandGem Gas Generated (lb/yr)	2023 LandGem Fugitives (lb/yr) *	2023 LandGem Open Flare 1 (lb/yr) **	2023 LandGem Open Flare 2 (lb/yr) **
Total landfill gas	8.10E+04	1.62E+08	4.05E+07	1.21E+06	1.21E+06
Methane	2.36E+04	4.72E+07	1.18E+07	3.54E+05	3.54E+05
Carbon dioxide	5.74E+04	1.15E+08	2.87E+07	8.60E+05	8.60E+05
Butane - VOC	8.06E-01	1.61E+03	4.03E+02	1.21E+01	1.21E+01
Dimethyl sulfide (methyl sulfide) - VOC	1.34E+00	2.69E+03	6.72E+02	2.02E+01	2.02E+01
Ethane	7.43E+01	1.49E+05	3.71E+04	1.11E+03	1.11E+03
Ethanol - VOC	3.45E+00	6.90E+03	1.73E+03	5.18E+01	5.18E+01
Ethyl mercaptan (ethanethiol) - VOC	3.97E-01	7.93E+02	1.98E+02	5.95E+00	5.95E+00
Methyl mercaptan - VOC	3.34E-01	6.67E+02	1.67E+02	5.01E+00	5.01E+00
Pentane - VOC	6.61E-01	1.32E+03	3.30E+02	9.91E+00	9.91E+00
Propane - VOC	1.35E+00	2.69E+03	6.73E+02	2.02E+01	2.02E+01

Notes:

* Fugitive emissions assumed 75% gas collection and 25% fugitive loss.

** Flare emissions assumed 98% destruction of the 75% gas collection, then a 50% / 50% split for Open Flare 1 and Open Flare 2.

Appendix D

Scenario #2 Emission Rates

2052 Emission Inventory

2052 Data	Source Name	CAS No.	Pollutant Name	Emission Factor Reference	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
LandGEM	FUG	75-18-3	Dimethyl sulfide (methyl sulfide)	LandGEM	1,153.66	8760	1.66E-02
LandGEM	FUG_EXP	75-18-3	Dimethyl sulfide (methyl sulfide)	LandGEM	271.94	8760	3.91E-03
LandGEM	EFLARE-1	75-18-3	Dimethyl sulfide (methyl sulfide)	LandGEM	85.54	8760	1.23E-03
LandGEM	FUG	100-41-4	Ethyl benzene	AP-42	1,145.09	8760	1.65E-02
LandGEM	FUG_EXP	100-41-4	Ethyl benzene	AP-42	269.92	8760	3.88E-03
LandGEM	EFLARE-1	100-41-4	Ethyl benzene	AP-42	84.90	8760	1.22E-03
LandGEM	FUG	75-08-1	Ethyl mercaptan (ethanethiol)	LandGEM	340.18	8760	4.89E-03
LandGEM	FUG_EXP	75-08-1	Ethyl mercaptan (ethanethiol)	LandGEM	80.19	8760	1.15E-03
LandGEM	EFLARE-1	75-08-1	Ethyl mercaptan (ethanethiol)	LandGEM	25.22	8760	3.63E-04
LandGEM	FUG	7783-06-4	Hydrogen sulfide	AP-42	2,830.78	8760	4.07E-02
LandGEM	FUG_EXP	7783-06-4	Hydrogen sulfide	AP-42	667.27	8760	9.60E-03
LandGEM	EFLARE-1	7783-06-4	Hydrogen sulfide	AP-42	209.88	8760	3.02E-03
LandGEM	FUG	74-93-1	Methyl mercaptan	LandGEM	286.32	8760	4.12E-03
LandGEM	FUG_EXP	74-93-1	Methyl mercaptan	LandGEM	67.49	8760	9.71E-04
LandGEM	EFLARE-1	74-93-1	Methyl mercaptan	LandGEM	21.23	8760	3.05E-04
LandGEM	AIA	10102-44-0	NOx (as NO2)	Title V Permit	2,000.00	8760	2.88E-02
LandGEM	TIP-2	10102-44-0	NOx (as NO2)	Title V Permit	23,180.00	3322	8.79E-01
LandGEM	TIP-3	10102-44-0	NOx (as NO2)	Title V Permit	17,940.00	3337	6.77E-01
LandGEM	EFLARE-1	10102-44-0	NOx (as NO2)	Title V Permit	92,958.10	8760	1.34E+00
LandGEM	FUG	108-88-3	Toluene	AP-42	8,471.72	8760	1.22E-01
LandGEM	FUG_EXP	108-88-3	Toluene	AP-42	1,996.96	8760	2.87E-02
LandGEM	EFLARE-1	108-88-3	Toluene	AP-42	628.12	8760	9.03E-03
LandGEM	TIP-2	108-88-3	Toluene	AP-42 3.3-2	2.14	3322	8.12E-05
LandGEM	TIP-3	108-88-3	Toluene	AP-42 3.3-2	1.66	3337	6.26E-05
LandGEM	FUG	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42	3,005.55	8760	4.32E-02
LandGEM	FUG_EXP	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42	708.47	8760	1.02E-02
LandGEM	EFLARE-1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42	222.84	8760	3.21E-03
LandGEM	TIP-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42 3.3-2	1.49	3322	5.66E-05
LandGEM	TIP-3	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42 3.3-2	1.16	3337	4.36E-05

Pollutants Added from 2052 LandGem Inventory

Pollutant	2052 LandGem Gas Generated (tons/yr)	2052 LandGem Gas Generated (lb/yr)	2052 LandGEM Fugitives (lb/yr) *	2052 LandGEM FUG (lb/yr) **	2052 LandGEM FUG_EXP (lb/yr) **	2052 LandGem Enclosed Flare (lb/yr) ***
Total landfill gas	1.71E+05	3.43E+08	8.57E+07	6.93E+07	1.63E+07	5.14E+06
Methane	4.99E+04	9.99E+07	2.50E+07	2.02E+07	4.76E+06	7.49E+05
Carbon dioxide	1.21E+05	2.43E+08	6.07E+07	4.91E+07	1.16E+07	1.82E+06
Butane - VOC	1.71E+00	3.41E+03	8.53E+02	6.90E+02	1.63E+02	2.56E+01
Dimethyl sulfide (methyl sulfide) - VOC	2.85E+00	5.69E+03	1.42E+03	1.15E+03	2.71E+02	4.27E+01
Ethane	1.57E+02	3.14E+05	7.86E+04	6.36E+04	1.50E+04	2.36E+03
Ethanol - VOC	7.30E+00	1.46E+04	3.65E+03	2.96E+03	6.97E+02	1.10E+02
Ethyl mercaptan (ethanethiol) - VOC	8.39E-01	1.68E+03	4.19E+02	3.39E+02	8.00E+01	1.26E+01
Methyl mercaptan - VOC	7.06E-01	1.41E+03	3.53E+02	2.86E+02	6.74E+01	1.06E+01
Pentane - VOC	1.40E+00	2.80E+03	6.99E+02	5.66E+02	1.33E+02	2.10E+01
Propane - VOC	2.85E+00	5.69E+03	1.42E+03	1.15E+03	2.72E+02	4.27E+01

Notes:

* Fugitive emissions assumed 75% gas collection and 25% fugitive loss.

** Fugitive emissions split 81% to FUG and 19% to FUG_EXP sources based on area size

*** Flare emissions assumed 98% destruction of the 75% gas collection

Appendix E

Odor Thresholds

Odor Thresholds

CAS No.	Pollutant	Molecular Weight (g/mole)	Odor Threshold Reference	Odor Threshold (ppm)	Odor Threshold (ug/m3)	Odor Threshold (mg/m3)	Odor Threshold (g/m3)
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	133.42	AIHA	0.97	5.293E+03	5.293E+00	5.293E-03
79-34-5	1,1,2,2-Tetrachloroethane	167.85	AIHA	0.233	1.600E+03	1.600E+00	1.600E-03
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	98.97	EPA HAPs	120	4.857E+05	4.857E+02	4.857E-01
95-50-1	1,2-Dichlorobenzene	147.00	AIHA	0.02	1.202E+02	1.202E-01	1.202E-04
78-87-5	1,2-Dichloropropane (propylene dichloride)	112.99	EPA HAPs	0.25	1.155E+03	1.155E+00	1.155E-03
106-99-0	1,3-Butadiene	54.09	AIHA	0.099	2.190E+02	2.190E-01	2.190E-04
78-93-3	2-Butanone (methyl ethyl ketone)	72.10	AIHA	0.07	2.064E+02	2.064E-01	2.064E-04
83-32-9	Acenaphthene	154.21	N/A	0	0.000E+00	0.000E+00	0.000E+00
208-96-8	Acenaphthylene	152.19	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-07-0	Acetaldehyde	44.06	AIHA	0.0015	2.703E+00	2.703E-03	2.703E-06
67-64-1	Acetone	58.08	AIHA	0.4	9.502E+02	9.502E-01	9.502E-04
107-02-8	Acrolein	56.06	AIHA	0.0027	6.191E+00	6.191E-03	6.191E-06
107-13-1	Acrylonitrile	53.06	AIHA	1.6	3.472E+03	3.472E+00	3.472E-03
120-12-7	Anthracene	178.23	N/A	0	0.000E+00	0.000E+00	0.000E+00
56-55-3	Benz[a]anthracene	228.29	N/A	0	0.000E+00	0.000E+00	0.000E+00
71-43-2	Benzene	78.11	AIHA	0.47	1.502E+03	1.502E+00	1.502E-03
50-32-8	Benzo[a]pyrene	252.31	N/A	0	0.000E+00	0.000E+00	0.000E+00
205-99-2	Benzo[b]fluoranthene	252.31	N/A	0	0.000E+00	0.000E+00	0.000E+00
191-24-2	Benzo[g,h,i]perylene	276.33	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-27-4	Bromodichloromethane	163.83	N/A	0	0.000E+00	0.000E+00	0.000E+00
106-97-8	Butane	58.12	AIHA	0.421	1.001E+03	1.001E+00	1.001E-03
124-38-9	Carbon dioxide	44.01	AIHA	39000	7.020E+07	7.020E+04	7.020E+01
75-15-0	Carbon disulfide	76.14	AIHA	0.016	4.983E+01	4.983E-02	4.983E-05
630-08-0	Carbon monoxide	28.01	N/A	0	0.000E+00	0.000E+00	0.000E+00
56-23-5	Carbon tetrachloride	153.80	AIHA	1.68	1.057E+04	1.057E+01	1.057E-02
463-58-1	Carbonyl sulfide	60.08	AIHA	0.057	1.401E+02	1.401E-01	1.401E-04
108-90-7	Chlorobenzene	112.56	AIHA	0.087	4.005E+02	4.005E-01	4.005E-04
75-45-6	Chlorodifluoromethane (Freon 22)	86.47	AIHA	200192	7.080E+08	7.080E+05	7.080E+02
75-00-3	Chloroethane (ethyl chloride)	64.52	AIHA	3.8	1.003E+04	1.003E+01	1.003E-02
67-66-3	Chloroform	119.38	AIHA	0.102	4.980E+02	4.980E-01	4.980E-04
74-87-3	Chloromethane (methyl chloride)	50.49	AIHA	10	2.065E+04	2.065E+01	2.065E-02
218-01-9	Chrysene	228.29	N/A	0	0.000E+00	0.000E+00	0.000E+00
53-70-3	Dibenz[a,h]anthracene	278.35	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-71-8	Dichlorodifluoromethane (Freon 12)	120.91	AIHA	199790	9.880E+08	9.880E+05	9.880E+02
75-43-4	Dichlorofluoromethane (Freon 21)	102.92	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-09-2	Dichloromethane (methylene chloride)	84.93	AIHA	1.2	4.168E+03	4.168E+00	4.168E-03
75-18-3	Dimethyl sulfide (methyl sulfide)	62.14	CAMEO	0.001	2.541E+00	2.541E-03	2.541E-06
74-84-0	Ethane	30.07	N/A	0	0.000E+00	0.000E+00	0.000E+00
64-17-5	Ethanol	46.07	AIHA	0.09	1.696E+02	1.696E-01	1.696E-04
100-41-4	Ethyl benzene	106.16	AIHA	0.002	8.684E+00	8.684E-03	8.684E-06
75-08-1	Ethyl mercaptan (ethanethiol)	62.13	CAMEO	0.001	2.541E+00	2.541E-03	2.541E-06
106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	187.86	AIHA	10	7.683E+04	7.683E+01	7.683E-02
107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	98.96	AIHA	4.3	1.740E+04	1.740E+01	1.740E-02
206-44-0	Fluoranthene	202.25	N/A	0	0.000E+00	0.000E+00	0.000E+00
86-73-7	Fluorene	166.22	N/A	0	0.000E+00	0.000E+00	0.000E+00
50-00-0	Formaldehyde	30.03	AIHA	0.027	3.316E+01	3.316E-02	3.316E-05
110-54-3	Hexane	86.17	AIHA	1.5	5.287E+03	5.287E+00	5.287E-03
7783-06-4	Hydrogen sulfide	34.08	CAMEO	0.0047	6.551E+00	6.551E-03	6.551E-06
193-39-5	Indeno[1,2,3-cd]pyrene	276.33	N/A	0	0.000E+00	0.000E+00	0.000E+00
67-63-0	Isopropyl alcohol	60.11	AIHA	1	2.458E+03	2.458E+00	2.458E-03
7439-97-6	Mercury and compounds	200.59	N/A	0	0.000E+00	0.000E+00	0.000E+00
74-82-8	Methane	16.04	N/A	0	0.000E+00	0.000E+00	0.000E+00
108-10-1	Methyl isobutyl ketone (MIBK, hexone)	100.16	AIHA	0.03	1.229E+02	1.229E-01	1.229E-04
74-93-1	Methyl mercaptan	48.11	CAMEO	0.0021	4.132E+00	4.132E-03	4.132E-06
91-20-3	Naphthalene	128.19	AIHA	0.0013	6.816E+00	6.816E-03	6.816E-06
N/A	NMOC	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
10102-44-0	NOx (as NO2)	46.01	CAMEO	1	1.882E+03	1.882E+00	1.882E-03
106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	147.02	AIHA	0.121	7.276E+02	7.276E-01	7.276E-04
109-66-0	Pentane	72.15	AIHA	1.29	3.807E+03	3.807E+00	3.807E-03
85-01-8	Phenanthrene	178.23	N/A	0	0.000E+00	0.000E+00	0.000E+00
N/A	PM	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
N/A	PM10	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
74-98-6	Propane	44.10	AIHA	1497	2.700E+06	2.700E+03	2.700E+00
7446-09-5	Sulfur dioxide	64.06	AIHA	0.33	8.646E+02	8.646E-01	8.646E-04
127-18-4	Tetrachloroethene (perchloroethylene)	165.83	AIHA	0.767	5.202E+03	5.202E+00	5.202E-03
108-88-3	Toluene	92.15	AIHA	0.026	9.799E+01	9.799E-02	9.799E-05
N/A	Total landfill gas	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
156-60-5	trans-1,2-Dichloroethene	96.94	AIHA	277	1.098E+06	1.098E+03	1.098E+00
79-01-6	Trichloroethene (TCE, trichloroethylene)	131.40	AIHA	0.5	2.687E+03	2.687E+00	2.687E-03
75-69-4	Trichlorofluoromethane (Freon 11)	137.37	AIHA	5	2.809E+04	2.809E+01	2.809E-02
75-01-4	Vinyl chloride	62.50	AIHA	203	5.189E+05	5.189E+02	5.189E-01
75-35-4	Vinylidene chloride	96.95	AIHA	50	1.983E+05	1.983E+02	1.983E-01
N/A	VOC	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	106.16	AIHA	0.012	5.210E+01	5.210E-02	5.210E-05

N/A = not applicable

Name	Address	City	State	ZipCode	NAICSCode	NAICSDescription
Kubler Consulting Inc	6855 NE Arnold Ave	Adair Village	OR	97330	541511	Computers-System Designers & Consultants
Santiam Christian Schools	7220 NE Arnold Ave	Adair Village	OR	97330	611110	Schools
Valley View Window Cleaning	8317 Hibiscus Dr	Adair Village	OR	97330-9596	238990	All Other Specialty Trade Contractors
City of Benton	6030 NE William R Carr St	Adair Village	OR	97330	921110	City Government-Executive Offices
Prince of Peace Community Church	7234 NE Arnold Ave	Adair Village	OR	97330	813110	Churches
Adair Living History	176 NE Azalea Dr	Adair Village	OR	97330-9436	813319	Miscellaneous social service advocacy organizations
Adair Village Food Mart	6002 NE William R Carr St	Adair Village	OR	97330	445110	Grocers-Retail
Bella's Pizzeria-Adair Village	6002 NE William R Carr St	Adair Village	OR	97330	722511	Restaurants
Adair Rural Fire Protection District	6021 NE Marcus Harris Ave	Adair Village	OR	97330-9490	922160	Fire Protection
Corvallis City Public Works	1245 NE 3rd St	Adair Village	OR	97330-6229	921120	Legislative assemblies
State of Oregon	7118 NE Vandenberg Ave	Adair Village	OR	97330	921120	Government Offices-State
SERVPRO of Benton & Linn Counties	6835 NE Arnold Ave	Adair Village	OR	97330-9585	236118	Residential Remodeling Contractors
GenX Detectors, LLC	8404 NE Barberry Dr	Adair Village	OR	97330	621999	Photographers-Medical & Dental
AmeriGas Propane Exchange	6002 NE William R Carr St	Adair Village	OR	97330	457210	Propane Tank Kiosks
Delta Delta Delta	340 NW 26th St	Adair Village	OR	97330	813410	Fraternities & Sororities
McGinnis Restoration & Construction	6835 NE Arnold Ave	Adair Village	OR	97330	236115	General Contractors
City of Adair Village Main Number	6030 NE William R Carr St	Adair Village	OR	97330	921110	City Government-Executive Offices
Barnhart Bradley L	2815 NW Glenwood Dr	Adair Village	OR	97330	541715	Physical Engineering & Life Sciences Research & Development
Benton County Public Works	1245 NE 3rd St	Adair Village	OR	97330-6229	921120	Legislative assemblies
Corvallis Bike Path/Lane Maintenance	1245 NE 3rd St	Adair Village	OR	97330	921120	Public Works Department
Clearman LLC	7336 SE Dot St	Adair Village	OR	97330	999990	Nonclassified Establishments
Oregon-Southern ID Laborers	6011 NE Marcus Harris Ave	Adair Village	OR	97330	624310	Employment Training Service
Blatt, David MD	350 NW Elks Dr	Adair Village	OR	97330	621111	Physicians & Surgeons
Adair Village, City	6030 NE William R Carr St	Adair Village	OR	97330	921120	Government Offices-City/Village & Twp
Fish & Wildlife Department	7118 NE Vandenberg Ave	Adair Village	OR	97330	924120	State Government-Land/Mineral/Wildlife/Forest Conservation
Corvallis Transit System	1245 NE 3rd St	Adair Village	OR	97330	485999	Transportation Services
Adair Rural Fire & Rescue-Main Station	6021 NE Marcus Harris Ave	Adair Village	OR	97330-9490	922160	Fire Protection
Design Tops Inc	7170 NE Arnold Ave	Adair Village	OR	97330	337110	Counter Tops
Alma Alaska Seafoods LLC	252 NE Azalea Dr	Adair Village	OR	97330	445250	Seafood-Retail
Northwest Roofing LLC	16024 Alsea Hwy	Alsea	OR	97324	238160	Roofing Contractors
Leaping Lamb Farm	20368 Honey Grove Rd	Alsea	OR	97324	721191	Bed & Breakfast Accommodations
Lobster Valley Church of Christ	17248 Lobster Valley Rd	Alsea	OR	97324	813110	Churches
D Miller Excavating	16582 Alsea Hwy	Alsea	OR	97324	238910	Excavating Contractors
Riley Family Farm	20678 Honey Grove Rd	Alsea	OR	97324	111998	Farms
Highway Department	27343 Alsea Deadwood Hwy	Alsea	OR	97324	237310	Road Maintenance
Tobe Creek Quarry A Div-J R	26451 Tobe Creek Rd	Alsea	OR	97324	423320	Rock (Whls)
Alsea Elementary School	301 S 3rd St	Alsea	OR	97324	611110	Schools
Alsea Rural Health Center	435 E Alder St	Alsea	OR	97324-9634	621111	Physicians' clinics
Cantrell Logging Company LLC	17979 Alsea Hwy	Alsea	OR	97324-9630	113310	Logging
Fil Construction	28828 Fish Hatchery Rd	Alsea	OR	97324	236115	Construction Companies
Out on A Limb Tree Service	26950 Fudge Rd	Alsea	OR	97324	561730	Tree Service
Farm Stay USA Farm and Ranch Vacations	20368 Honey Grove Rd	Alsea	OR	97324	813319	Non-Profit Organizations
The Alsea Firewood Company	20329 Alsea Hwy	Alsea	OR	97324	457210	Firewood
Complete Brush Cutting Service LLC	21340 Alsea Hwy	Alsea	OR	97324-5904	115310	Support Activities for Forestry
The Thyme Garden	20546 Alsea Hwy	Alsea	OR	97324	444240	Nurserymen
Biron, Kira	435 E Alder St	Alsea	OR	97324	621399	Nurses-Registered RN
Alsea Valley Gleaners	18889 Haines Rd	Alsea	OR	97324	813319	Community Action Agencies
Alsea Food Bank	18595 Alsea Hwy	Alsea	OR	97324	624210	Food Banks
Oregon Public Charter Schools Association	301 S 3rd St	Alsea	OR	97324	813910	Associations
Suislaw Brewing	NULL	Alsea	OR	97324	312120	Brewers (Mfrs)
United States Postal Service	140 E Main St	Alsea	OR	97324-9407	491110	Postal Service
Fish & Wildlife Department	2457 E Fall Creek Rd	Alsea	OR	97324	921120	Government Offices-State
Alsea Christian Fellowship	18080 Alsea Hwy	Alsea	OR	97324	813110	Churches
Alsea Community Library	19192 Alsea Hwy	Alsea	OR	97324	519210	Libraries-Public
Alsea Community Effort	19192 Alsea Hwy	Alsea	OR	97324-9607	813319	Miscellaneous social service advocacy organizations

G Barnes Trucking LLC	135 E Main St	Alsea	OR	97324	484230	Trucking
Pretty Parrots & Friendly	16482 Alsea Hwy	Alsea	OR	97324	459910	Birds
John Boy's Mercantile	186 E Main St	Alsea	OR	97324	444140	Hardware-Retail
Shirt Star Screen Printing	215 E Main St	Alsea	OR	97324	323113	Screen Printing (Mfrs)
Hendrix, J R	27030 Alsea Deadwood Hwy	Alsea	OR	97324	115310	Foresters-Consulting
Turpen Family Farm LLC	25354 Alsea Deadwood Hwy	Alsea	OR	97324-9428	111998	All Other Miscellaneous Crop Farming
Alsea Quarries I, LLC	19331 S Fork Rd	Alsea	OR	97324	212321	Construction-Sand & Gravel
Strom Contract Cutting Inc	17895 Alsea Hwy	Alsea	OR	97324	113310	Logging Companies (Mfrs)
Alsea Cemetery Main District	Highway 24	Alsea	OR	97324	812220	Cemeteries
Pups Preschool	178 S 3rd St	Alsea	OR	97324	812910	Pet Training
Cavatorta, Joy RN	435 E Alder St	Alsea	OR	97324	621399	Nurses-Registered RN
Alsea Trout Hatchery	29050 Fish Hatchery Rd	Alsea	OR	97324	112511	State Fish Hatcheries/Fishing Areas
Deb's Cafe LLC	185 W Main St	Alsea	OR	97324	722511	Restaurants
Oregon Hatchery Research Center	2418 E Fall Creek Rd	Alsea	OR	97324-9504	712190	Nature Reserves
Northwest Firewagon	17180 Alsea Hwy	Alsea	OR	97324	423610	Fire Protection Equipment & Supls (Whls)
USPS Blue Collection Box	140 E Main St	Alsea	OR	97324	541860	Mailing & Shipping Kiosks
Independent Organic Services	14942 Lobster Valley Rd	Alsea	OR	97324	541990	Services NEC
Alsea Fire Department	NULL	Alsea	OR	97324	922160	Fire Protection
Alsea School District	301 S 3rd St	Alsea	OR	97324	611110	School Districts
Carr, Mary Ann NP	435 E Alder St	Alsea	OR	97324	621399	Nurses-Practitioners
Alsea Quarries	19331 S Fork Rd	Alsea	OR	97324	423320	Sand & Gravel (Whls)
Alsea Valley Bed & Breakfast	19237 Alsea Hwy	Alsea	OR	97324	721191	Bed & Breakfast Accommodations
Floyd Stout Farms	19660 Alsea Hwy	Alsea	OR	97324	111998	Agricultural Products
Electric Charging Station	777 NW Kings Blvd	Corvallis	OR	97330	457120	Electric Charging Station
Tessas Kitchen	3930 NW Witham Hill Dr	Corvallis	OR	97330	722511	Restaurants
Frank, Taylor	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Agae Technologies Lic	33890 SE Eastgate Cir	Corvallis	OR	97333	424720	Oils-Fuel (Whls)
Creekside & Spring Creek Apartments	1613 SW 49th St	Corvallis	OR	97333	531311	Apartment Finding & Rental Service
Brune Dermatology LLC	1740 NW 9th St	Corvallis	OR	97330	621111	Dermatologists
Campus Villa	1445 SW A Ave	Corvallis	OR	97333	531110	Apartments
Gemcane	1730 NW Lewisburg Ave	Corvallis	OR	97330	561990	Business Services NEC
King, Margaret, Webb, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Harkness, Weston T DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
New Horizons in-Home Care	1318 NW 9th St	Corvallis	OR	97330-4565	621610	Home nursing services
Sparks, Chase, True-Love	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Blueberry Meadows	3860 NE Highway 20	Corvallis	OR	97330-9211	445230	Produce Markets
Northstar Surveying Inc	720 NW 4th St	Corvallis	OR	97330	541370	Surveyors-Land
Oregon VW Camping	704 NW 11th St	Corvallis	OR	97330	532289	Camping Equipment-Renting
Electric Charging Station	2900 SW Campus Way	Corvallis	OR	97331	457120	Electric Charging Station
Bruce Carsten Associates Inc	6410 NW Sisters Pl	Corvallis	OR	97330	541715	Electronic Research & Development
Rejuvenation Medical Center	2211 NW Professional Dr	Corvallis	OR	97330-3892	621111	Physicians' clinics
Smokiez Edibles	720 NE Granger Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Sinclair, Jacquelyn J	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Canales, George, III	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Stan A Gresick Tax Preparation	4365 NW Queens Ave	Corvallis	OR	97330	541213	Tax Return Preparation & Filing
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Willamette Valley Pole Buildings	5110 SW Blueberry Dr	Corvallis	OR	97333	236220	Building Contractors
Moore, Sabrena, Marie	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Yanez, Eric	815 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Sumner, Brent	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
COUNTRY Financial	201 St	Corvallis	OR	97330	524210	Insurance
Erin Michelle Erven MD	2101 NW Professional Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Gielow, Maycee MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rosenthal, Courtney M DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Nano3D Systems LLC	1110 NE Circle Blvd	Corvallis	OR	97330	332813	Electroplating/Polishing/Anodizing (Mfr)
The Church of Jesus Christ of Latter-Day Saints	4141 NW Harrison Blvd	Corvallis	OR	97330	813110	Religious societies

Cracker Jack Salon		230 Corvallis	OR	97333	812112	Beauty Salons
Longstreet Property Management	552 SW 3rd St	Corvallis	OR	97333	237210	Property Management-Commercial
Bowlsby McBrid, Annika	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Stephen, Crissandra	1650 SW 45th Pl	Corvallis	OR	97333	624190	Marriage & Family Counselors
Pierce, Aaron DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
T-Mobile	2307 NW Kings Blvd	Corvallis	OR	97330-3924	517112	Wireless Telecommunications Carriers (except Satellite)
Brewer, Jennifer, Clorinda, MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Lisa Cornelius DPM	4226 SW Agate Ave	Corvallis	OR	97333	621391	Podiatrists
Guardian Ventures LLC	885 NW Grant Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Oregon State Dept of Transportation	3700 SW Philomath Blvd	Corvallis	OR	97333	926120	State Government-Regulation & Administration-Transportation Programs
Samaritan Neuromuscular Medicine Resident Clinic	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
KBVR	210 Memorial Un E	Corvallis	OR	97331	516110	Radio Stations & Broadcasting Companies
Ayers, Amaya Breon	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Superior Electric	155 SE Lilly Ave	Corvallis	OR	97333	238210	Electric Contractors
Benton Oaks RV Campground	110 SW 53rd St	Corvallis	OR	97333	721211	Campgrounds
Fast, Maci	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Common Futures LLC	7445 NW Oak Creek Dr	Corvallis	OR	97330	541690	Scientists-Consulting
Corvallis Community Children's Center	4000 SW Western Blvd	Corvallis	OR	97333	624410	Child Care Service
Shari's Cafe & Pies	1117 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Elcano Counseling LLC	1461 SW A Ave	Corvallis	OR	97333	624190	Counselors
Signature Construction	3085 NW Angelica Dr	Corvallis	OR	97330	236220	Building Contractors
Corvallis Endodontics	1811 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Kokkoris, Rita	685 NW 5th St	Corvallis	OR	97330	624190	Counselors
Forrest, Joshua	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Orangetheory	1838 NW 9th St	Corvallis	OR	97330	713940	Health Clubs Studios & Gymnasiums
Phil Howard Construction	1825 NW 14th St	Corvallis	OR	97330	238320	Painters
Samaritan Hematology Oncology	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Kelle Judah & Ndash, Bellaisima Design Studio	901 NW Kings Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Hannigan, Kim	214 Langton Hall	Corvallis	OR	97331-8534	621340	Physical, occupational, speech therapists and audiogists' clinics
Ratliff, Tabetha S MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ipmnet News	606 SW 15th St	Corvallis	OR	97331	459210	News Dealers
Johnstone, Sydney K PA	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Talon Pro Construction	1927 SE 3rd St	Corvallis	OR	97333	236115	Construction Companies
Highland View Mobile Estates	2655 NW Highland Dr	Corvallis	OR	97330	721211	Recreational Vehicle Parks
Corvallis Korean Church	1625 NW Grant Ave	Corvallis	OR	97330	813110	Churches
Corvallis Community Children's Center	3285 NE Oxford Cir	Corvallis	OR	97330	624410	Child Care Service
Pre-Atomic Records	425 SW Madison Ave	Corvallis	OR	97333	459510	Music Stores-Vintage
Kevin Schrier Custom Woodworking	7030 NW Churchill Way	Corvallis	OR	97330	238350	Woodworkers
Updraft UAV	2435 NW Harrison Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Mitchell Contracting LLC	6700 NE Pettibone Dr	Corvallis	OR	97330	238990	Contractors
Heinz, Susan J NP	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Nurses-Practitioners
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Public School Foundation	4444 NW Highland Dr	Corvallis	OR	97330	611110	Schools
Dependable Drywall	820 SW 5th St	Corvallis	OR	97333	238310	Dry Wall Contractors
Fifita, Miki	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Northwestern Mutual	777 NW 9th St	Corvallis	OR	97330	524210	Insurance
Hohstadt, Jordyn, Roberts	420 NW 2nd St	Corvallis	OR	97330	624190	Marriage & Family Counselors
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Imtech Inc	2101 NE Jack London St	Corvallis	OR	97330	999990	Nonclassified Establishments
Carter, Rayan C DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Heart in the Valley Massage	456 SW Washington Ave	Corvallis	OR	97333	812199	Massage Therapists
Bank of America	324 SW 3rd St	Corvallis	OR	97333-4671	522110	Commercial banks
Krohn, Eric F DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Brad Johnson Signs	1045 SW 13th St	Corvallis	OR	97333	339950	Signs (Mfrs)
Habel, Diane W	444 NW Elks Dr	Corvallis	OR	97330	621330	Social Workers
Mattka, Zachary DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Commercial Associates	202 NW 6th St	Corvallis	OR	97330	531210	Real Estate Investments
Vasdev, Surinder, MD	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hammerquist, Inc	249 SW Avery Ave	Corvallis	OR	97333	238220	Plumbing Heating & Air Conditioning
Boss, Travis E	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Riutzel, Julia, E	620 NW Van Buren Ave	Corvallis	OR	97330	624190	Counselors
Dickerhoos Construction	922 NW Circle Blvd	Corvallis	OR	97330	236115	Construction Companies
Lance, Jhenna M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Smith & Smith	30361 Loren Ln	Corvallis	OR	97333	111998	Farms
Pro Nails	127 NW 4th St	Corvallis	OR	97330	812113	Manicuring
Mizak, Vanessa K	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Samaritan Hand Therapy Specialty	3640 NW Samaritan Dr	Corvallis	OR	97330-3784	621111	Physicians' clinics
Grevenstuk, Russell	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Collaborative Employment LLC	408 SW Monroe Ave	Corvallis	OR	97333	561311	Employment Agencies & Opportunities
Hovland, Anne	4185 SW Research Way	Corvallis	OR	97333	621330	Social Workers
Eyecare Associates	330 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Fresh Start	455 NW Tyler Ave	Corvallis	OR	97330	722515	Coffee Shops
Schairer, Rosemary S NP	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Marys Peak Search & Rescue Inc	180 NW 5th St	Corvallis	OR	97330-4703	813319	Miscellaneous social service advocacy organizations
Independent Auto Werks	605 SW 13th St	Corvallis	OR	97333	811111	Automobile Repairing & Service
Valley Endodontics	2350 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Alexander Court Apartments	100 SW Alexander Ave	Corvallis	OR	97333	531110	Apartments
Baldrica, Brent, Michael, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sigma Phi Epsilon Fraternity	224 NW 26th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Corvallis Radiology PC	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Region4Wib	545 SW 2nd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Akro Construction Corp	3490 NW Dimple Hill Rd	Corvallis	OR	97330	236115	Construction Companies
Rush Cycle Corvallis	545 SW 2nd St	Corvallis	OR	97333	441227	Motorcycles & Motor Scooters-Dealers
USPS Blue Collection Box	2005 NW Circle Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
College of Engineering Oregon State University	101 Covell Hall	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Family Acupuncture Christi	845 NW Monroe Ave	Corvallis	OR	97330	621399	Acupuncture
College of Veterinary Medicine	105 Magruder Hall	Corvallis	OR	97331-4802	541940	Animal hospitals, clinics, and veterinarians
Oregon State University West Greenhouses	2801 SW Campus Way	Corvallis	OR	97331-8647	111421	Nursery and Tree Production
Porter Remodeling Inc	4851 SW Hoffman Ave	Corvallis	OR	97333	236118	Remodeling & Repairing Building Contractors
Valley Eye Care	1505 NW Harrison Blvd	Corvallis	OR	97330	621320	Optometrists OD
The Tack Shop	28970 Highway 34	Corvallis	OR	97333-2222	325315	Compost Manufacturing
Ketelson, Kathleen C FNP	2001 NW Monroe Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Guthrie, Britt	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Cavalier Painting	3075 NW Harrison Blvd	Corvallis	OR	97330	238320	Painters
U.S. Bank Branch	2600 NW 9th St	Corvallis	OR	97330	522110	Banks
Wallen, Herschel, D, MD	441 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Edge Analytical	1100 NE Circle Blvd	Corvallis	OR	97330-4741	562910	Environmental remediation treatment
Holiday Tree Farm Nursery	30132 Beaver Creek Rd	Corvallis	OR	97333	561730	Tree Service
McQueen, Icis, Jena	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Kelly's Appliances	720 NE Circle Blvd	Corvallis	OR	97330-4207	423620	Electrical and Electronic Appliance, Television, and Radio Set Merchant Wholesalers
Oregon State University College of Business	302 Austin Hall	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Riley, Julie, M, CNM	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Midwives
Samaritan Endoscopy Center	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Alan Tate Herlihy	5870 NW Fair Oaks Pl	Corvallis	OR	97330	541620	Environmental Consulting Services
Lutheran Campus Ministry	211 NW 23rd St	Corvallis	OR	97330	813110	Religious Organizations
Thomas, Tracy Marie	1760 SW 3rd St	Corvallis	OR	97333	621340	Physical Therapists
Wells Fargo	2543 NW Kings Blvd	Corvallis	OR	97330-3988	522110	Commercial banks
Corvallis Auto Clinic	33901 SE Peoria Rd	Corvallis	OR	97333-2308	811111	Car repair shops
Rodeway Inn Willamette River	345 NW 2nd St	Corvallis	OR	97330	721110	Hotels & Motels
Bowman, Ivona, M	815 NW 9th St	Corvallis	OR	97330	621340	Speech Pathologists
Christian Counseling	2304 NW Kings Blvd	Corvallis	OR	97330	621399	Psychologists
Ous Oregon State University Medical Laboratory	108 SW Memorial Pl	Corvallis	OR	97331	611310	University-College Dept/Facility/Office

Jeffrey H Beck-Ameriprise Financial	777 NE 2nd St	Corvallis	OR	97330-6200	523940	Portfolio Management and Investment Advice
Pilo's Mexican Bakery	954 NW Circle Blvd	Corvallis	OR	97330	311811	Bakers-Retail
The Movement Center	916 NW Kings Blvd	Corvallis	OR	97330	621340	Physical Therapists
Friends-the Family Ministries	685 NW 5th St	Corvallis	OR	97330-6462	813110	Religious societies
Ideal-Logic, LLC	101 SW Western Blvd	Corvallis	OR	97333	541511	Software/Application/Platform Developers & Programmers
St Martin Russian Orthodox Church	925 NW Camellia Dr	Corvallis	OR	97330-9709	813110	Religious societies
Edward Jones	806 NW Buchanan Ave	Corvallis	OR	97330-6218	523940	Portfolio Management and Investment Advice
Hawk-Vera, April	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Rathbun, Beth Anne	444 NW Elks Dr	Corvallis	OR	97330	621399	Physicians Assistants
Healing Comfort Clinic	2310 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Osprey Financial SVC LLC	975 NW Spruce Ave	Corvallis	OR	97330	523940	Financial Advisory Services
Delollis, Michael V MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samfit	777 NW 9th St	Corvallis	OR	97330	713940	Health Clubs Studios & Gymnasiums
Boike, Alec, Thomas, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rhino Mechanical LLC	5020 NW Highland Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Hatfield, Katherine N	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Kidsthletics Club	324 SW 2nd St	Corvallis	OR	97333	713940	Children's Fitness
Louann Spevacek	3285 NE Oxford Cir	Corvallis	OR	97330	624410	Child Care Service
Robinson, Melissa, R, MD	3640 NW Samaritan Dr	Corvallis	OR	97330-3738	621111	Physicians' clinics
University Hero	211 SW 5th St	Corvallis	OR	97333-4620	722511	Full-Service Restaurants
OSU Beaver Store	300 NE Walnut Blvd	Corvallis	OR	97330-4282	455219	All Other General Merchandise Retailers
Simone, Kelly, Morgan	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dial-A-Bus	4077 SW Research Way	Corvallis	OR	97333	624120	Senior Citizens Service
Dowdell, Samantha	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Peterson Landscape Service Inc	1160 SW Stamm Pl	Corvallis	OR	97333	561730	Landscape Contractors
Henderer Design + Build + Remodel	2350 NW Professional Dr	Corvallis	OR	97330	541310	Building Designers
New China Buffet	1720 NW 9th St	Corvallis	OR	97330	722511	Restaurants
CVO Electrical Systems LLC	1600 SW Western Blvd	Corvallis	OR	97333	238210	Electric Contractors
Chateau Construction	6421 NW Oak Creek Dr	Corvallis	OR	97330	236115	General Contractors
Institute For Applied Ecology	4950 SW Hout St	Corvallis	OR	97333-9598	813312	Environmental advocacy organizations
Alpaca Research Foundation	33201 SE Peoria Rd	Corvallis	OR	97333	541720	Foundation-Educ Philanthropic Research
Cornerstone Landscape Maintenance	1445 SE Crystal Lake Dr	Corvallis	OR	97333	813319	Non-Profit Organizations
Federal Security	808A NW Buchanan Ave	Corvallis	OR	97330	423610	Security Control Equip & Systems-Whls
Bradattig.com	459 SW Madison Ave	Corvallis	OR	97333	541613	Marketing Programs & Services
E-Learn	895 NW Grant Ave	Corvallis	OR	97330-4539	611710	Educational Assistance Services
Alexandru-Abra, Daniela MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Paventy & Brown Orthodontics	2434 NW Professional Dr	Corvallis	OR	97330-3991	621210	Dentists' clinics
Ohana Exceptional Travel Services	1744 NW Garryanna St	Corvallis	OR	97330	561510	Travel Agencies & Bureaus
Petersen, Devin, R, PHD	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
PGPV, LLC	993 NW Circle Blvd	Corvallis	OR	97330	541110	Attorneys
Carvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cook, Richard F DO	NULL	Corvallis	OR	NULL	621111	Physicians & Surgeons
FedEx Drop Box	1175 NW 9th St	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Watkins, Amelia C MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
CosmoProf	929 NW Circle Blvd	Corvallis	OR	97330-1409	423850	Service Establishment Equipment and Supplies Merchant Wholesalers
Glowinski, Zachary, Adam	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Becker, Timothy M DO	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Clay Harpole Tattoo LLC	340 SW 2nd St	Corvallis	OR	97333	812199	Tattooing
Hoffman Manufacturing Inc	8521 NW Arboretum Rd	Corvallis	OR	97330	334516	Laboratory Analytical Instruments (Mfrs)
Clifford, Anna	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hama, Eiko	2300 NW Walnut Blvd	Corvallis	OR	97330	621330	Pharmacists
Sonneborn, Theodore	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Brink, Aimee, Victoria	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Foster, Jacqueline	108 SW Memorial Pl	Corvallis	OR	97331	621330	Pharmacists
Imel, Janice D	230 SW 3rd St	Corvallis	OR	97333	624190	Counselors

Automated I/O	1143 SW West Hills Pl	Corvallis	OR	97333-3900	811412	Household type appliance repair services and support
Cavanagh, Bonnie	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Carr, Kaylee A DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Regional Cancer Center Radiation Oncology	501 NW Elks Dr	Corvallis	OR	97330-3757	621111	Physicians' clinics
De Forest, Sarah A MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Connected Real Estate Group Corvallis	435 NW 5th St	Corvallis	OR	97330	531390	Real Estate Consultants
Alison Roffman LCSW LLC	744 NW 4th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Moss, Dillon A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Talbot, Cody DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Pillar Consulting Group	835 NW 23rd St	Corvallis	OR	97330	541330	Engineers-Civil
Oregon State University Center For Fraternity & Sorority Life	2251 SW Jefferson Way	Corvallis	OR	97331-8660	611310	Schools offering baccalaureate or graduate degrees
SNOWFOX	777 NW Kings Blvd	Corvallis	OR	97330	722513	Food Service Kiosk
Crown Electrokinetics Corp	1110 NE Circle Blvd	Corvallis	OR	97330-4254	326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing
Knoll Terrace	5055 NE Elliott Cir	Corvallis	OR	97330-9008	531190	Landlords of Other Real Estate Property
Electric Charging Station	1220 SW Jefferson Way	Corvallis	OR	97331	457120	Electric Charging Station
Dollar Tree	5222 SW Philomath Blvd	Corvallis	OR	97333-1042	455219	All Other General Merchandise Retailers
Wurster, Melissa	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Urion, Franklin, DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Laflamme, Malory Skye	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Rubin Madeline MSW LCSW	216 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Corvallis Mayor's Office	501 SW Madison Ave	Corvallis	OR	97333-4601	921110	County supervisors' and executives' offices
Valliscor	1110 NE Circle Blvd	Corvallis	OR	97330	325998	Chemicals-Manufacturers
LifeSafer Ignition Interlock	727 NW 4th St	Corvallis	OR	97330	811111	Ignition Interlock Devices-Install & Svc
Anzai, Tomoko, Iwanaga, DPT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Samaritan Mental Health	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Northwest Hills Community Church	3300 NW Walnut Blvd	Corvallis	OR	97330	813110	Churches
Corvallis Zoning Info	501 SW Madison Ave	Corvallis	OR	97333	925120	City Government-Urban Planning/Community & Rural Development
Stieglitz, Krista Dae	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Selby, Laura DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Goodeill, Teigen Paul DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ie3 Global	1600 SW Western Blvd	Corvallis	OR	97333-4187	611710	Educational Assistance Services
J D Construction	NULL	Corvallis	OR	NULL	236220	Building Contractors
The Old Spaghetti Factory	603 NW 2nd St	Corvallis	OR	97330	722511	Restaurants
Downing, Maxwell J	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Murugaverl, Emma S DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Garden Color	205 NE Conifer Blvd	Corvallis	OR	97330	444240	Nurserymen
C K Farm	24044 Decker Rd	Corvallis	OR	97333	115210	Horse Breeders
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ashley	720 NE Circle Blvd	Corvallis	OR	97330-4207	449110	Furniture Retailers
Corvallis Handyman Services	Technology Loop	Corvallis	OR	97333	236118	Handyman Services
Nistico, Amy E	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Dave Severns-COUNTRY Financial Representative	201 NW 3rd St	Corvallis	OR	97330	524210	Insurance
Astute Spruce, LLC	520 SE Vera Ave	Corvallis	OR	97333	541511	Software/Application/Platform Developers & Programmers
Two Rivers Psychiatry	257 SW Madison Ave	Corvallis	OR	97333-4757	621112	Mental health physicians clinics
Smith, Katie	922 NW Circle Blvd	Corvallis	OR	97330	621340	Physical Therapists
Mouse Brains LLC	6513 SW Janet Way	Corvallis	OR	97333	541511	Software/Application/Platform Developers & Programmers
Nierenberg, Tara	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Skin Maven LLC	1128 NE 2nd St	Corvallis	OR	97330	812112	Skin Treatments
Sumitomo Electric Carbide	3517 NW Samaritan Dr	Corvallis	OR	97330	423840	Carbide Metals & Products (Whls)
Sweet Potato LLC	430 SW 53rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Gene Kiel & Associates	226 SW 7th St	Corvallis	OR	97333	524210	Insurance
Good Samaritan Regional Medical	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
TCC-Verizon Authorized Retailer	303 NW Harrison Blvd	Corvallis	OR	97330-4815	517112	Wireless Telecommunications Carriers (except Satellite)
Light, Tyler, J	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Beaver Plumbing & Heating Inc	922 NW Circle Blvd	Corvallis	OR	97330	238220	Plumbing Contractors
Plate, Stefani, Lynn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

United States Post Office CPU	1425 NW 9th St	Corvallis	OR	97330-4510	491110	Postal Service
Corvallis Veterinary Hospital	1543 NW 9th St	Corvallis	OR	97330	541940	Veterinarians
Yeast, Emily Z CNM	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Midwives
Samaritan Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kelly, Shannon OD	1597 SW 53rd St	Corvallis	OR	97333	621320	Optometrists OD
Valley Pathology Services	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Courtyard Corvallis	400 SW 1st St	Corvallis	OR	97333-4911	721110	Lodging
Rite Aid	2080 NW 9th St	Corvallis	OR	97330-1484	456110	Pharmacies and Drug Retailers
Arc of Benton County	1885 NW 9th St	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
Sensenbach, Bobby G	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Dream Remodeling	2120 NW 11th St	Corvallis	OR	97330	236118	Remodeling & Repairing Building Contractors
Fortune, Linda	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Marriage & Family Counselors
E Bike Ventures LLC	545 NW 4th St	Corvallis	OR	97330	441227	Motorcycles & Motor Scooters-Dealers
North Point Dental Group PC	2222 NW Lincoln Ave	Corvallis	OR	97330	621210	Dentists
Poth, Lauren, D, PHD	444 NW Elks Dr	Corvallis	OR	97330	621399	Psychologists
Timberhill Chiropractic Clinic	2721 NW 9th St	Corvallis	OR	97330-3857	621340	Physical, occupational, speech therapists and audiogists' clinics
Maier Roofing Co	NULL	Corvallis	OR	97330	238160	Roofing Contractors
Villaruz, Danielle, Monica	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Du Boise Kennedy & Sappington	260 SW Madison Ave	Corvallis	OR	97333	621399	Psychologists
Unger, McKenzie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Wilson, Erika H DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Manor Nursing & Rehabilitation Center	160 NE Conifer Blvd	Corvallis	OR	97330-4199	621340	Physical, occupational, speech therapists and audiogists' clinics
Lacy, Gabrielle	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Earth Fortification Supplies Co	635 SW Western Blvd	Corvallis	OR	97333	325998	Chemicals-Manufacturers
Peterson, Janice, Kathleen, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Lynne Brown Writing	1930 NW 29th Pl	Corvallis	OR	97330	541690	Writing Consultants
University Christian Center	1655 NW Monroe Ave	Corvallis	OR	97330	813110	Religious Organizations
Samaritan Cardiovascular Surgery	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Cloud Bank Books	NULL	Corvallis	OR	NULL	459210	Book Dealers-Retail
Zazu LLC	1360 NW Van Buren Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Salvesen, Jeannine, Celeste, MD	4993 SW Roseberry St	Corvallis	OR	97333	621111	Physicians & Surgeons
Steele, Thomas MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Personal Summer	2305 NW Monroe Ave	Corvallis	OR	97330	812199	Tanning Salons
American Federation-Teachers	760 SW Madison Ave	Corvallis	OR	97333	813930	Labor Organizations
Benton Community Foundation	340 NW 5th St	Corvallis	OR	97330	541720	Foundation-Educ Philanthropic Research
Crescent Valley High School	4444 NW Highland Dr	Corvallis	OR	97330	611110	Schools
Maximize Your Tech LLC	1240 SE Alexander Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Lisa Burner, Counselor	4185 SW Research Way	Corvallis	OR	97333-1067	622210	Rehabilitation hospitals
Hlebechuk Painting Services	NULL	Corvallis	OR	NULL	238320	Painters
Papillon Aesthetics	620 NW Van Buren Ave	Corvallis	OR	97330	621340	Physical Therapists
Intertech Inc	720 NW 2nd St	Corvallis	OR	97330	541990	Services NEC
Coffin Butte Landfill	29175 Coffin Butte Rd	Corvallis	OR	97330	423930	Recycling Centers (Whls)
Peace Seedlings	2385 SE Thompson St	Corvallis	OR	97333	444240	Seeds & Bulbs-Retail
Mid-Valley Gastroenterology	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Whispering Pines Mobile Lodge Mobl Homes	29229 Highway 34	Corvallis	OR	97333-2243	531190	Landlords of Other Real Estate Property
Dreisbach, Tina	650 SW 3rd St	Corvallis	OR	97333	621399	Acupuncture
Centerwall, Patrik, G	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Area Trailrunners	123 NW 7th St	Corvallis	OR	97330	813311	Charitable Institutions
Financial Advisors U.S. Bancorp Investments	2600 NW 9th St	Corvallis	OR	97330	523940	Financial Planning Consultants
Gump Nathaniel W PHD	408 SW Monroe Ave	Corvallis	OR	97333	621399	Psychologists
Jameslee Auto Detailing	820 NW Kings Blvd	Corvallis	OR	97330-5623	811121	Car exterior and interior restoration
Evans, Paul, Michael	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Joos Hardwood Flooring	3500 NW Marshall Dr	Corvallis	OR	97330	238330	Floor Laying Refinishing & Resurfacing
John Fox Investments Inc	777 NE 2nd St	Corvallis	OR	97330	531210	Real Estate
Green Point Consulting	2397 NW Kings Blvd	Corvallis	OR	97330	541714	Environmental & Ecological Services
McDermond, Jennifer L	NULL	Corvallis	OR	97330	624190	Counselors

Zurbrugg, Erin	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Davis Family Farm	4380 NE Highway 20	Corvallis	OR	97330	445230	Fruits & Vegetables & Produce-Retail
Germainiac Productions Inc	1375 NW Forest Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Hedrick Food & Nutrition Consulting, LLC	305 SW C Ave	Corvallis	OR	97333	621399	Nutritionists
Casa Voices For Children	129 NW 4th St	Corvallis	OR	97330	624190	Social Service & Welfare Organizations
Raunthewanderer Shop	701 SW 7th St	Corvallis	OR	97333	999990	Nonclassified Establishments
Kent, Randall	2001 NW Monroe Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
OSU Forest Engineering Department	280 Peavy Hall	Corvallis	OR	97331-8615	611310	Schools offering baccalaureate or graduate degrees
Linn Benton Lincoln Education Service	33461 SE Peoria Rd	Corvallis	OR	97333	611710	Educational Service-Business
Days Inn By Wyndham Corvallis	1113 NW 9th St	Corvallis	OR	97330-4593	721110	Lodging
Re New Church	NULL	Corvallis	OR	NULL	813110	Churches
American Federation of Teachers	101 NW 23rd St	Corvallis	OR	97330	813930	Labor Organizations
Sarah Smiles Photography	NULL	Corvallis	OR	97330	541921	Photography
Amrock, Levana, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Miller, Kaytlin RN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
Owen Ryan Construction LLC	1515 SE Bethel St	Corvallis	OR	97333	236115	Construction Companies
Holiday Inn Express Corvallis-on the River, An IHG Hotel	781 NE 2nd St	Corvallis	OR	97330	721110	Hotels & Motels
Cycle Lab	545 SW 2nd St	Corvallis	OR	97333	541714	Laboratories
Garland Nursery	5470 NE Highway 20	Corvallis	OR	97330-9622	541320	Landscape architects
Lewisburg Hall	6000 NE Elliott Cir	Corvallis	OR	97330	722320	Caterers
Nature's Beauty Skincare	425 SW Madison Ave	Corvallis	OR	97333-4799	812112	Beauty Shops
Fawver, Justin G	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
North West Dental of Corvallis	2342 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
Insight Gallery	414 NW 4th St	Corvallis	OR	97330	459920	Art Galleries & Dealers
King Machine Products Inc	1555 SE Crystal Lake Dr	Corvallis	OR	97333	811111	Automobile Machine Shop Service
Thurman, Shelby, R	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Samaritan Pediatrics	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Keating, Andrea	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Midwives
Oregon State University Milne Computing Center	1800 SW Campus Way	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Corvallis Veterinary Hospital	1543 NW 9th St	Corvallis	OR	97330	541940	Veterinarians
Forbidden Fruit Ciderhouse, LLC	1749 SW Airport Ave	Corvallis	OR	97333	445230	Fruits & Vegetables & Produce-Retail
Beekman Place Antique Mall	601 SW Western Blvd	Corvallis	OR	97333	459510	Antiques-Dealers
Lyon-Hubert, Kyla	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Stover Neyhart, Yee & Co	806 NW Buchanan Ave	Corvallis	OR	97330	541211	Accountants
Electric Charging Station	1100 NW Kings Blvd	Corvallis	OR	97330	457120	Electric Charging Station
Volvo Cars Corvallis	900 NW 4th St	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Crafty Conifer LLC	2171 NW Janssen St	Corvallis	OR	97330	999990	Nonclassified Establishments
Marlon's Painting	2494 NW Garryanna St	Corvallis	OR	97330-1463	238320	Painting and Wall Covering Contractors
Walmart Neighborhood Market	1840 NW 9th St	Corvallis	OR	97330	445110	Grocers-Retail
Mor Sun Construction	745 NW 16th St	Corvallis	OR	97330	236220	Building Contractors
St John Society	501 NW 25th St	Corvallis	OR	97330	813110	Churches
Arnold Air Society-Silver Wings	308 McAlexander Fieldhouse	Corvallis	OR	97331-8556	813410	Community clubs
Ray Garretson-COUNTRY Financial	201 NW 3rd St	Corvallis	OR	97330	524210	Insurance
Hurley Financial Group	111 SW 4th St	Corvallis	OR	97333	523940	Financial Advisory Services
CMT	275 SW 3rd St	Corvallis	OR	97333-4629	513210	Software Publishers
Homan, Katie	114 Gill Coliseum	Corvallis	OR	97331-8547	621340	Physical, occupational, speech therapists and audiogists' clinics
NW Tax & Accounting LLC	561 NW Van Buren Ave	Corvallis	OR	97330	541219	Accounting & Bookkeeping General Svc
Mr Nice Guy	504 NW 3rd St	Corvallis	OR	97330	459991	Cannabis Dispensary
Translations	230 SW 3rd St	Corvallis	OR	97333-4692	541930	Language interpretation/translation services
Nuckolls, Katheryn	650 SW 3rd St	Corvallis	OR	97333	621399	Physicians-Naturopathic
Corvallis Masonic Lodge	306 SW Madison Ave	Corvallis	OR	97333	813410	Fraternal Organizations
Llamas, Marielle A MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Orton, Amanda P	644 NW 4th St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Samaritan Obstetrics-Gynclgy	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jiffy Lube	855 NW Circle Blvd	Corvallis	OR	97330	811191	Automobile Lubrication Service
Abigail Bisson ND Corp	28083 Ewelty Way	Corvallis	OR	97330	999990	Nonclassified Establishments

Sandcastle Preschool Inc	435 NW 21st St	Corvallis	OR	97330	624410	Schools-Pre-School/Kindergarten-Academic
Western Union Agent Location	440 SW Western Blvd	Corvallis	OR	97333	522320	Money Order Service
Burke, Richard, H, MD	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Tillitt, Amber	3640 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Tacos El Machine	544 SW 4th St	Corvallis	OR	97333	722511	Restaurants
Chavez, Briana, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dutch Bros Coffee	1765 NW 9th St	Corvallis	OR	97330-2142	722515	Snack & Nonalcoholic Beverage Bars
Corvallis Mobile Home Park	200 NW 53rd St	Corvallis	OR	97330	531190	Mobile Homes-Parks & Communities
Windermere Real Estate	987 NW Circle Blvd	Corvallis	OR	97330	531210	Real Estate
Trujillo, Leonel A MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Mueller Implants & Periodontics	2601 NW Rolling Green Dr	Corvallis	OR	97330	621210	Dentists
Corvallis Cat Care	620 NW 4th St	Corvallis	OR	97330	541940	Veterinarians
Leo-Nyquist, Stefan DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Read, Karli Lea	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Marchino, Deborah C NP	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Truax	4221 SW Research Way	Corvallis	OR	97333-1799	561110	Office management services
Advance Auto Parts	532 NW 3rd St	Corvallis	OR	97330	441330	Automobile Parts & Supplies-Retail-New
The Book Bin, Inc	215 SW 4th St	Corvallis	OR	97333	459210	Book Dealers-Retail
Samaritan Regional Cancer Center Radiation Oncology	501 NW Elks Dr	Corvallis	OR	97330-3757	621111	Physicians' clinics
Vetco Vaccination Clinic	2365 NW Kings Blvd	Corvallis	OR	97330	541940	Veterinarians
Pegasus Aviation Services	5725 SW Plumley St	Corvallis	OR	97333	611512	Flight Aircraft Instruction
District 4 Office	3700 SW Philomath Blvd	Corvallis	OR	97333	921120	Government Offices-State
Corvallis Radiology	2314 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Pacific Stonescape, Inc	29545 Highway 34	Corvallis	OR	97333	444180	Stone-Retail
McNary Dining Center	300 SW Jefferson Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Cascadia Paleo	1005 NW 30th St	Corvallis	OR	97330	813312	Environmental Conservation/Ecologcl Org
Noah's Ark Day Care	2760 SW 53rd St	Corvallis	OR	97333	624410	Child Care Service
Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Groh, Hailey N	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Parish Gap	29424 Newton Rd	Corvallis	OR	97330	999990	Nonclassified Establishments
Samaritan Pediatrics	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Cobblestone Square Apartment LLC	1425 NW Monroe Ave	Corvallis	OR	97330	531120	Shopping Centers & Malls
Edward Jones-Financial Advisor: Jonathan Riddle	545 SW 2nd St	Corvallis	OR	97333-4920	523940	Portfolio Management and Investment Advice
Richins, Alyssa	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Fifth Street Growlers	215 SW 5th St	Corvallis	OR	97333	445320	Beer & Ale-Retail
Oregon Screen Crafts	457 SW C Ave	Corvallis	OR	97333	459120	Crafts
Kids LLC	922 NW Circle Blvd	Corvallis	OR	97330	813319	Social Services NEC
Big 5 Sporting Goods	595 NE Circle Blvd	Corvallis	OR	97330	459110	Sporting Goods-Retail
Kens Car Care Center	1419 NW 9th St	Corvallis	OR	97330-4510	811111	Car repair shops
Peak Sports Inc	129 NW 2nd St	Corvallis	OR	97330-4719	999990	Unclassified Establishments
Corvallis Family Medicine PC	2400 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Republic Services	29175 Coffin Butte Rd	Corvallis	OR	97330	333310	Waste Reduction Disposal Equip-Ind-Mfrs
Sanchez-Massengill, Tecumseh, Manuel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
US Agricultural Department	3450 SW Campus Way	Corvallis	OR	97331	926140	Federal Government-Regulation-Agricultural Marketing & Commodities
Lancasater Bridge Community LLC	257 SW Madison Ave	Corvallis	OR	97333	624190	Community Services
Valley Endodontics	2350 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Watson Mechanical	3470 NE Canterbury Cir	Corvallis	OR	97330	238210	Mechanical Contractors
Beit AM	4318 NW Circle Blvd	Corvallis	OR	97330	516110	Radio Stations & Broadcasting Companies
Southside Storage	1750 SW Allen St	Corvallis	OR	97333	236118	Carports
Sierra Student Apartments	960 SW Washington Ave	Corvallis	OR	97333-4912	531110	Landlords of Residential Buildings and Dwellings
Corvallis Montessori Society Inc	2730 NW Greeley Ave	Corvallis	OR	97330	813410	Educational Associations
Oregon State University Finance & Administration	2701 SW Campus Way	Corvallis	OR	97331-8646	611310	Schools offering baccalaureate or graduate degrees
Development Review	501 SW Madison Ave	Corvallis	OR	97333	921190	City Government-General Offices
Pelkey, Ethan M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
OSU Beaver Store	663 SW 26th St	Corvallis	OR	97331	459210	Books School & Textbooks
Lerma, Keegan, KM	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists

Cegielski, Alyssa	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Mental Health	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rjet Construction LLC	1010 NW Lewisburg Ave	Corvallis	OR	97330	236115	Construction Companies
Willamette Veterinary Hospital	1562 SW 3rd St	Corvallis	OR	97333-4490	541940	Animal hospitals, clinics, and veterinarians
Willamette Dental Group-Corvallis	2420 NW Professional Dr	Corvallis	OR	97330-3977	621210	Dentists' clinics
Wilson, Jennifer M NP	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Transportation Department Maintenance	3700 SW Philomath Blvd	Corvallis	OR	97333	926120	State Government-Regulation & Administration-Transportation Programs
Taco Vino	151 NW Monroe Ave	Corvallis	OR	97330-4708	722511	Full-Service Restaurants
South, Susan, M, Psyd	3509 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Good Earth Pest Company	NULL	Corvallis	OR	97333	561710	Bird Barriers & Repellents & Controls
Fagoaga, Isabel	650 SW 3rd St	Corvallis	OR	97333	621340	Physical Therapists
Funderburg, Linda G MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Barton, Justin B	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Glasmann, Joshua, Reed, DC	867 NW 23rd St	Corvallis	OR	97330	621310	Chiropractors DC
Fixercat Inc	5165 SW Blueberry Dr	Corvallis	OR	97333	423390	Fence (Whls)
Good Earth Pest Company	29030 Highway 34	Corvallis	OR	97333	561710	Pest Control
R M Sutherland Construction	29595 Bellfountain Rd	Corvallis	OR	97333	238110	Concrete Contractors
Regent Court at Corvallis	400 NW Elks Dr	Corvallis	OR	97330	623312	Residential Care Homes
Saydell, Peggy A PAC	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Lesle, Ann, Solgaard, MD	6237 SW Quietcreek Dr	Corvallis	OR	97333	621111	Physicians & Surgeons
Luminous Salon	521 SW 2nd St	Corvallis	OR	97333	812112	Beauty Salons
Willamette Valley Cancer Institute and Research Center	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Corvallis Pain Management	800 NE Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Michael's Jewelers Precious	425 SW 3rd St	Corvallis	OR	97333	455219	Coin Dealers Supplies & Etc
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Comcast Corp	150 NW Lewisburg Ave	Corvallis	OR	97330-9236	999990	Unclassified Establishments
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Benton County Counsel	205 NW 5th St	Corvallis	OR	97330-4808	921120	Legislative assemblies
DRDN Productions LLC	455 NW Tyler Ave	Corvallis	OR	97330	512110	Production Services
Urich, Daniela, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Boss Studio	408 SW Monroe Ave	Corvallis	OR	97333	713940	Health Clubs Studios & Gymnasiums
Massey, Erin W MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Advanced Environmental Systems	5120 SW West Hills Rd	Corvallis	OR	97333	238220	Heating Contractors
MJPM	425 SW 3rd St	Corvallis	OR	97333	455219	Coin Dealers Supplies & Etc
Corvallis Parks & Recreation	1310 SW Avery Park Dr	Corvallis	OR	97333	712190	Parks
Cartwright, Olivia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
T.J. Maxx	1550 NW 9th St	Corvallis	OR	97330	455110	Department Stores
Williams, Amy Jo PHD	3509 NW Samaritan Dr	Corvallis	OR	97330-3893	621399	Offices of All Other Miscellaneous Health Practitioners
Boucher, Mary	922 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians-Naturopathic
Merback, Wayne, Joseph, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Ark Animal Hospital	33888 SE Peoria Rd	Corvallis	OR	97333	541940	Veterinarians
Alpha Tau Omega Fraternity	309 NW 26th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Columbia 410 LLC	4515 NE Elliott Cir	Corvallis	OR	97330	999990	Nonclassified Establishments
O'Brien Dental Lab	4311 SW Research Way	Corvallis	OR	97333	339116	Laboratories-Dental
Recretec Manufacturing Inc	29342 OR-34	Corvallis	OR	97333	811490	Miscellaneous personal and household goods restoration and support
Primatics, Inc	2101 NE Jack London St	Corvallis	OR	97330	518210	Automation Technology Services
Morton, Craig B	530 NW 27th St	Corvallis	OR	97330	621399	Psychologists
Corvallis Clinic OB/GYN	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Gump, Nathaniel W PHD	887 NW Grant Ave	Corvallis	OR	97330	621399	Psychologists
McCully, Sean, Patrick	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330-4714	621111	Physicians' clinics
Jennifer I Nash & Nicolas Ortiz, P.C.	435 NW 4th St	Corvallis	OR	97330	541110	Attorneys
Macdonald, Erin	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
Padua, Angelina, Marie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
USPS Blue Collection Box	2350 NW Professional Dr	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Foster Care	555 NW 5th St	Corvallis	OR	97330	923130	State Government-Social/Human Resources

Coinstar	2335 NW Kings Blvd	Corvallis	OR	97330	541990	Coin & Bill Counting/Sorting Svc Kiosks
Samaritan Medical Equipment	777 NW 9th St	Corvallis	OR	97330-6169	423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers
Weber, Anastasia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Rutter, Jason PA	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Herrera, Beau, Ryan	2450 SW Jefferson Way	Corvallis	OR	97331	621340	Physical Therapists
Microepic Productions	922 NW Circle Blvd	Corvallis	OR	97330-1483	512110	Film and Video Production
Valcan Cellars	341 SW 2nd St	Corvallis	OR	97333	445320	Wines-Retail
Oregon State University	1500 SW Jefferson Ave	Corvallis	OR	97331	611310	Schools-Universities & Colleges Academic
Block 15 Brewing Co	300 SW Jefferson Ave	Corvallis	OR	97333	312120	Brewers (Mfrs)
Tilth	2525 SE 3rd St	Corvallis	OR	97333-1641	813319	Miscellaneous social service advocacy organizations
Samaritan Recovery Clinic	5234 SW Philomath Blvd	Corvallis	OR	97333-1042	621111	Physicians' clinics
Haworth, Terrie	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Riley, Julie M CNM	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Midwives
Styke, Alexandra N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Custom Valley Roofing LLC	584 NW Oak Ave	Corvallis	OR	97330-1513	238160	Roofing Contractors
Oregon State University Valley Football Center	325 Valley Football Ctr	Corvallis	OR	97331-8544	711310	Organizers of state and county fairs, concerts, and festivals with facilities
Carts & Tools	280 NW 1st St	Corvallis	OR	97330	561990	Business Services NEC
Atlantic Salmon Fly International	3415 NE Canterbury Cir	Corvallis	OR	97330-4005	999990	Unclassified Establishments
Burton, Elan, C, MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvalis Friends Meeting House	3311 NW Polk Ave	Corvallis	OR	97330	813110	Churches
Lochner, Abrianna, M	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Next Level Media	126 SW 4th St	Corvallis	OR	97333	541512	Website Design Service
Carbony Celtic Winds	419 NW 18th St	Corvallis	OR	97330	339992	Musical Instruments-Manufacturers
Morgan, Trey, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benco	2235 NW 17th St	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
Information & Referral-Benton County Health Department	530 NW 27th St	Corvallis	OR	97330	923120	County Government-Public Health Programs
Wade, L, Haslam, DDS	2657 NW Rolling Green Dr	Corvallis	OR	97330	621210	Dentists
Benco1650 NW Garfield	1650 NW Garfield Ave	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
Tan Rebuplic	820 NW 9th St	Corvallis	OR	97330	812199	Tanning Salons
Corvallis Custom	1869 NW 9th St	Corvallis	OR	97330	323111	Printers (Mfrs)
Catarius, Ryan, E	260 SW Madison Ave	Corvallis	OR	97333	621330	Social Workers
K-3 Inc	NULL	Corvallis	OR	NULL	236115	General Contractors
Eye Care Associates	330 NW Elks Dr	Corvallis	OR	97330	621320	Optometrists OD
Cardv	NULL	Corvallis	OR	NULL	624221	Domestic Abuse Information & Treatment
Hilson, Melissa M MSN	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Nurses-Registered RN
Celebration Church	2700 SW 3rd St	Corvallis	OR	97333	813110	Churches
Pta Oregon Congress	340 NE Granger Ave	Corvallis	OR	97330	813910	Associations
International Association of Fire Fighters	903 NW Beca Ave	Corvallis	OR	97330	813930	Labor Organizations
Rivera, Ashley N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Orthopedics Luis Vela DO	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Earley, Tyler, DO	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Central Willamette Credit Union	555 NE Circle Blvd	Corvallis	OR	97330	522130	Credit Unions
Gregs Auto Service	440 SW Wake Robin Ave	Corvallis	OR	97333	811111	Automobile Repairing & Service
Alien Drone Service LLC	6298 SW Grand Oaks Dr	Corvallis	OR	97333	441227	Drones
Delmendo, Madison N	1680 SE Crystal Lake Dr	Corvallis	OR	97333	621399	Dietitians
International Mountain Bicycling Association	NULL	Corvallis	OR	NULL	813910	Associations
Hinsley Homes LLC	1121 NW 9th St	Corvallis	OR	97330	236115	Home Builders
Gienapp, Ryan, Brand, DO	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Anderson, Deborah E	252 SW Madison Ave	Corvallis	OR	97333	621399	Physicians-Naturopathic
Pachaearth Inc	4826 SW Roseberry St	Corvallis	OR	97333	115310	Foresters-Consulting
LifeStance Therapists & Psychiatrists Corvalis	4185 SW Research Way	Corvallis	OR	97333-1783	621399	Offices of All Other Miscellaneous Health Practitioners
Taylor, Matthew, Alan, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Demeter Association Inc	6735 SW Country Club Dr	Corvallis	OR	97333	813910	Associations
Max's Food	2475 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Vasoya, Bella	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Harder Wells Baron-Manning PC	560 NW Van Buren Ave	Corvallis	OR	97330	541110	Attorneys

Bruns, Maureen MD	NULL	Corvallis	OR	NULL	621111	Physicians & Surgeons
Lucidyne Technologies LLC	5129 SW Hout St	Corvallis	OR	97333	541330	Engineers-Consulting
OSU Student Health Center	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Gerrah, Rabin MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Starbucks	590 NE Circle Blvd	Corvallis	OR	97330	722515	Coffee Shops
Snjin Inc	2461 NW Monroe Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Grand Oaks	6300 SW Grand Oaks Dr	Corvallis	OR	97333	531110	Apartments
Shell	2635 NW 9th St	Corvallis	OR	97330	457120	Service Stations-Gasoline & Oil
Corvallis Elks Lodge	1400 NW 9th St	Corvallis	OR	97330	813410	Fraternal Organizations
Walmart Pharmacy	1840 NW 9th St	Corvallis	OR	97330	456110	Pharmacies
Ambassadors Health Alliance	310 NW 5th St	Corvallis	OR	97330-4895	621999	Miscellaneous health care providers
American Family Insurance-Bryan Flager Agency	2396 NW Kings Blvd	Corvallis	OR	97330	524210	Insurance
Fitzgerald, Thomas J MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
USPS Blue Collection Box	2335 NW Kings Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Samaritan Bariatric Surgery	3517 NW Samaritan Dr	Corvallis	OR	97330-3768	812191	Weight loss centers
The Howard Martin Firm Inc	5145 NE Highway 20	Corvallis	OR	97330-9208	115310	Support Activities for Forestry
Corvallis Nails & Spa	2321 NW Kings Blvd	Corvallis	OR	97330	812113	Manicuring
Lockwood, Fahlene	2075 NW Grant Ave	Corvallis	OR	97330	621330	Social Workers
Dai, Joy	160 NE Conifer Blvd	Corvallis	OR	97330	621340	Speech Pathologists
UPS Access Point Location	219 SW Madison Ave	Corvallis	OR	97333	541860	Mailing & Shipping Services
G & J Auto Sales	336 NW 2nd St	Corvallis	OR	97330	441120	Automobile/Trucks Dealers-Used
First Tech Federal Credit Union	1044 NE Circle Blvd	Corvallis	OR	97330	522130	Credit Unions
Corvallis Pediatric Dentistry	2350 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Electric Charging Station	110 SW 53rd St	Corvallis	OR	97333	457120	Electric Charging Station
De La Cruz, Karina	230 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Morales, Aubrie, Rochelle	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Volunteer Interfaith	501 NW 25th St	Corvallis	OR	97330	624190	Social Service & Welfare Organizations
Schweitzer Design & Build Inc	602 NW 4th St	Corvallis	OR	97330	236118	Remodeling & Repairing Building Contractors
Cyclotopia	435 SW 2nd St	Corvallis	OR	97333	459110	Bicycles-Dealers
Tan Republic	937 NW Kings Blvd	Corvallis	OR	97330	812199	Tanning Salons
Corvallis Coffeeworks	33898 SE Eastgate Cir	Corvallis	OR	97333	999990	Nonclassified Establishments
Schweiger, Liana MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dod Enterprises LLC	3160 NE Powderhorn Pl	Corvallis	OR	97330	541511	Software/Application/Platform Developers & Programmers
or State University Student Health	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Domino's	1420 NW 9th St	Corvallis	OR	97330	722511	Pizza
Eqr Training & Consulting, Inc	120 SW 4th St	Corvallis	OR	97333	541612	Training Consultants
Storage Depot	1520 SW 3rd St	Corvallis	OR	97333-1240	531130	Landlords of Miniwarehouses and Self-Storage Units
Rose Valley Home Service	320 NW 16th St	Corvallis	OR	97330	541990	Services NEC
Toyota of Corvallis	800 NW 5th St	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Sunflower Spa Asian Massage	1333 NW 9th St	Corvallis	OR	97330-5386	812113	Manicure and pedicure salons
Stefonek, Erin	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Budget Office	4077 SW Research Way	Corvallis	OR	97333	921120	Government Offices-County
Crawford, Jeffrey, David, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wood, Leslie D	223 SW 8th St	Corvallis	OR	97333	621330	Social Workers
Kanwar, Parinav	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Be Well Corvallis Chiropractic	2306 NW Kings Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Smith, Thomas, Roger, DO	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Valley Landfills Inc	28972 Coffin Butte Rd	Corvallis	OR	97330	562212	Landfills-Sanitary
Peak Sports	135 NW 2nd St	Corvallis	OR	97330	459110	Sporting Goods Retailers
FedEx Ship Center	201 SW Airport Ave	Corvallis	OR	97333	541860	Mailing & Shipping Services
Samaritan Health Service	3509 NW Samaritan Dr	Corvallis	OR	97330-3893	456110	Pharmacies and Drug Retailers
Atlas Ti Americas	NULL	Corvallis	OR	97330	999990	Nonclassified Establishments
Gordon & Associates Inc	508 SW Jefferson Ave	Corvallis	OR	97333	541330	Engineers-Consulting
Richardson, Joseph R	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Baha'i Faith	3620 NW Lincoln Ave	Corvallis	OR	97330	813110	Religious Organizations
Forest Health-Human Health Institute	101 SW Western BLVD Ate 101	Corvallis	OR	97333	813920	Scientific Organization

View Plus Technologies	1965 SW Airport Ave	Corvallis	OR	97333-9555	334118	Computer Terminal/Other Computer Prphrl Equip Mfg
Polizzo, Christina	NULL	Corvallis	OR	97330	621330	Social Workers
Koriander	215 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Edward Jones-Financial Advisor: Rob Schreier	545 SW 2nd St	Corvallis	OR	97333-4920	523940	Portfolio Management and Investment Advice
Benton County Victim Service	NULL	Corvallis	OR	97330	921120	Government Offices-County
Peak Internet	660 NW Harrison Blvd	Corvallis	OR	97330	517810	Information Retrieval Services
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cirellos Pizza	919 NW Circle Blvd	Corvallis	OR	97330	722511	Pizza
Jagger Kaeser, Seth J PT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Willamette Tours & Cruises	33336 SE White Oak Rd	Corvallis	OR	97333-2505	561520	Travel tour operators
Barnes Gary L	760 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Bike N Hike	401 SW 3rd St	Corvallis	OR	97333-4440	459110	Sporting Goods Retailers
Epic Day Spa	517 SW 2nd St	Corvallis	OR	97333	812112	Beauty Salons
The UPS Store	5060 SW Philomath Blvd	Corvallis	OR	97333-4845	541860	Mail advertising services
Summit Orthotics & Prosthetics	400 NW Walnut Blvd	Corvallis	OR	97330-3800	456199	All Other Health and Personal Care Retailers
Corvatek	3025 NW McKinley Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
KMT Ventures LLC	5260 NW Highway 99	Corvallis	OR	97330	999990	Nonclassified Establishments
Posler, Jeanette Ot	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Corvallis City Manager	501 SW Madison Ave	Corvallis	OR	97333	921110	City Government-Executive Offices
Samaritan Medical Laboratories	3600 NW Samaritan Dr	Corvallis	OR	97330	621511	Laboratories-Medical
Directors Mortgage	430 NW 3rd St	Corvallis	OR	97330	522292	Real Estate Loans
Studio 505	425 SW Butterfield Pl	Corvallis	OR	97333	812112	Beauty Salons
NuScale Power, LLC	1100 NE Circle Blvd	Corvallis	OR	97330-4741	541690	Scientific and technical consulting services (except environmental)
Varsity House	119 NW 9th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Hennings, Matthew, Bradley	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Jackson Hewitt Tax Service	919 NW Circle Blvd	Corvallis	OR	97330	541213	Tax Return Preparation & Filing
PNS Homestead	445 SW Tunison Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Glass Slipper Inc	116 NW 2nd St	Corvallis	OR	97330	458110	Dancing Supplies
High Priestess Piercing-Tattoo	2475 NW Monroe Ave	Corvallis	OR	97330	812990	Body Piercing
Norm Vedaa Construction	3015 NW Christine St	Corvallis	OR	97330	236118	Remodeling & Repairing Building Contractors
Alpha Zeta Chapter of Pi Kappa Phi	2111 NW Harrison Blvd	Corvallis	OR	97330	813410	Fraternities & Sororities
Hockley, Tessa	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Patrick Wayne Valley Stadium	660 SW 26th St	Corvallis	OR	97331-8622	711310	Organizers of state and county fairs, concerts, and festivals with facilities
Reynolds Law Firm	555 NW 5th St	Corvallis	OR	97330	541110	Attorneys
Samaritan Health Plans	2300 NW Walnut Blvd	Corvallis	OR	97330	524210	Insurance
Schmolzi, Wendy, Monette	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Nurses-Practitioners
Good Samaritan Regional Medical Center Hospitalist	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton County Parole-Probation	180 NW 5th St	Corvallis	OR	97330	921120	Government Offices-County
Pajaggle	2851 NW 9th St	Corvallis	OR	97330	339999	Game Designers (Mfrs)
New Morning Bakery	1870 SW 3rd St	Corvallis	OR	97333	424490	Bakers-Wholesale
Bursky, Kathleen, Theresa	1760 SW 3rd St	Corvallis	OR	97333	624190	Counselors-Licensed Professional
Westby, Tara, N	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Mark A Henke PC	2605 NW Rolling Green Dr	Corvallis	OR	97330	621210	Dentists
Mexico Lindo	5228 SW Philomath Blvd	Corvallis	OR	97333-1042	722511	Full-Service Restaurants
Corvallis Sports Park	175 SW Twin Oaks Cir	Corvallis	OR	97333	711211	Soccer Clubs
Chaplin, Alana, Mikayla	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Bob Grant Construction Inc	2696 SW 3rd St	Corvallis	OR	97333	236115	Home Builders
Benco NW Sequoia	918 NW Sequoia Ave	Corvallis	OR	97330	623110	Adult Care Facilities
Lipe, Kristin DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon Electro-MEC Inc	1555 SE Crystal Lake Dr	Corvallis	OR	97333-1201	333111	Farm Machinery and Equipment Manufacturing
Willamette Neighborhood HSNG	3384 NE Oxford Cir	Corvallis	OR	97330	541990	Services NEC
Frost Eye Care	1329 NW 9th St	Corvallis	OR	97330-5386	621320	Doctors of optometry clinics
Al & Merles Rock & Gem Shop	28816 Highway 34	Corvallis	OR	97333	423830	Lapidary Equipment & Supplies (Whls)
Starbucks	5270 SW Philomath Blvd	Corvallis	OR	97333	722515	Coffee Shops
Evergreen Dental	1823 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Unruh, Claire, L, DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics

Blue Rhino	2045 NW 9th St	Corvallis	OR	97330	457210	Propane Tank Kiosks
Benco NW Grant	1325 NW Grant Ave	Corvallis	OR	97330-4610	624310	Vocational rehab agencies
ULTA Beauty	1550 NW 9th St	Corvallis	OR	97330	456120	Cosmetics & Perfumes-Retail
Oregon Hang Gliding School	131 NW 4th St	Corvallis	OR	97330-4702	611110	Elementary, middle and high schools
Bashful Bob's MFG Construction	550 SW 7th St	Corvallis	OR	97333-4562	999990	Unclassified Establishments
Forest Health-Human Health	136 SW Washington Ave	Corvallis	OR	97333	813910	Associations
Country Market & Deli	310 NW 53rd St	Corvallis	OR	97330	445110	Grocers-Retail
Gene's Antenna Service	2065 NW Buchanan Ave	Corvallis	OR	97330	449210	Satellite Equipment & Systems-Retail
Century Constructors	NULL	Corvallis	OR	97330	236115	General Contractors
Milan Laser Hair Removal	1335 NW 9th St	Corvallis	OR	97330-5387	812199	Miscellaneous self grooming services (except hair, nail, facial, nonpermanent makeup, nonmedical diet services)
Da Vinci Days Inc	568 SW 3rd St	Corvallis	OR	97333-4439	455219	All Other General Merchandise Retailers
Corvallis Radiology PC	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Couch, Ashley, Alyn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Pta Oregon Congress	2701 NW Satinwood St	Corvallis	OR	97330	813910	Associations
Futon Man	5280 NW Highway 99	Corvallis	OR	97330-9485	449110	Furniture Retailers
Samaritan Hematology & Oncology Consultants	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Acpuncture Clinic of Corvallis	310 NW 5th St	Corvallis	OR	97330-4895	621111	Physicians' clinics
Benton County Development Department	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
Irie-at Inc	7555 NW Oak Creek Dr	Corvallis	OR	97330	334111	Computers-Electronic-Manufacturers
Bartosh, Pieter	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Airgas	405 NE Circle Blvd	Corvallis	OR	97330	424720	Gas-Indstrl/Med-Cylinder & Bulk (Whls)
Unbank Bitcoin ATM	2875 SW Western Blvd	Corvallis	OR	97333	523160	Virtual Currency Conversion Kiosk/ATM
Citizens Bancorp	275 SW 3rd St	Corvallis	OR	97333	551111	Holding Companies (Bank)
Krisar White, Patricia MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Therapeutic Solutions of Oregon PC	260 SW Madison Ave	Corvallis	OR	97333	621330	Therapy
Holifield, Joshua, M, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Zivanovic, Mario	777 NW Kings Blvd	Corvallis	OR	97330	621330	Pharmacists
Lach Daniel & Nancy DC	2296 NW Kings Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Day Heating Company	787 NE Circle Blvd	Corvallis	OR	97330	238220	Air Conditioning Contractors & Systems
Mike's Heating	NULL	Corvallis	OR	97330	238220	Heating Contractors
Crumbl Cookies	1705 NW 9th St	Corvallis	OR	97330	722515	Cookie Shops
Douglas, James, Edward, MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kernutt Stokes-Corvallis Certified Public Accountants & Cons	2273 NW Professional Dr	Corvallis	OR	97330	541110	Attorneys
Park, Sohyun	444 NW Elks Dr	Corvallis	OR	97330	621399	Physicians Assistants
Conifer House Nursing Home	145 NE Conifer Blvd	Corvallis	OR	97330	623110	Nursing & Convalescent Homes
AAA Insurance	1550 NW 9th St	Corvallis	OR	97330	524210	Insurance
Shapiro Virginia	915 NW 36th St	Corvallis	OR	97330	621999	Health Services
Mary & Co Salon	410 NW Walnut Blvd	Corvallis	OR	97330	812112	Beauty Salons
Todd, Branden, Ollee	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Farrer, Sterling MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Whitman, Mallory R	114 Gill Coliseum	Corvallis	OR	97331-8547	621340	Physical, occupational, speech therapists and audiogists' clinics
Samaritan Gynecology & Surgical Associates	400 NW Walnut Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Marek & Lanker	810 SW Madison Ave	Corvallis	OR	97333	541110	Attorneys
Mid-Valley Harvest	5060 SW Philomath Blvd	Corvallis	OR	97333	813311	Charitable Institutions
Michael Cross-Financial Advisor, Ameriprise Financial Services, LLC	777 NE 2nd St	Corvallis	OR	97330	523940	Financial Advisory Services
Abundant Solar	7267 NW Grandview Dr	Corvallis	OR	97330	423720	Solar Energy Equipment-Wholesale
Timber Hill Foot Clinic	2440 NW Professional Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Karate School	311 NW 6th St	Corvallis	OR	97330	611620	Martial Arts Instruction
Equilibrium Painting LLC	1812 NE Noble Ave	Corvallis	OR	97330	238320	Painters
Malik, Natasha M	108 SW Memorial Pl	Corvallis	OR	97331	621330	Pharmacists
The Delta Chi Fraternity, Inc	203 NW 13th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Corvallis Fire Department-Station 2	500 SW 35th St	Corvallis	OR	97333-4048	922160	Fire Protection
Oregon State University Oregon Sea Grant	1600 SW Western Blvd	Corvallis	OR	97333-4287	611310	Schools offering baccalaureate or graduate degrees
Oag	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Davis, Christina	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists

Fish Emergency Service	968 NW Garfield Ave	Corvallis	OR	97330	541990	Services NEC
Jackson, Melanie, A, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Obermire, Travis M DPT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Starbucks	777 NW Kings Blvd	Corvallis	OR	97330	722515	Coffee Shops
Adult & Family Service	4170 SW Research Way	Corvallis	OR	97333	923130	State Government-Social/Human Resources
Penguin Florist & Flower Delivery	2465 NW Monroe Ave	Corvallis	OR	97330-5367	459420	Gift, Novelty, and Souvenir Retailers
Savage Cannabis Holdings LLC	27630 Llewellyn Rd	Corvallis	OR	97333	551112	Holding Companies (Non-Bank)
Knapp, Philippe A DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Artemis, Diana	301 SW 4th St	Corvallis	OR	97333	624190	Marriage & Family Counselors
Dale the Builder	3310 SW Knollbrook Ave	Corvallis	OR	97333	236118	Handyman Services
Coast to the Cascades Community Wellness Network	815 NW 9th St	Corvallis	OR	97330-6173	999990	Unclassified Establishments
Goodrum, Benjamin, Ashby	530 NW 27th St	Corvallis	OR	97330	621399	Midwives
Wesenberg, Brent C MD	5234 SW Philomath Blvd	Corvallis	OR	97333-1042	621111	Physicians' clinics
Brooklane Cottage	1921 SW Brooklane Dr	Corvallis	OR	97333	531110	Operators Of Apartment Buildings
Lorimer, Dorothy	260 SW Madison Ave	Corvallis	OR	97333	624190	Counselors
Crystals Cuisine & Cafe	1425 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Levrum, Inc	408 SW Monroe Ave	Corvallis	OR	97333	999990	Federal Government Contractors
Diana Artemis Counseling Services	301 SW 4th St	Corvallis	OR	97333	624110	Counseling Services
Benco Garfield	965 NW Garfield Ave	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
Bencostone St	1940 SE Stone St	Corvallis	OR	97333	624310	Cognitive Disability-Dev Disability Svcs
Ryan D Sparks, DMD	2200 NW Century Dr	Corvallis	OR	97330-3496	621210	Dentists' clinics
Skufca, Joshua A DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wells Fargo Advisors	2273 NW Professional Dr	Corvallis	OR	97330-3999	523940	Portfolio Management and Investment Advice
Hirsch, Frederick, Danner, MD	2298 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
John Kerekanich-COUNTRY Financial	201 NW 3rd St	Corvallis	OR	97330	524210	Insurance
Eirppe LLC	215 SW 4th St	Corvallis	OR	97333	999990	Nonclassified Establishments
Pace Heating & Air	NULL	Corvallis	OR	97330	238220	Air Conditioning Contractors & Systems
Oregon State University College of Civil & Construction Engineering	202 Apperson Hall	Corvallis	OR	97331-8522	611310	Schools offering baccalaureate or graduate degrees
Green Law LLC	1756 SE Lilly Pl	Corvallis	OR	97333	541110	Attorneys
Trusty Auto Repair	2335 SE 3rd St	Corvallis	OR	97333	811111	Automobile Repairing & Service
Six Stars CCC	3530 NE Lancaster St	Corvallis	OR	97330	999990	Nonclassified Establishments
OSU Extended Campus	4943 The Valley Library	Corvallis	OR	97331	611710	Education Centers
Oregon State University Strand	170 SW Waldo Pl	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
My Corvallis Dentist	2055 NW Grant Ave	Corvallis	OR	97330	621210	Dentists
Polaris Psychiatric Associates	2090 NW Rosewood Pl	Corvallis	OR	97330	621111	Physicians & Surgeons
Buffalo Wild Wings	NULL	Corvallis	OR	97330	722511	Restaurants
Marlon's Painting LLC	154 NE Conifer Blvd	Corvallis	OR	97330-4677	238320	Painting and Wall Covering Contractors
Linn-Benton Housing Authority	5140 SW Meadow Flower Dr	Corvallis	OR	97333	531311	Housing Authorities
Northwest Medical Isotopes, LLC	815 NW 9th St	Corvallis	OR	97330	325412	Pharmaceutical Preparation (Mfrs)
Citizens Bank	978 NW Circle Blvd	Corvallis	OR	97330	522110	Banks
Quintero, Angela P	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Curves	1333 NW 9th St	Corvallis	OR	97330	713940	Health Clubs Studios & Gymnasiums
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hunter-Zaworski, Katharine	7810 NW Oxbow Dr	Corvallis	OR	97330	541330	Engineering
Electric Charging Station	220 SW 26th St	Corvallis	OR	97331	457120	Electric Charging Station
Evangelical Church	1525 NW Kings Blvd	Corvallis	OR	97330	813110	Churches
Lincoln Health Center	121 SE Viewmont Ave	Corvallis	OR	97333	621111	Physicians & Surgeons
York Engineering Services Inc	2107 NW Fillmore Ave	Corvallis	OR	97330	541330	Engineers-Consulting
Vela, Kerri Sue PAC	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Christi Raunig Family Acupuncture	845 NW Monroe Ave	Corvallis	OR	97330-6352	621399	Offices of All Other Miscellaneous Health Practitioners
Emerald National Laboratory LLC	132 SW 4th St	Corvallis	OR	97333	621511	Laboratories-Medical
Hair Body & Sole	2611 NW 9th St	Corvallis	OR	97330	812112	Beauty Salons
Anderson Group CPAs	2165 NW Professional Dr	Corvallis	OR	97330	541211	Accountants
Cascade Pointe Apartments	1315 SW E Ave	Corvallis	OR	97333	531110	Apartments
Aboosaiedi, Ali	501 NW Elks Dr	Corvallis	OR	97330	621330	Pharmacists
Stricker, Anthony R	3521 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists

East Valley Community Health Center	1525 NW Kings Blvd	Corvallis	OR	97330	621999	Health Services
The Thrive Clinic LLC	1755 NW Kings Blvd	Corvallis	OR	97330-1905	999990	Unclassified Establishments
Kim, Esther, Jihae, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Shekhar, Adithya, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Kid Shop	116 SW 3rd St	Corvallis	OR	97333	459120	Toys-Retail
Powers, Keana, Laine	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Niemeier, Cara S MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Downing's Gym	1820 SW 3rd St	Corvallis	OR	97333	713940	Health Clubs Studios & Gymnasiums
Day Energy Solutions	787 NE Circle Blvd	Corvallis	OR	97330-4206	238310	Drywall and Insulation Contractors
Blount, Rheannon, Rua	923 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Alpine Animal Hospital PC	5120 NW Highland Dr	Corvallis	OR	97330	541940	Veterinarians
Michael Brugger Arts LLC	2340 SW 3rd St	Corvallis	OR	97333	712110	Arts Organizations & Information
Riverside Window & Door Inc	439 SW 2nd St	Corvallis	OR	97333	444180	Windows
Katy Blye-Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330-6492	531210	Real Estate Agencies and Brokerages
Oregon State University Student Experiences & Engagement	2251 SW Jefferson Way	Corvallis	OR	97331	611310	Schools offering baccalaureate or graduate degrees
Blumer, Tim E DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Allen, Jessie E DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Green Point Consulting	946 NW Circle Blvd	Corvallis	OR	97330-1410	541614	Custom consulting services
Mary's Peak	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Nirsa	4185 SW Research Way	Corvallis	OR	97333-1783	813910	Business organizations
WinCo Foods	2335 NW Kings Blvd	Corvallis	OR	97330	445110	Grocers-Retail
Fresh & Local First	203 Waldo Hall	Corvallis	OR	97331	813930	Labor Organizations
Pastega Guest House	3505 NW Samaritan Dr	Corvallis	OR	97330	721310	Guest Houses
Les Schwab	2220 SW 3rd St	Corvallis	OR	97333-1787	441340	Tire Dealers
Albuschat, Katherine M	501 NW Elks Dr	Corvallis	OR	97330	621340	Physical Therapists
Good Samaritan Regional Medical Center	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Northwest Health & Healing Center	999 NW Circle Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Reeser, Ryan, Matthew O'N, DO	850 SW 26th St	Corvallis	OR	97331-8624	621111	Physicians' clinics
Corvallis City Finance Department	500 SW Madison Ave	Corvallis	OR	97333-4610	921130	Public monetary activities
Home Services at the Home Depot	1780 NW Four Acre Place	Corvallis	OR	97330	236118	Residential Remodeling Contractors
Planet Fitness	1900 NW 9th St	Corvallis	OR	97330-2145	713940	Gymnasium (gym)
Dental Health	869 NW 23rd St	Corvallis	OR	97330	621210	Dentists
Spies Corp	600 SW 3rd St	Corvallis	OR	97333	531210	Real Estate
Cornerstone Realty Management	301 SW 4th St	Corvallis	OR	97333	531210	Real Estate Management
Haag, Karen J	230 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Corvallis Floor Covering	235 NW 2nd St	Corvallis	OR	97330-4834	449121	Floor Covering Retailers
Valley Remodeling	2305 NW Kings Blvd	Corvallis	OR	97330	236118	Remodeling & Repairing Building Contractors
PLC Asset Management	2141 NW Janssen St	Corvallis	OR	97330	523150	Stock & Bond Brokers
Olson, Emily R	2773 NW 9th St	Corvallis	OR	97330	621399	Physicians Assistants
Federoff, Margaret K	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Church of Christ	2020 NW Circle Blvd	Corvallis	OR	97330-1316	813110	Religious societies
Cook, Antonia, Steple	121 SE Viewmont Ave	Corvallis	OR	97333	621399	Nurses-Registered RN
GXM Recreational Facility	5520 NW Highway 99	Corvallis	OR	97330	713940	Recreation Centers
Corvallis-Albany Farmers Markets	5570 SW 3rd St	Corvallis	OR	97333	813319	Non-Profit Organizations
Redmon, Sarah E	815 NW 9th St	Corvallis	OR	97330	621340	Speech Pathologists
AmeriGas Propane Exchange	2405 SE 3rd St	Corvallis	OR	97333	457210	Propane Tank Kiosks
Pioneer Veterinary Clinic	5610 SW Philomath Blvd	Corvallis	OR	97333	541940	Veterinarians
Bobek, Rebecca, Sophie, Psyd	216 NW 6th St	Corvallis	OR	97330	621399	Psychologists
Brown Paventy Properties LLC	2434 NW Professional Dr	Corvallis	OR	97330	531210	Real Estate Management
CPM Development Corp	28054 Payne Rd	Corvallis	OR	97333	327320	Ready-Mixed Concrete-Manufacturers
Sweet Yoga	834 NE 2nd St	Corvallis	OR	97330	611699	Yoga Instruction
Spivey, Susan, Michelle	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Pita Pit	1425 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Verizon Business Services	303 NW Harrison Blvd	Corvallis	OR	97330-4815	517810	All Other Telecommunications
Morden, Genelynne	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Stadium at Corvallis HS	1400 NW Buchanan Ave	Corvallis	OR	97330	711310	Stadiums Arenas & Athletic Fields

Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330-3781	621111	Physicians' clinics
Healing Comfort Clinic	2310 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
OSU Student Health Center	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Samaritan Weight Management & Metabolic Surgery Institute	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Glo Aesthetics LLC	1128 NE 2nd St	Corvallis	OR	97330	812112	Estheticians
Anway, Corinne	530 NW 27th St	Corvallis	OR	97330	621330	Pharmacists
Claggett, Kailey J	2438 NW Professional Dr	Corvallis	OR	97330	624190	Counselors
Corvallis Endodontics	1811 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Tsai, Diane C MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Mahmud, Elisabeth, Romatz	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Corvallis Waldorf Association	3855 NE Highway 20	Corvallis	OR	97330-9212	813319	Miscellaneous social service advocacy organizations
Meeker, Scott CPA	2045 NW Grant Ave	Corvallis	OR	97330	541211	Accountants
Christ Church	440 SW 9th St	Corvallis	OR	97333	813110	Churches
ServiceMaster Restoration & Cleaning Services	30649 OR Highway 34	Corvallis	OR	97333	238990	Cleaning Services-Industrial
Wild Side Smoke Shop	820 NW 9th St	Corvallis	OR	97330	459991	Cigar Cigarette & Tobacco Dealers-Retail
Good Samaritan Regional Medical Center Mental Health	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Brady, Adam C MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Allstate Insurance	310 NW 5th St	Corvallis	OR	97330	524210	Insurance
Samaritan Urology	990 NW Circle Blvd	Corvallis	OR	97330-1967	621111	Physicians' clinics
Crossroads Foreign Auto Repair	460 SW Cummings Ave	Corvallis	OR	97333-1108	811111	Car repair shops
Beckon Call	NULL	Corvallis	OR	97339	238990	Window Cleaning
Istok, Jonathan	6425 NW Oak Creek Dr	Corvallis	OR	97330	541330	Engineering
Corvallis Market Center	1550-1580 NW 9th St	Corvallis	OR	97330	445110	Grocery Stores and Supermarkets
Willamette Valley Cancer Institute and Research Center	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Mortgage Express	405 NW 5th St	Corvallis	OR	97330	522292	Real Estate Loans
Go Giddy Pops	NULL	Corvallis	OR	97330	722330	Food carts
Casco Net	1600 SW Western Blvd	Corvallis	OR	97333	518210	Internet Service
Metolius Construction Inc	4430 SW Golf View Dr	Corvallis	OR	97333	237990	Construction Management
Nick's Auto Repair	128 NW 2nd St	Corvallis	OR	97330	423120	Automobile Parts & Supplies-Wholesale
Mattress Firm	1580 NW 9th St	Corvallis	OR	97330	449110	Mattresses
Barthel, Jonathan, Lindsay	3620 NW Samaritan Dr	Corvallis	OR	97330	621340	Physical Therapists
Nightingale-Warren, Elanya, D'yns Ennli	877 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Lasells Stewart Center OSU	875 SW 26th St	Corvallis	OR	97331	711110	Performing Arts
Jenkins, Colin R	4194 SW Fairhaven Dr	Corvallis	OR	97333	459420	Gift Shops
China Delight Restaurant & Lounge	325 NW 2nd St	Corvallis	OR	97330	722511	Restaurants
Applebaum, Nicole	114 SW 8th St	Corvallis	OR	97333	621330	Social Workers
Greenblatt, Jesse MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Intivix	2851 NW 9th St	Corvallis	OR	97330	541511	Information Technology Services
Amazon Locker	2080 NW 9th St	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Cushman, Tausha, Inara	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Chamberlain, Lee Ann	2001 NW Monroe Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Phi Delta Theta Fraternity	120 NW 13th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Richard, Gregory, Allen, MD	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Holiday Tree Farms	800 NW Cornell Ave	Corvallis	OR	97330	455219	Christmas Trees
Oregon Tilth Inc	2525 SE 3rd St	Corvallis	OR	97333	541380	Laboratories-Testing
Wake Robin Storage	541 SW Wake Robin Ave	Corvallis	OR	97333	531130	Storage-Household & Commercial
Master Gardener Association	NULL	Corvallis	OR	NULL	813910	Associations
Perfect Look Hair Salon	2325 NW Kings Blvd	Corvallis	OR	97330	812112	Beauty Salons
Benton County	4077 SW Research Way	Corvallis	OR	97333	921190	County Government-General Offices
Marie Janes Cannabis Connection	568 SW 3rd St	Corvallis	OR	97333	459991	Cannabis Dispensary
Oregon State University Facilities Infrastructure & Oper	560 SW 15th St	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Maggiulli, Tessa Rhea DVM	1562 SW 3rd St	Corvallis	OR	97333	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jim Schrock Construction Co	NULL	Corvallis	OR	NULL	236115	Construction Companies
Arc Thrift Store	928 NW Beca Ave	Corvallis	OR	97330	459510	Thrift Shops
Steele Schlauderaff, Hayley, Christine	2400 NW Kings Blvd	Corvallis	OR	97330	621399	Nurses-Practitioners

USPS Blue Collection Box	311 SW 2nd St	Corvallis	OR	97333	541860	Mailing & Shipping Kiosks
London's Automotive	855 SW Western Blvd	Corvallis	OR	97333-4301	423120	Motor Vehicle Supplies and New Parts Merchant Wholesalers
Vester, Amber, M, DO	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
J B Good Inc	5250 NE Highway 20	Corvallis	OR	97330	561730	Tree Service
Rico, Edward H	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Jackson Street Youth Shelter Inc	555 NW Jackson Ave	Corvallis	OR	97330-4831	624110	Children services
Offenhauser, Caroline E	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Porter, Lori T MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330-5472	621999	Miscellaneous health care providers
Sillars, Carol F PHD	744 NW 4th St	Corvallis	OR	97330	621399	Psychologists
Abraham, Mary, MD	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cho, Paul	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Autism Toolbox	2913 NW Lincoln Ave	Corvallis	OR	97330-4403	611710	Educational Assistance Services
Best Friends Obedience & Agility School	2660 SW 3rd St	Corvallis	OR	97333-1635	812910	Animal care services
Devco Engineering Inc	245 NE Conifer Blvd	Corvallis	OR	97330	541330	Engineers-Civil
North Point Dental Group LLC	2250 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Bellaisima Design Studio	901 NW Kings Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Sweet Home 44th Ave LLC	2065 NW Grant Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Pink Caterpillar Photographers	1295 NW 17th St	Corvallis	OR	97330	541921	Photographers-Portrait
Aponso, Savinda, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Accountable Behavioral Health Alliance	310 NW 5th St	Corvallis	OR	97330-4895	622210	Rehabilitation hospitals
Baker, Bryan J DMD	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Shepherd, Sharyn B	501 NW Elks Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
The Retreat at Corvallis	700 SW Chickadee St	Corvallis	OR	97333-4106	236115	New Single-Family Housing Construction (except Operative Builders)
Special Occasions Parties & Events	4314 SW Research Way	Corvallis	OR	97333	531210	Rental Agencies
Hughes, Guy	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sassy Cakes	312 SW Madison Ave	Corvallis	OR	97333	311811	Bakers-Retail
M3 Inc	2107 NW Fillmore Ave	Corvallis	OR	97330-5624	541330	Engineers' offices
Fleming, Tyler B MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Raymond James Financial Services	2101 NW Professional Dr	Corvallis	OR	97330	523940	Financial Advisory Services
Under Pressure, LLC	2340 NE Steele Ave	Corvallis	OR	97330	811411	Water Pressure Cleaning
Slack, Sara K	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Halcrow, Donald A	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Benton County Veteran's Memorial	1450 NW 12th St	Corvallis	OR	97330	921120	Government Offices-County
Toy Factory	442 SW 2nd St	Corvallis	OR	97333	459120	Toys-Retail
Kolas, Jaden S	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Greaves, Maddison M	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Heidi Gornik Real Estate LLC	1121 NW 9th St	Corvallis	OR	97330	531210	Real Estate Management
Oregon Nanoscience	1110 NE Circle Blvd	Corvallis	OR	97330	813319	Non-Profit Organizations
Electrical Engineering & Computer Science	110 SW Park Ter	Corvallis	OR	97331-8676	238210	Electricians and Wire Installation Contractors
Michelle McVay LMT	442 NW 3rd St	Corvallis	OR	97330-6403	812199	Miscellaneous self grooming services (except hair, nail, facial, nonpermanent makeup, nonmedical diet services)
Hampton, Linda	4455 NE Highway 20	Corvallis	OR	97330	624190	Marriage & Family Counselors
Dillingham, Sophia, R	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Adhikari, Bikash	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Police Crime Prevention	180 NW 5th St	Corvallis	OR	97330-4793	922120	Police Protection
Lucas Gems LLC	1699 SW Country Club Pl	Corvallis	OR	97333	999990	Nonclassified Establishments
Lifestance Health	4185 SW Research Way	Corvallis	OR	97333-1783	624190	Miscellaneous Individual and Family Services
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330-3758	621111	Physicians' clinics
Jones, Carson	3620 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
American Computer-Elctro SVC	904 NW Kings Blvd	Corvallis	OR	97330	621999	Health Recording Service
Frome Family Dentistry	1759 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Stutzman & Kropf Contractors Inc	NULL	Corvallis	OR	97330	236115	General Contractors
Eduworks Corp	400 SW 4th St	Corvallis	OR	97333	541511	Software/Application/Platform Developers & Programmers
Specht, Adam, B, PA	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants

The Reynolds Law Firm PC	555 NW 5th St	Corvallis	OR	97330	541199	Arbitration Services
Murry, Evan	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Republican Party	1760 SW 3rd St	Corvallis	OR	97333	813940	Political Organizations
Le Cafe	517 SW 2nd St	Corvallis	OR	97333	722511	Restaurants
Casey Long Financial Services	8495 NW Waneta Dr	Corvallis	OR	97330	523150	Investment Securities
Tara Crawford Gardening	110 SW 53rd St	Corvallis	OR	97333	561730	Lawn & Grounds Maintenance
Practical Dental Assisting of Oregon	1885 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
The Brass Monkey	130 SW 1st St	Corvallis	OR	97333-4720	722511	Full-Service Restaurants
OSU Team Oregon	3550 SW Deschutes St	Corvallis	OR	97333	611699	Personal Development Schools
Sea & Shore Solutions, LLC	337 NE Conifer Blvd	Corvallis	OR	97330	541620	Environmental Consulting Services
David Mendenhall PFS	2334 NW Professional Dr	Corvallis	OR	97330	541211	Accountants
Hope, Amy, Elizabeth, DPT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
B & R Towing	3065 SE 3rd St	Corvallis	OR	97333	488410	Wrecker Service
Double Eagle Construction Company	33833 SE Eastgate Cir	Corvallis	OR	97333	238110	Concrete Contractors
Mike Horner Farm	4474 SW Airport Ave	Corvallis	OR	97333-9514	561730	Land maintenance services
My Hearing Centers	2296 NW Kings Blvd	Corvallis	OR	97330-3899	456199	All Other Health and Personal Care Retailers
Stoneybrook Lodge Gracious Retirement Living	4700 SW Hollyhock Cir	Corvallis	OR	97333-1372	531110	Landlords of Residential Buildings and Dwellings
2900 Coburg LLC	903 NW Beca Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Town & Country Animal Clinic	2621 NW 9th St	Corvallis	OR	97330	541940	Veterinarians
AmeriTitle	525 NW 2nd St	Corvallis	OR	97330-6487	541191	Title Search Companies
Marc Musson DO	2358 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Mulligan, Colin M	236 Kerr Administration Bldg	Corvallis	OR	97331-8578	621340	Physical, occupational, speech therapists and audiogists' clinics
Pathway Solutions	408 NW 7th St	Corvallis	OR	97330-6308	621999	Miscellaneous health care providers
Wojtkowicz, Mike	4455 NE Highway 20	Corvallis	OR	97330	621399	Psychologists
Heinrich, Steve PHD	700 NW 3rd St	Corvallis	OR	97330	541110	Attorneys
Lululox LLC	NULL	Corvallis	OR	97330	999990	Nonclassified Establishments
Quixotic Ecoconsulting	722 NW 33rd St	Corvallis	OR	97330	541614	Business Management Consultants
Corpac Construction Co Inc	NULL	Corvallis	OR	NULL	236115	Construction Companies
Bertsch Moving and Storage	155 SE Lilly Ave	Corvallis	OR	97333	484230	Trucking
Chuck's Upholstery	930 NW Hayes Ave	Corvallis	OR	97330	811420	Upholsterers
Azadnia, Emily, Etheram	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Clair Company Inc	525 NW 2nd St	Corvallis	OR	97330	541350	Building Inspection Service
Pega Tots Preschool	6880 SW West Hills Rd	Corvallis	OR	97333	624410	Schools-Pre-School/Kindergarten-Academic
Knights Templar of the United States of America	306 SW Madison Ave	Corvallis	OR	97333	813410	Fraternal Organizations
Margot Vance Borland LLC	8285 NW Wynoochee Dr	Corvallis	OR	97330	624190	Marriage & Family Counselors
Corvallis Odd Fellows Barnum	223 SW 2nd St	Corvallis	OR	97333	813410	Fraternal Organizations
Hiatt Farm	30699 Peterson Rd	Corvallis	OR	97333	311811	Bakers-Retail
Blue Rhino	1905 NE Four Acre St	Corvallis	OR	97330	457210	Propane Tank Kiosks
Turman Financial Group LLC	343 NW 7th St	Corvallis	OR	97330	523940	Financing Consultants
Beyond Belief	931 NW Harrison Blvd	Corvallis	OR	97330	541410	Interior Decorators Design & Consultants
Chateau Management	2305 NW Monroe Ave	Corvallis	OR	97330	236115	Construction Companies
Ebert, Maggie E PA	3600 NW Samaritan Dr	Corvallis	OR	97330-5472	621399	Offices of All Other Miscellaneous Health Practitioners
Pathfinder Clubhouse	250 NW 1st St	Corvallis	OR	97330-4836	813319	Miscellaneous social service advocacy organizations
Birkby, Cara	3600 NW Samaritan Dr	Corvallis	OR	97330	621340	Physical Therapists
Seaders Tree Care LLC	3160 NE Asbahr Ave	Corvallis	OR	97330-9213	561730	Land maintenance services
Lotspeich, Elizabeth, Ann	142 SW 2nd St	Corvallis	OR	97333	621399	Dental Hygienists
Bird Bath Soap	2675 NE Lancaster St	Corvallis	OR	97330	325611	Soaps & Detergents-Manufacturers
Corvallis Municipal Airport-CVO	5695 SW Airport Pl	Corvallis	OR	97333-9547	488119	Other Airport Operations
Corvallis Tourism Convention	113 SW 3rd St	Corvallis	OR	97333	561510	Tourist Information
Northwest Health & Healing Center	999 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians-Naturopathic
Corvallis Radiology PC	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Bikram Yoga	1750 SW 3rd St	Corvallis	OR	97333	611699	Yoga Instruction
Behee, Colin G	905 NW 10th St	Corvallis	OR	97330	813311	Human Services Organizations
USPS Blue Collection Box	301 SW 15th St	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Gill Coliseum	107 Gill Coliseum	Corvallis	OR	97331-8547	711310	Organizers of state and county fairs, concerts, and festivals with facilities
West Hills Animal Hospital	430 SW 53rd St	Corvallis	OR	97333	541940	Veterinarians

LT Investments, LLC	2380 NW Kings Blvd	Corvallis	OR	97330	523910	Investments
Carpenter, Sierra L	108 SW Memorial Pl	Corvallis	OR	97331	621330	Pharmacists
Get Organized!, LLC	5060 SW Philomath Blvd	Corvallis	OR	97333-1044	541211	Accountants/CPAs offices/private accounting practices
Gadusol Laboratories	1110 NE Circle Blvd	Corvallis	OR	97330	325620	Perfumes Cosmetics/Toilet Preps (Mfrs)
Salman Alfarisi Islamic Center	610 NW Kings Blvd	Corvallis	OR	97330	813110	Religious Organizations
Shirley, Rachel, J, DO	441 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Boyd, Jack H MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wild Birds Unlimited	1935 NW 9th St	Corvallis	OR	97330	444240	Animal & Bird Housing
Young, Nathan J	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Aomatsu Japanese Restaurant	122 NW 3rd St	Corvallis	OR	97330	722511	Restaurants
American Veterinary Medical Association	700 SW 30th St Magruder Hall 200	Corvallis	OR	97331	813910	Business organizations
Bucy Associates	2921 NW Hayes Ave	Corvallis	OR	97330-1855	519290	Web Search Portals and All Other Information Services
Evans Watkins, Julie A PHD	260 SW Madison Ave	Corvallis	OR	97333	621399	Psychologists
Koebel House	745 NW 25th St	Corvallis	OR	97330	813311	Disability Services
Northwest Financial Group Inc	310 NW 7th St	Corvallis	OR	97330	523940	Financial Planning Consultants
Homestead Fungi	1005 SW Washington Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Franklin School	750 NW 18th St	Corvallis	OR	97330	611110	Schools
Pi Mu Epsilon Inc	Math Dept Oregon State University	Corvallis	OR	97331	813410	Educational Associations
Pederson, Elina, Gouw	530 NW 27th St	Corvallis	OR	97330	621330	Pharmacists
Miller, Bryan, Keir, PA	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Miguel's Mexican Cuisine	520 SW 4th St	Corvallis	OR	97333	722330	Mobile Food Services
Ackridge, Jasmine M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Friends of Corvallis Policeincorporated	NULL	Corvallis	OR	NULL	922120	Police Departments
Ballard, Joseph, Scott	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Willamette Saw Service	5200 SW Philomath Blvd	Corvallis	OR	97333	236118	Patio Porch & Deck Enclosures
Samaritan Mental Health Family	3517 NW Samaritan Dr	Corvallis	OR	97330	621498	Outpatient Services
Peak Internet	1600 SW Western Blvd	Corvallis	OR	97333	518210	Internet Service
Hills, Riley	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Zaps Technologies Inc	4314 SW Technology Pkwy	Corvallis	OR	97333	541714	Environmental & Ecological Services
Di Simone, Julia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Love Inc	4900 NW Highway 99	Corvallis	OR	97330	541614	Business Management Consultants
Vanguelova, Veneta, V, DO	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Fire Department-Station 4	365 SW Tunison Ave	Corvallis	OR	97333	922160	Fire Protection
Crozier, Erin, Fuller, PHD	518 SW 3rd St	Corvallis	OR	97333	621399	Psychologists
Schweiss, Robert E DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Hissho Sushi	922 NW Circle Blvd	Corvallis	OR	97330	722513	Food Service Kiosk
DBM Computer Consulting Inc	NULL	Corvallis	OR	NULL	541511	Computer Programming and Software Development Services
Wright, Signe H PA	5232 SW Philomath Blvd	Corvallis	OR	97333	621399	Physicians Assistants
English-Cremeans, Maureen, Kathryn	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Defilippis, Tammara, DC	408 NW 7th St	Corvallis	OR	97330	621310	Chiropractors DC
Corvallis Clinic Immediate	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Elegance & Geekery	311 SW 2nd St	Corvallis	OR	97333	999990	Nonclassified Establishments
McArdle, Kendra	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Kreofsky, Tess	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Health Services Pharmacy	530 NW 27th St	Corvallis	OR	97330-5223	456110	Pharmacies and Drug Retailers
Center Of Health	6455 NW Concord Dr	Corvallis	OR	97330	812199	Massage Therapists
Houston, James	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Haugan, Heather A FNP	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Marilyn Slizeski, Counselor	4185 SW Research Way	Corvallis	OR	97333-1783	622210	Rehabilitation hospitals
Edward Jones	5216 SW Philomath Blvd	Corvallis	OR	97333-1042	523940	Portfolio Management and Investment Advice
Northwest Multisports	310 SW 2nd St	Corvallis	OR	97333	459110	Bicycles-Dealers
Subway	2350 NW 9th St	Corvallis	OR	97330-1557	722511	Full-Service Restaurants
Work Unlimited Department	715 SE Alexander Ave	Corvallis	OR	97333	561311	Employment Agencies & Opportunities
Matt's Cavalcade of Comics Cards & Collectibles	2075 NW Buchanan Ave	Corvallis	OR	97330	459210	Comic Books
Lucidyne Technologies Inc	155 SW Madison Ave	Corvallis	OR	97333	334513	Industrial Measuring/Controlling Instr (Mfrs)
Core Vitality Clinic	650 SW 3rd St	Corvallis	OR	97333-4437	621399	Offices of All Other Miscellaneous Health Practitioners

Mental Health Association of Benton County	NULL	Corvallis	OR	NULL	621999	Health Services
Beaver Caucus	4238 SW Research Way	Corvallis	OR	97333-1068	624190	Miscellaneous Individual and Family Services
Bowen, Katherine L CNM	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Registered RN
Corvallis Youth Symphony Association	4444 NW Highland Dr	Corvallis	OR	97330-9734	813319	Miscellaneous social service advocacy organizations
Encore Physical Therapy	2609 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
La Paloma Apartments LLC	913 NW Grant Ave	Corvallis	OR	97330	531110	Apartments
Suds & Suds	1045 NW Kings Blvd	Corvallis	OR	97330	722511	Restaurants
Denno, Bailey E DPT	525 NW 2nd St	Corvallis	OR	97330	621340	Physical Therapists
Guild Mortgage	435 NW 5th St	Corvallis	OR	97330-6492	522292	Real Estate Credit Lending
Robinson, Elena, Kristine	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Stephens Heating & Air Conditioning	1920 SW 3rd St	Corvallis	OR	97333	238220	Air Conditioning Contractors & Systems
Myles, Sherie, Denise, RN	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
Landucci, Bradly D	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
First Congregational UCC	4515 SW West Hills Rd	Corvallis	OR	97333-3999	813110	Religious societies
Shagavah, Santon M	3600 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Nixon, Stephanie NP	2001 NW Monroe Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Rapid Refill Print Solutions	301 SW 4th St	Corvallis	OR	97333-4665	423830	Industrial Machinery and Equipment Merchant Wholesalers
McMaster Donna	254 SW Madison Ave	Corvallis	OR	97333-4706	999990	Unclassified Establishments
Tammy Chatfield, Ma, MFT, LPC	2075 NW Grant Ave	Corvallis	OR	97330	621112	Psychiatry-Adult Child & Adolescent
Emily Ford, Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531210	Real Estate
Corvallis Auto Electric	34127 NE Sunrise St	Corvallis	OR	97333	811111	Automobile Repairing & Service
McCullum, Peggy Lisa CNM	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
US Marine Corps Officer Selection Office Corvallis	2001 NW Monroe Ave	Corvallis	OR	97330-5508	928110	National Security
Al & Sons Private Eye	NULL	Corvallis	OR	NULL	621320	Optometrists OD
Bessie Coleman Elementary School	3838 NW Walnut Blvd	Corvallis	OR	97330	611110	Schools
Blue Rhino	1050 NW 5th St	Corvallis	OR	97330	457210	Propane Tank Kiosks
Forest Service	4077 SW Research Way	Corvallis	OR	97333	924120	Federal Government-Land/Mineral/Wildlife/Forest Conservation
Oregon's Choice Gourmet Albcr	1985 NW Lance Way	Corvallis	OR	97330	445250	Seafood-Retail
Beautiful Bountiful Oregon	547 NW 9th St	Corvallis	OR	97330	459210	Book Dealers-Retail
Nichols, Sierra E	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Fillmore, Eric	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Bennett, Adrienne L MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Julie Livingston	1109 NW 9th St	Corvallis	OR	97330-4505	531210	Real Estate Agencies and Brokerages
Extension & Experiment Station	422 Kerr Adm Bldg	Corvallis	OR	97331	513199	Publishers (Mfrs)
Corvallis Self Storage	435 NE Circle Blvd	Corvallis	OR	97330	531130	Storage-Household & Commercial
Warren, Marisa	410 NW Walnut Blvd	Corvallis	OR	97330	621330	Social Workers
Neeley, Dulcy K	3089 SW Knollbrook Ave	Corvallis	OR	97333	624190	Counselors
Boss, Hayley	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Union at Pacific Highway	150 SW Wake Robin Ave	Corvallis	OR	97333	531110	Landlords of Residential Buildings and Dwellings
Corellas, Dominique, Lea	2396 NW Kings Blvd	Corvallis	OR	97330	621330	Social Workers
Blank Canvas Tattoo Studio LLC	425 SW Madison Ave	Corvallis	OR	97333	812199	Tattooing
Samaritan Kidney Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330-3771	621111	Physicians' clinics
Case Printing Solutions	350 SW Wake Robin Ave	Corvallis	OR	97333	323111	Printers (Mfrs)
Wong, Joshua	3521 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Oregon State University, Student Health Services	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Wolfe, Logan Jay	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Schultheiss, Kim Evelyn MD	3600 NW Samaritan Hospital	Corvallis	OR	97339	621111	Physicians & Surgeons
Rogers, Thomas M ND	650 SW 3rd St	Corvallis	OR	97333	621399	Physicians-Naturopathic
Tost, Kristen, Michelle SW	1461 SW A Ave	Corvallis	OR	97333	624190	Counselors
Bridges Enterprise	1225 NW Fernwood Cir	Corvallis	OR	97330	623990	Foster Care
Greater Western Chapter-Ttra	2936 NW 13th Pl	Corvallis	OR	97330-3615	541910	Marketing analysis services
Edward Jones	556 SW Adams Ave	Corvallis	OR	97333-4612	523940	Portfolio Management and Investment Advice
Footwise	301 SW Madison Ave	Corvallis	OR	97333	458210	Shoes-Retail
Tuttle, Joel R OD	130 SW 3rd St	Corvallis	OR	97333	621320	Optometrists OD
Recovery Wellness Center	442 NW 4th St	Corvallis	OR	97330-6409	621999	Miscellaneous health care providers
Benton Furniture Share	4950 SW Hout St	Corvallis	OR	97333	624190	Family & Children Services

Tau Kappa Epsilon	1460 NW Van Buren Ave	Corvallis	OR	97330	813410	Fraternities & Sororities
DTS Enterprises	230 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Marys River Watershed Council	101 SW Western Blvd	Corvallis	OR	97333	484220	Grain Hauling
CMT	413 SW Jefferson Ave	Corvallis	OR	97333	541370	Surveyors-Industrial
Farrow, Cory James	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Timberhill Place	989 NW Spruce Ave	Corvallis	OR	97330-2299	623312	Senior homes (without nursing care)
Benton Plaza	408 SW Monroe Ave	Corvallis	OR	97333	531210	Real Estate Management
Solar, Mattieson, Elizabeth P	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
BigML	2851 NW 9th St	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Wolfgang, Amadeus, Dengler, MD	1220 NW Overlook Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Silicon Box Inc	427 NW 7th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Gale, Derek J	3517 NW Samaritan Dr	Corvallis	OR	97330	624190	Counselors
Specialty Sewing By Leslie	225 SW Madison Ave	Corvallis	OR	97333	458110	Tailors
Treebeerd's Taphouse	201 SW 2nd St	Corvallis	OR	97333	722410	Bars
Bombs Away Cafe	2527 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Edward Jones-Financial Advisor: Amanda R Henevoy	2529 NW Kings Blvd	Corvallis	OR	97330-3988	523940	Portfolio Management and Investment Advice
University Market	1149 NW Van Buren Ave	Corvallis	OR	97330	445110	Grocers-Retail
Mid Valley Enterprise	1867 NW Kings Blvd	Corvallis	OR	97330-1907	456199	All Other Health and Personal Care Retailers
Work Unlimited Department Twelve	515 SW Western Blvd	Corvallis	OR	97333	624310	Employment Svc-Handicapped & Disabled
Mid-Valley Gastroenterology	3521 NW Samaritan Dr	Corvallis	OR	97330-4744	621111	Physicians' clinics
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Benton County Marriage License	120 NW 4th St	Corvallis	OR	97330-4734	921120	Legislative assemblies
Bo & Vine Burger Bar-Corvallis	110 NW 3rd St	Corvallis	OR	97330-4701	722511	Full-Service Restaurants
Walmart Bakery	1840 NW 9th St	Corvallis	OR	97330	311811	Bakers-Retail
Pie Five Pizza	2333 NW Kings Blvd	Corvallis	OR	97330-3924	722511	Full-Service Restaurants
Craft, Andrea, Jean	1318 NW 9th St	Corvallis	OR	97330	624190	Counselors
Nettles-Pledger, Kobe, Byron	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Windermere Property Management	987 NW Circle Blvd	Corvallis	OR	97330	531210	Real Estate Management
Cappadona, Timothy, De Jonghe K	1650 SW 45th Pl	Corvallis	OR	97333	621340	Physical Therapists
Russell Page-Financial Advisor, Ameriprise Financial Services, LLC	777 NE 2nd St	Corvallis	OR	97330-6200	523940	Portfolio Management and Investment Advice
Upci	444 NW 15th St	Corvallis	OR	97330	813110	Churches
Energy Medicine Revolution, LLC	NULL	Corvallis	OR	NULL	238220	Energy Management Systems & Products
Seriously Sassy	1965 NW Kings Blvd	Corvallis	OR	97330	812112	Beauty Salons
Keller Williams Mid Willamette	201 NW 3rd St	Corvallis	OR	97330-4801	531210	Real Estate Agencies and Brokerages
Balser, Emily, Katherine, MD	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Fish & Wildlife Department	28655 Highway 34	Corvallis	OR	97333	924120	State Government-Land/Mineral/Wildlife/Forest Conservation
Bahm, Morgan A NP	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
KL Jamco LLC	4001 SW Western Blvd	Corvallis	OR	97333	561990	Business Services NEC
Brown, Alyssa Mae	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Sunset Valley Organics	31567 Highway 99W	Corvallis	OR	97333	445230	Fruits & Vegetables & Produce-Retail
AutoZone	2108 NW 9th St	Corvallis	OR	97330-1553	441330	Automotive Parts and Accessories Retailers
Rejuvenation By Black Stone	2314 NW Kings Blvd	Corvallis	OR	97330	561311	Personal Coaching
Oregon State University Seed Lab	3291 SW Campus Way	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Greenwood Manor Or	945 NW Circle Blvd	Corvallis	OR	97330	531110	Apartments
All About Cake!	NULL	Corvallis	OR	97330	311811	Bakers-Retail
Wisecracks Cafe	119 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Samaritan Health Service	3640 NW Samaritan Dr	Corvallis	OR	97330	621999	Health Services
Healing Properties LLC	344 NW 6th St	Corvallis	OR	97330	531210	Real Estate Management
Hilton Garden Inn Corvallis	2500 SW Western Blvd	Corvallis	OR	97333-4104	721110	Lodging
Campbell's Cleaners Timberhill Mall	2525 NW Kings Blvd	Corvallis	OR	97330	812320	Cleaners
Northwest Or Housing Authority	545 SW 2nd St	Corvallis	OR	97333	531311	Housing Authorities
Hafner, Romy Lee	444 NW Elks Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Kopf, Erica, Sara	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Gresick Tax Service	4365 NW Queens Ave	Corvallis	OR	97330	541213	Tax Return Preparation & Filing
Pastega Coffee Service	2786 NE Belvue St	Corvallis	OR	97330	423990	Manufacturers-Agents & Representatives

Trysting Tree Golf Club	34028 NE Electric Rd	Corvallis	OR	97333	713910	Golf Courses
Willamette Dental Group-Corvallis	2420 NW Professional Dr	Corvallis	OR	97330-3977	621210	Dentists' clinics
City Barber Shop	104 SW 3rd St	Corvallis	OR	97333	812111	Barbers
Corvallis School District 509	750 NW 18th St	Corvallis	OR	97330	611110	School Districts
Merritt, Thurman A MD	2555 NE Belvue St	Corvallis	OR	97330	621111	Physicians & Surgeons
The UPS Store	922 NW Circle Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Services
Friends of Corvallis Parks & Recreation	1310 SW Avery Ave	Corvallis	OR	97333	813219	Fund Raising Counselors & Organizations
Knight Design Lic	720 NE Granger Ave	Corvallis	OR	97330-9660	336991	Motorcycle, Bicycle, and Parts Manufacturing
Corvallis Pain Management	2175 NW Professional Dr	Corvallis	OR	97330-3886	999990	Unclassified Establishments
Tricia Nielsen DO	3516 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Recovery Clinic Corvallis	5234 SW Philomath Blvd	Corvallis	OR	97333-1042	621111	Physicians' clinics
Fashion Street LLC	3129 SE Midvale Dr	Corvallis	OR	97333	458110	Clothing-Retail
Campola, Jessica, Marilyn	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Olivarez Joveria	919 NW Circle Blvd	Corvallis	OR	97330	458310	Jewelers-Retail
Tick Licker Firearms	1880 SW 3rd St	Corvallis	OR	97333	459110	Guns & Gunsmiths
Northside Electric	620 SW 4th St	Corvallis	OR	97333	238210	Electric Contractors
Gohome Networks Inc	410 NW Walnut Blvd	Corvallis	OR	97330	541512	Website Design Service
Highland Bowl	2123 NW 9th St	Corvallis	OR	97330	713950	Bowling Centers
Naturalpoint Inc	3658 SW Deschutes St	Corvallis	OR	97333	334118	Computer Supplies & Parts-Manufacturers
Apple Blossom Massage	2151 NW Fillmore Ave	Corvallis	OR	97330	621999	Health Services
The Prediction Lab LLC	6300 SW Grand Oaks Dr	Corvallis	OR	97333	541990	Services NEC
Heine, Margaret Hy MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Eoff, Tracie J	520 NW 27th St	Corvallis	OR	97330	624190	Counselors
OEM Inc	1555 SE Crystal Lake Dr	Corvallis	OR	97333	334516	Laboratory Analytical Instruments (Mfrs)
Corvallis Dental Group	2318 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Campbell Construction NW LLC	940 NW Camellia Dr	Corvallis	OR	97330-9709	999990	Unclassified Establishments
Abundant Life Center of Eugene Inc	105 SW 2nd St	Corvallis	OR	97333	813110	Religious Organizations
Corvallis Custom Kitchens & Baths	602 NW 4th St	Corvallis	OR	97330	236118	Kitchen Remodeling & Planning Service
Powell, Kimberly J CNM	444 NW Elks Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Crescent Valley Parent Organization	4444 NW Highland Dr	Corvallis	OR	97330	813311	Charitable Institutions
Corvallis Fall Festival Inc	420 NW 2nd St	Corvallis	OR	97330	711190	Carnivals
Delurey, Rebecca, Lynn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Al808Ha Grindz	118 NW Jackson Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Hudson, Maggie May CNM	3640 SW Samaritan Dr	Corvallis	OR	97330	621399	Midwives
Samaritan Orthopedic & Sports Medicine	3620 NW Samaritan Dr	Corvallis	OR	97330-3785	621111	Physicians' clinics
Boe, James Aaron	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Pak Mail	2397 NW Kings Blvd	Corvallis	OR	97330-3985	561439	Miscellaneous business service centers
Sichi Mary Psyd	4185 SW Research Way	Corvallis	OR	97333	621399	Psychologists
Holiday, the Regent	440 NW Elks Dr	Corvallis	OR	97330-3744	623311	Assisted-living facilities with on-site nursing facilities
Maylu	33890 SE Eastgate Cir	Corvallis	OR	97333-2248	325620	Toilet Preparation Manufacturing
Underwater Audio	NULL	Corvallis	OR	97333	449210	Audio-Visual Equipment-Dealers
Waverly, Brett J DPM	3680 NW Samaritan Dr	Corvallis	OR	97330	621391	Podiatrists
Aldaco Garcia, Esmeralda	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Republic Services	110 NE Walnut Blvd	Corvallis	OR	97330	562219	Waste Disposal
Dow, Isaac	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Dursun, Abdulmetin, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
McDonald, Vanessa A DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kappa Sigma Nu Association	120 NW 13th St	Corvallis	OR	97330	813410	Fraternal Organizations
Kidco Earlier Headstart Corvallis Center	NULL	Corvallis	OR	97330	624110	Counseling Services
Duvall Properties LLC	1112 NW 9th St	Corvallis	OR	97330	531210	Real Estate Management
Chamber Music Corvallis Inc	NULL	Corvallis	OR	NULL	813319	Non-Profit Organizations
Center Against Rape-Domestic	2208 SW 3rd St	Corvallis	OR	97333	624221	Domestic Abuse Information & Treatment
Pack, Carmen Lee	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Grace Center For Adult Day Service	980 NW Spruce Ave	Corvallis	OR	97330	624120	Elderly & Disabled Person Services
Tree Hive Bees	30807 SW Decker Ridge Rd	Corvallis	OR	97333	561730	Tree Service
Happy Trails Records	100 SW 3rd St	Corvallis	OR	97333	449210	Records Tapes & Compact Discs-Retail

Vyanet Operating Group	NULL	Corvallis	OR	97330	423610	Burglar Alarm Systems (Whls)
Knight Financial Home Loans	385 NW Harrison Blvd	Corvallis	OR	97330	523940	Financial Advisory Services
Overbay, Ildiko M LPC	760 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Human Services Oregon Department	4170 SW Research Way	Corvallis	OR	97333	923130	State Government-Social/Human Resources
Unity Safeplace	2945 NW Circle Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Blue Sky Chinese Restaurant	5275 SW Philomath Blvd	Corvallis	OR	97333	722511	Restaurants
Oseguera, Julia	4455 NE Highway 20	Corvallis	OR	97330	621399	Psychologists
Witt Consulting	582 NW Van Buren Ave	Corvallis	OR	97330	541618	Consultants-Business NEC
Edward Jones	545 SW 2nd St	Corvallis	OR	97333-4920	523940	Portfolio Management and Investment Advice
Kimmel, Olivia, Caroline	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Strigle, Donna Marie	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Lehman, Christopher	3521 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Kent Burnett DDS	1711 NW Grant Ave	Corvallis	OR	97330-2642	621210	Dentists' clinics
Duffey Court Reporting	420 NW 2nd St	Corvallis	OR	97330	561492	Court & Convention Reporters
Tougher, LLC	4191 SW 53rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
United Campus Ministry	101 NW 23rd St	Corvallis	OR	97330	813110	Churches
Chris & Calvin LLC	1830 NW 9th St	Corvallis	OR	97330	611699	First Aid Instruction
Samaritan Health Service	3521 NW Samaritan Dr	Corvallis	OR	97330-4744	621111	Physicians' clinics
Digital Inspections	804 NW Buchanan Ave	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Chipotle Mexican Grill	2501 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Samaritan Health Service	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Veronick, Sandra	760 SW Madison Ave	Corvallis	OR	97333	621330	Social Workers
Anytime Fitness	955 NW Kings Blvd	Corvallis	OR	97330	713940	Health Clubs Studios & Gymnasiums
Corvallis Clinic Patient Advct	NULL	Corvallis	OR	97330	621111	Physicians' clinics
Corvallis Clinic Family Practice	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
E Cafe	2500 NW Monroe Ave	Corvallis	OR	97331	722511	Full-Service Restaurants
Lavarne, Lorena, Yoko, DMD	530 NW 27th St	Corvallis	OR	97330	621210	Dentists
Corvallis Salem Building Inc	930 NW Kings Blvd	Corvallis	OR	97330	236220	Building Contractors
Baune, Andrea M DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
De Menezes Jr, Jurandir B	3615 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Corvallis Clinic Neurology	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
OSU-Fairbanks Hall	220 SW 26th St	Corvallis	OR	97331	721310	Student Housing
Kinser, Charli, Madeline	3680 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Valley Service	563 SW Jefferson Ave	Corvallis	OR	97333-4602	811412	Household type appliance repair services and support
The Thrive Clinic	1755 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Center Against Rape-Domestic	129 NW 4th St	Corvallis	OR	97330	813319	Non-Profit Organizations
AAMCO	805 NW 5th St	Corvallis	OR	97330	811114	Transmissions-Automobile
Security Alarm Corp	NULL	Corvallis	OR	97330	423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
Cloutier, Cale	887 NW Grant Ave	Corvallis	OR	97330	624190	Marriage & Family Counselors
Broken Yolk Cafe	119 SW 3rd St	Corvallis	OR	97333-4713	722511	Full-Service Restaurants
Karen Weisman, MD	2310 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Sharipo, Virginia DC	915 NW 36th St	Corvallis	OR	97330	621310	Chiropractors DC
OSU Student Health Services	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Pupuseria Del Valle	1st & Monroe Ave NW	Corvallis	OR	97333	722511	Full-Service Restaurants
Blue Rhino	777 NW Kings Blvd	Corvallis	OR	97330	457210	Propane Tank Kiosks
Barbara Cohen Grant MSW LCSW	891 NW Grant Ave	Corvallis	OR	97330	624190	Marriage & Family Counselors
Timber Hill Apartments	2493 NW Garryanna St	Corvallis	OR	97330	531110	Apartments
Edwards, John, Allen	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
xBiologix, Inc.	857 NE Granger Ave	Corvallis	OR	97330	541714	Biotechnology Products & Services
Corvallis Market	28788 Highway 34	Corvallis	OR	97333	445131	Convenience Stores
First Call Home Health Agency	NULL	Corvallis	OR	97330	621610	Home Health Service
Chloe's Cookies	2517 NW 9th St	Corvallis	OR	97330	722515	Cookie Shops
Boguna Falco, Cristina	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Hill, Shene, Erica, DPT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Fingerboard Extension	120 NW 2nd St	Corvallis	OR	97330	459140	Musical Instruments-Dealers
Samaritan Family Medicine Resident Clinic	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Greenberry Store & Tavern	29974 Highway 99W	Corvallis	OR	97333-9449	722410	Bars
GBC Construction Lic	1925 NW 9th St	Corvallis	OR	97330	236115	Construction Companies
Absolutely Clear	NULL	Corvallis	OR	NULL	561720	Janitorial/Custodial services
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bird, Rebekah, Dawn	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Serenity Business Service LLC	887 NW Grant Ave	Corvallis	OR	97330	561990	Business Services NEC
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Timberhill Athletic Club	2855 NW 29th St	Corvallis	OR	97330	812191	Exercise & Physical Fitness Programs
Corvallis Pediatric Denistry	2350 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Corvallis Family Medicine	2400 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Sahali Health Clinic	2855 NW Glenwood Dr	Corvallis	OR	97330	621999	Health Services
Concerned Citizens For Corvallis Downtown Safety-Livability	230 SW 3rd St	Corvallis	OR	97333	611699	Safety Training
Conifer Wellness, Inc	139 SW 3rd St	Corvallis	OR	97333-4713	621111	Physicians' clinics
OSU Student Health Center	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Frog Store	1065 NW Charlemagne Pl	Corvallis	OR	97330	459420	Gift Shops
AmeriGas Propane Exchange	1334 NW 9th St	Corvallis	OR	97330	457210	Propane Tank Kiosks
HQ Estates LLC	1435 NW 9th St	Corvallis	OR	97330	531210	Real Estate Management
Intoxalock Ignition Interlock	355 NW 3rd St	Corvallis	OR	97330	811111	Ignition Interlock Devices-Install & Svc
Merkl, Elizabeth, Anne	260 SW Madison Ave	Corvallis	OR	97333	624190	Counselors
Davis, Robert, W, MD	441 NW Elks Dr	Corvallis	OR	97330-3744	621111	Physicians' clinics
Harbor Freight	2005 NW Circle Blvd	Corvallis	OR	97330	444140	Tools-New & Used
Milestones Family Recovery	530 NW 5th St	Corvallis	OR	97330	813319	Drug Abuse & Addiction Info & Treatment
Van Schenck, Caylee B	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Lincoln, Elizabeth A MD	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton Community Health Services	530 NW 27th St	Corvallis	OR	97330	621399	Physicians Assistants
Panda Express	1822 NW 9th St	Corvallis	OR	97330-2143	722511	Full-Service Restaurants
Eyecare Associates	330 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Waldorf School	3855 NE Highway 20	Corvallis	OR	97330	611110	Schools
Tian Su Noddle	1425 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Meadow Park Mobile Estates	277 NE Conifer Blvd	Corvallis	OR	97330	531190	Mobile Homes-Parks & Communities
Sten Carlson-Private Wealth Advisor, Ameriprise Financial Services, LLC	2396 NW Kings Blvd	Corvallis	OR	97330-3984	523940	Portfolio Management and Investment Advice
Valley Vapors	2319 NW 9th St	Corvallis	OR	97330	459991	Smoke Shops & Supplies
Benton County Assessor	4077 SW Research Way	Corvallis	OR	97333	921120	Government Offices-County
AmeriGas Propane Exchange	27678 Highway 99W	Corvallis	OR	97333	457210	Propane Tank Kiosks
Swiff Rebecca M MD	525 NW 2nd St	Corvallis	OR	97330	624190	Counselors
Cole, Stacy L	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Quigonge Association America	27133 Forest Springs Ln	Corvallis	OR	97330	813910	Associations
Schaaf, Breanna	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Rubin Madeline MSW	216 SW Madison Ave	Corvallis	OR	97333	624110	Counseling Services
Neuropathways Counseling LLC	636 SW 2nd St	Corvallis	OR	97333	624110	Counseling Services
Corvallis Family Therapy Center	699 SW 15th St	Corvallis	OR	97333	621111	Physicians & Surgeons
Kelly, Angela D	306 SW 8th St	Corvallis	OR	97333	624190	Counselors
Knutson, Ilsa	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Mountain View Elementary School	340 NE Granger Ave	Corvallis	OR	97330	611110	Schools
Karl Maasdam Photography	505 SW 2nd St	Corvallis	OR	97333	541921	Photographers-Portrait
Bullock, Kalika, Faith	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Billamor, Odessa K	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Financial Freedom Wealth	518 SW 3rd St	Corvallis	OR	97333	523940	Financial Advisory Services
Rogers, Alicia Dawn ND	650 SW 3rd St	Corvallis	OR	97333	621399	Physicians-Naturopathic
Sunset Dental-Dr Linda Selby	5208 SW Philomath Blvd	Corvallis	OR	97333	621210	Dentists
Sorseth, Noah	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Federal Reserve Bank-St Louis	1500 SW Jefferson Ave	Corvallis	OR	97331	521110	Federal Reserve Banks
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jim Kuhlman Ins Agcy Inc	1807 NW Kings Blvd	Corvallis	OR	97330-1907	524210	Insurance Agencies and Brokerages
Life in Balance Acupuncture	534 NW 4th St	Corvallis	OR	97330	621399	Acupuncture
USPS Blue Collection Box	100 Crop Science Bldg	Corvallis	OR	97331	541860	Mailing & Shipping Kiosks

Oregon State Credit Union	1980 NW 9th St	Corvallis	OR	97330-2179	522130	Credit Unions
Serdar, Cody W	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Bryan, Kimberly A	3600 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Neers Payroll & Accounting	923 NW Grant Ave	Corvallis	OR	97330	541214	Payroll Preparation Service
Karlin, Moriah	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Claborn, Miya	4495 SE Highway 20	Corvallis	OR	97330	624190	Counselors
Budget Blinds	33930 SE Eastgate Cir	Corvallis	OR	97333	449129	Window Treatments
Lennar Mortgage	230 SW 3rd St	Corvallis	OR	97333	522292	Real Estate Loans
David, Eldredge, DDS	2500 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Hooda Limited Art & Clothing	327 NW 14th St	Corvallis	OR	97330	459920	Art Galleries & Dealers
Byzick & Company-Corvallis	2015 NW Grant Ave	Corvallis	OR	97330	541211	Accountants
City Limits Country Store	5800 NW Highway 99	Corvallis	OR	97330	457120	Service Stations-Gasoline & Oil
Medema Labs Corp	125 NW 30th St	Corvallis	OR	97330-5134	541330	Engineers' offices
Sarpong, Yaw, D, MD	3615 NW Samaritan Dr	Corvallis	OR	97330-3771	621111	Physicians' clinics
Brown, Fagan, E	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Cafe Yumm	2001 NW Monroe Ave	Corvallis	OR	97330	518210	Internet Service
Delta Upsilon Building Association	903 NW Beca Ave	Corvallis	OR	97330	813410	Fraternal Organizations
WKL Investments	5127 SW Hout St	Corvallis	OR	97333	523910	Investments
Restore Physical Therapy	966 NW Circle Blvd	Corvallis	OR	97330	621340	Physical Therapists
Louie, Megan DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Floan, Seneca	500 SW Madison Ave	Corvallis	OR	97333	541219	Billing Service
Desi Roots LLC	919 NW Circle Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Tunnel Radio of America, Inc	6435 Hyslop Rd	Corvallis	OR	97330	334220	Radio/TV Broadcasting/Comm Equip (Mfrs)
Ideas Illustrated	1840 SW Brooklane Dr	Corvallis	OR	97333	541430	Graphic Designers
Corvallis Vision Center	130 SW 3rd St	Corvallis	OR	97333	621320	Optometrists OD
Heart of the Valley Law LLC	NULL	Corvallis	OR	NULL	541110	Attorneys
Block 15 Caves Public House	308 SW 3rd St	Corvallis	OR	97333-4627	312120	Breweries
River Roc Yard Maintenance	NULL	Corvallis	OR	97333	999990	Unclassified Establishments
Campbell Construction NW LLC	NULL	Corvallis	OR	97330	238110	Poured Concrete Foundation and Structure Contractors
Snell, Christina	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Dog Licenses	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
Benton Health Center	530 NW 27th St	Corvallis	OR	97330-5298	621111	Physicians' clinics
RiverBend Materials, A CRH Company	28054 Payne Rd	Corvallis	OR	97333	423320	Sand & Gravel (Whls)
Here to There Auto Repair LLC	307 SW 7th St	Corvallis	OR	97333	811111	Automobile Repairing & Service
D & B BEAR SERVICE	305 NW 2nd St	Corvallis	OR	97330	811111	Automobile Repairing & Service
Allen, Lois, Marie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Big Hug Botanicals	1750 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Pink Laser & Spa	425 SW Madison Ave	Corvallis	OR	97333-4799	999990	Unclassified Establishments
Milburn, Lea	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Gupta, Shivani	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Del Alma	136 SW Washington Ave	Corvallis	OR	97333	722511	Restaurants
Unique Mart	5500 SW Philomath Blvd	Corvallis	OR	97333	445131	Convenience Stores
Graphic Transfer	NULL	Corvallis	OR	97333	541430	Graphic Designers
Nettles, Timothy S	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Orange Media Network	2251 SW Jerfferson Way	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Cluff Kingsford, Alisha, Marie, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dagosa Enterprises LLC	585 NW Oak Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Jersey Mike's Subs	2051 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Tenth Street Apartments	707 SW 10th St	Corvallis	OR	97333-4200	531110	Landlords of Residential Buildings and Dwellings
Davis, Sierra M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Sick Town Derby Dames	2397 NW Kings Blvd	Corvallis	OR	97330	813319	Non-Profit Organizations
U-Craft-It Frameshop	1100 SW 3rd St	Corvallis	OR	97333	455219	Picture Frames-Dealers
Thrive Business Solutions	NULL	Corvallis	OR	97330	541614	Business Management Consultants
Lieberman, Linda S NP	833 NW Buchanan Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Thwing, Sharon, L	1112 NW Circle Blvd	Corvallis	OR	97330	621330	Social Workers
Imagine Coffee Co	5460 SW Philomath Blvd	Corvallis	OR	97333-2095	722515	Snack & Nonalcoholic Beverage Bars

Benefit Cosmetics BrowBar	1550 NW 9th St	Corvallis	OR	97330-4692	456120	Cosmetics, Beauty Supplies, and Perfume Retailers
4 Spirits Distillery	3405 SW Deschutes St	Corvallis	OR	97333	999990	Nonclassified Establishments
Tech Web NW LLC	230 SW 3rd St	Corvallis	OR	97333	518210	Internet Home Page Dev Consulting
Weigel, Nathanael C DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Pacwest Wealth Partners-Ameriprise Financial Service	2396 NW Kings Blvd	Corvallis	OR	97330-3984	523940	Portfolio Management and Investment Advice
Khan, Amna MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Aurora Martial Arts	195 SE Crystal Lake Dr	Corvallis	OR	97333	611620	Martial Arts Instruction
Jiffy Fix	275 SW Avery Ave	Corvallis	OR	97333	236115	Home Builders
Nurding LLC	236 NW 8th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Chama Finds LLC	2940 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Metc Group Inc	2870 NW Duchess Pl	Corvallis	OR	97330-3207	541618	Miscellaneous Management Consulting Services
Murphy's Restaurant & Lounge	118 NW Jackson Ave	Corvallis	OR	97330	722511	Restaurants
Farmers Insurance-David Severns	230 SW 3rd St	Corvallis	OR	97333-4652	524210	Insurance Agencies and Brokerages
Samaritan Obstetrics & Gynecology	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Paige Warner LLC	744 NW 4th St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Cavanaugh, Shane	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Kasubhai, Saifuddin M MD	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Pacific Business Lending	843 SW 8th St	Corvallis	OR	97333	522291	Loans-Personal
OHSU Doernbecher Specialty Pediatrics Clinic, Corvallis	3640 NW Samaritan Dr	Corvallis	OR	97330-3784	621111	Physicians' clinics
Watts, Landon MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Griffo Brothers	744 NW 9th St	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Southside Rv/Auto Repair & Shelter Factory	1750 SW Allen St	Corvallis	OR	97333	811111	Recreational Vehicles-Repairing & Svc
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Willamette Valley Cancer Institute and Research Center	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Wolfe Wawrzynek, Laurel	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Samaritan Kidney Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330-3771	621111	Physicians' clinics
Zion Lutheran Church	2745 NW Harrison Blvd	Corvallis	OR	97330	813110	Churches
Jan M Johnson	2940 NW Aspen St	Corvallis	OR	97330	813312	Environmental Conservation/Ecologcl Org
Ameriprise Financial Services Inc	777 NE 2nd St	Corvallis	OR	97330	523940	Financial Advisory Services
Clear Vision Window Coverings Inc	2973 NW Morning Glory Dr	Corvallis	OR	97330	238990	Window Cleaning
Clover Pediatric Dentistry	2055 NW Grant Ave	Corvallis	OR	97330	621210	Dentists
Luminous Salon	201 SW 2nd St	Corvallis	OR	97333	812112	Beauty Salons
Jaques, Paul E DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Benton County Together	408 SW Monroe Ave	Corvallis	OR	97333	921120	Government Offices-County
Chipotle Mexican Grill	550 NE Circle Blvd	Corvallis	OR	97330-6828	722511	Full-Service Restaurants
Timberhill Chiropractic LLC	2721 NW 9th St	Corvallis	OR	97330	621310	Chiropractors DC
Electric Charging Station	530 NW 27th St	Corvallis	OR	97330	457120	Electric Charging Station
Alberti Design	728 SW Wake Robin Ave	Corvallis	OR	97333	339992	Musical Instruments-Manufacturers
Ims Integration LLC	808A NW Buchanan Ave	Corvallis	OR	97330	541519	Computers-Networking
Freedom Mortgage	2211 NW Professional Dr	Corvallis	OR	97330	522292	Real Estate Loans
Mercado, Chelsea Ann	2396 NW Kings Blvd	Corvallis	OR	97330	621330	Social Workers
Hise Studio	NULL	Corvallis	OR	NULL	541921	Photographers-Portrait
Sanchez, Lorena B	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Inavale Farm	316 SW Washington Ave	Corvallis	OR	97333	812910	Pet Washing & Grooming
Golf City Par Three	2115 NE Highway 20	Corvallis	OR	97330	713910	Golf Courses
Win Tech Design	5925 NW Pinewood Pl	Corvallis	OR	97330	541420	Tool Designers
Cole, Aaron	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton Community Health Services	530 NW 27th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Barnhisel Willis Barlow	123 NW 7th St	Corvallis	OR	97330	541110	Attorneys
Peck, Natalie A DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cole, Shawn PT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Cascade BBQ	2575 NW Kings Blvd	Corvallis	OR	97330-3988	722511	Full-Service Restaurants
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Van Brocklin Innovation LLC	6050 NW Happy Valley Dr	Corvallis	OR	97330	541715	Physical Engineering & Life Sciences Research & Development
Garfield Elementary School	1205 NW Garfield Ave	Corvallis	OR	97330	611110	Schools
Corvallis-Benton County Public Library	645 NW Monroe Ave	Corvallis	OR	97330	519210	Library Networks

Expressions in Bloom Fine	1575 NW 9th St	Corvallis	OR	97330	455219	Wedding Supplies & Services
Peak Psychological Services, PC	1300 NW Harrison Blvd	Corvallis	OR	97330	621330	Mental Health Counselors
J Walter Construction	29163 Highway 34	Corvallis	OR	97333	236115	Construction Companies
Cunningham, Julie	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Sheridan, Elizabeth, Jo	1555 SW 35th St	Corvallis	OR	97333	624190	Counselors
International Food & Agribusiness Management Association	922 NW Circle Blvd	Corvallis	OR	97330-1483	813910	Business organizations
Restyle	137 SW 3rd St	Corvallis	OR	97333	458110	Women's Apparel-Retail
Sigma Delta Omega	2251 SW Jefferson Way	Corvallis	OR	97331-8660	813410	Community clubs
Duffy, Robert DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Play It Again Sports	1422 NW 9th St	Corvallis	OR	97330	459110	Sporting Goods-Retail
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Goodrich, Lisa PT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Oregon State Credit Union	148 NW 25th St	Corvallis	OR	97330	522130	Credit Unions
Westside Storage	6915 SW Philomath Blvd	Corvallis	OR	97333	531130	Storage-Household & Commercial
Sheffield, Cassie Faye	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Jodi Elliot Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531390	Real Estate Consultants
Menninger, Michael, Daniel, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Seventh Self Counseling	302 NE Plymouth Cir	Corvallis	OR	97330	624190	Counselors
Garcia, Angelica, Kimberly	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Meredith, Grant W MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
CBD Scientific	964 NW Circle Blvd	Corvallis	OR	97330-1410	459999	All Other Miscellaneous Retailers
Echemion, Inc	575 SE Goodnight Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Guyton, Steven W MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Public Electronic Access	1600 SW Western Blvd	Corvallis	OR	97333	517810	Information Retrieval Services
Edmunson Barhart & Knight	761 NW Harrison Blvd	Corvallis	OR	97330	541110	Attorneys
Trombetta, Mallory	530 NW 27th St	Corvallis	OR	97330	621330	Pharmacists
RE/MAX Integrity	535 SW 2nd St	Corvallis	OR	97333	531210	Real Estate
Kappa Alpha Theta	465 NW 23rd St	Corvallis	OR	97330	813410	Fraternities & Sororities
Carpenter, Ann E LPN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Practitioners
Laughing Planet	127 NW 2nd St	Corvallis	OR	97330	722511	Restaurants
Alpha Kappa-Kappa Delta Association	305 NW 25th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Pta Oregon Congress	1825 NW 27th St	Corvallis	OR	97330	813910	Associations
Small, Mackenzie N	815 NW 9th St	Corvallis	OR	97330	621399	Psychologists
Underwater Audio LLC	215 SW 4th St	Corvallis	OR	97333	449210	Audio-Visual Equipment-Dealers
Owcr LLC	745 NW Van Buren Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Sigma Nu Fraternity	143 NW 10th St	Corvallis	OR	97330	813410	Fraternal Organizations
Earnest, Theo, W	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Guardian Games	137 SW 3rd St	Corvallis	OR	97333	459120	Games & Game Supplies
Monroe Avenue Dental Care	853 NW Monroe Ave	Corvallis	OR	97330	621210	Dentists
Glass Man	1678 SW Knollbrook Pl	Corvallis	OR	97333	444180	Glass-Auto Plate & Window & Etc
SP & B Reprographics	252 SW Jefferson Ave	Corvallis	OR	97333	323111	Printers (Mfrs)
Craft, Gregory, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Pi Kappa Phi	2111 NW Harrison Blvd	Corvallis	OR	97330	813410	Fraternities & Sororities
Christensen Law	804 SW 4th St	Corvallis	OR	97333	541110	Attorneys
Benton County Personnel Department	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
ExtraMile By Jacksons	1334 NW 9th St	Corvallis	OR	97330	445131	Convenience Stores
Manning, Kathryn E	333 NW 35th St	Corvallis	OR	97330	621330	Social Workers
Owen-Thayer, Rebakah, K, MD	850 SW 26th St	Corvallis	OR	97331-8624	621111	Physicians' clinics
Safeway Pharmacy	450 SW 3rd St	Corvallis	OR	97333	456110	Pharmacies
Julian Hotel Apartments	105 SW 2nd St	Corvallis	OR	97333-4715	721110	Lodging
Oregon Ffa	218 Strand Ag Hall	Corvallis	OR	97331-8594	611710	Educational Assistance Services
Krishnan, Sapna MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Mueller, Lori PT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Powell, Bailey	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Megan Skinner Ballet	108 NW 2nd St	Corvallis	OR	97330	611610	Dancing Instruction
Mundy, David R	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Dental Health	869 NW 23rd St	Corvallis	OR	97330	621210	Dentists
Webber, Sarah LPN	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Accounting Department	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
Department of Athletics	103 Gill Coliseum	Corvallis	OR	97331-8547	813990	Other similar associations
Agricultural Research Foundation	1600 SW Western Blvd	Corvallis	OR	97333	541330	Engineers-Foundation
Triplett, Ty, Andrew	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
RTG Motors	6421 NW Oak Creek Dr	Corvallis	OR	97330	441120	Automobile/Trucks Dealers-Used
Hines, Caden	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
USPS Blue Collection Box	900 NW Kings Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Kiger Island Blues, LLC	2322 SE Kiger Island Dr	Corvallis	OR	97333	111998	Farms
Chase	2055 NW Circle Blvd	Corvallis	OR	97330-1314	522110	Commercial banks
Pastry From Konstancja	NULL	Corvallis	OR	97330	311811	Bakers-Retail
Heartland Humane Society	398 SW Twin Oaks Cir	Corvallis	OR	97333-1118	459910	Pet and Pet Supplies Retailers
Knight Financial	385 NW Harrison Blvd	Corvallis	OR	97330	522292	Real Estate Loans
Jaguar Elementary School	1825 NW 27th St	Corvallis	OR	97330	611110	Schools
Mitchell, Ashley, Janette	910 NW Kings Blvd	Corvallis	OR	97330	621330	Pharmacists
Know Bones Pet Supply LLC	826 NW 35th St	Corvallis	OR	97330	424490	Bakers-Wholesale
Modern Nails & Hair LLC	1330 NW 9th St	Corvallis	OR	97330	812113	Manicuring
Elite Performance Myk & Massage	33864 SE Eastgate Cir	Corvallis	OR	97333	812199	Massage Therapists
Vineyard Mountain Water & Improvement District	6495 NW Concord Dr	Corvallis	OR	97330	111332	Vineyards
Books & Done	2131 NW Fillmore Ave	Corvallis	OR	97330	459210	Book Dealers-Retail
ecoATM	1840 NW 9th St	Corvallis	OR	97330	811210	E-Waste (Electronics Recycling) Kiosks
Watson, Lea	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
AmeriGas Propane Exchange	1780 NE Four Acre St	Corvallis	OR	97330	457210	Propane Tank Kiosks
Timothy Taylor, PMHNP-BC	2075 NW Grant Ave	Corvallis	OR	97330	621112	Psychiatry-Adult Child & Adolescent
Stuart, Julie Elise MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Smith Davison & Brasier PC	104 SW 2nd St	Corvallis	OR	97333	541110	Attorneys
A Cut Above	101 NW 21st St	Corvallis	OR	97330	812112	Beauty Salons
Body of Health LLC	867 NW 23rd St	Corvallis	OR	97330	621310	Chiropractors DC
Cascade Pacific RCND	847 NW Monroe Ave	Corvallis	OR	97330-6352	999990	Unclassified Establishments
Old Mill Center For Childern-Fmly	1650 SW 45th Pl	Corvallis	OR	97333-1768	621111	Physicians' clinics
Nagai, Kristina M DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Pastega Coffee Service	244 NW 2nd St	Corvallis	OR	97330	424490	Coffee & Tea-Wholesale
Corvallis Soccer Club	NULL	Corvallis	OR	NULL	711211	Soccer Clubs
Mehta, Shalini, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Health & Educational Consultants	2145 NW 14th St	Corvallis	OR	97330-1348	611519	Miscellaneous technical and vocational institutes
Corvallis Radiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sumida Brown Counseling LLC	922 NW Circle Blvd	Corvallis	OR	97330	624110	Counseling Services
Barnes, Gary	NULL	Corvallis	OR	97330	624190	Marriage & Family Counselors
Hoffman, Mark	NULL	Corvallis	OR	97330	621340	Physical Therapists
Chintimini Wildlife Rehab Center	311 NW Lewisburg Ave	Corvallis	OR	97330	114210	Animal Rescue Relocation & Transporting
Hume-Rodman, Constance MD	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Longfellow, Scott, A, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Work Unlimited Department 11	612 NW Linden Ave	Corvallis	OR	97330	623312	Residential Care Homes
Chase	235 NW 4th St	Corvallis	OR	97330-4804	522110	Commercial banks
Carlson College of Veterinary Medicine	200 Magruder Hall	Corvallis	OR	97331-8555	611310	Schools offering baccalaureate or graduate degrees
Mitchell, Jessica, MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Garman, Jordan, S, DO	800 NE Circle Blvd	Corvallis	OR	97330-4256	621111	Physicians' clinics
Mid-Valley Dental Associates	1829 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Corvallis Clinic Find-A-Physician	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Scott, Edward R	1760 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Gamelin, Lara, Jae, MD	2400 NW Kings Blvd	Corvallis	OR	97330-3900	621111	Physicians' clinics
Hsing, Jeff M MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Gordon, Jane L NP	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Health Solutions Pharmacy Center Inc	996 NW Circle Blvd	Corvallis	OR	97330	456110	Pharmacies
Joyner, Haley	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Wilson Motors	425 NW Buchanan Ave	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Bridge to Brooklyn	27630 Llewellyn Rd	Corvallis	OR	97333	999990	Nonclassified Establishments
Freshwaters Illustrated	340 SW 2nd St	Corvallis	OR	97333	813319	Non-Profit Organizations
Cascade Management	2566 SW Coho St	Corvallis	OR	97333	561110	Management Services
Crusius, Kelley C	501 NW Elks Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Ojeda, Sylvia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Mental Health Associates of Benton County	606 SW 5th St	Corvallis	OR	97333	621999	Health Services
So Fly Hair Salon	423 SW 3rd St	Corvallis	OR	97333	812112	Beauty Salons
Bittner, Hannah	927 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Jennifer Buys Lac LMT	620 NW Van Buren Ave	Corvallis	OR	97330	812199	Massage Therapists
Oregon State University Office of the Registrar	102 Kerr Admin	Corvallis	OR	97331	611310	Schools offering baccalaureate or graduate degrees
Tipsico Coin LLC	873 NW Grant Ave	Corvallis	OR	97330	455219	Coin Dealers Supplies & Etc
Lee A Powell Landscape Arch	5470 Nhighway 20	Corvallis	OR	97330	541320	Landscape Designers
Miller Paint Co	1405 NW 9th St	Corvallis	OR	97330	444120	Paint-Retail
OSU Child Development	110 SW 26th St	Corvallis	OR	97331	624410	Child Care Service
Rivera, Brittany	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Coast Range Association	NULL	Corvallis	OR	NULL	813910	Associations
Bombeck, Christopher, A, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
McKeever, Nickolas W	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Blumel, Rachel	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Schmidts Garden Center	1299 NW 29th St	Corvallis	OR	97330	444240	Garden Centers
Nurse 2 You	4145 NW Highland Dr	Corvallis	OR	97330	621610	Home Health Service
Acorn Dentistry For Kids-Corvallis	1731 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Bogdanovic, Molly	257 SW Madison Ave	Corvallis	OR	97333-4924	624190	Miscellaneous Individual and Family Services
Deuth, Carly, J	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Homes By Owner	360 NW Tyler Ave	Corvallis	OR	97330	531210	Real Estate Management
Home Life Inc-Main Office	2420 NW Professional Dr	Corvallis	OR	97330-3976	624310	Vocational rehab agencies
Imtech Inc	4100 SW Research Way	Corvallis	OR	97333	541330	Engineers-Professional
Carmen Cebreros-COUNTRY Financial Representative	201 NW 3rd St	Corvallis	OR	97330-4801	524210	Insurance Agencies and Brokerages
Inavale Farm & Pet Grooming Inc	NULL	Corvallis	OR	97330	812910	Pet Washing & Grooming
Allevia Health	2310 NW Kings Blvd	Corvallis	OR	97330	423450	Physicians & Surgeons Equip & Supls-Whls
Jackson Automotive Group	800 NW 5th St	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Corvallis Ceramic Tile	560 SW B Ave	Corvallis	OR	97333	238340	Tile-Ceramic-Contractors & Dealers
Lincoln Elementary School	110 SE Alexander Ave	Corvallis	OR	97333	611110	Schools
Insights Now	1600 SW Western Blvd	Corvallis	OR	97333-4285	541613	Customer service management consulting services
Blue Harbor Senior Living	400 NW Elks Dr	Corvallis	OR	97330	623312	Residential Care Homes
Pitman, Kathryn M	875 NW Grant Ave	Corvallis	OR	97330	621340	Physical Therapists
USPS Blue Collection Box	1000 NW Beca Ave	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Integrative Movement Clinic	6310 NW Concord Dr	Corvallis	OR	97330-9506	621111	Physicians' clinics
InterCommunity Health Plans, Inc	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	999990	Unclassified Establishments
Advantage Dental+	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Avery Investments, LLC	881 NW Grant Ave	Corvallis	OR	97330	523910	Investments
Accelerated Influence LLC	460 SW Madison Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Handheld US	33870 SE Eastgate Cir	Corvallis	OR	97333	322230	Stationery-Tablets & Related Products (Mfrs)
Samaritan Mental Health	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Oregon State University-Office of International Services	1600 SW Western Blvd	Corvallis	OR	97333	611310	University-College Dept/Facility/Office
Happy Shawarma	525 SW 4th St	Corvallis	OR	97333	722511	Restaurants
Baker, Theresa	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Haynes, Scott	2300 NW Walnut Blvd	Corvallis	OR	97330	621330	Social Workers
Brosnan, Josie, LPN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Practitioners
Collins, Steven, Isamu, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hartman, Peter	107 SW 2nd St	Corvallis	OR	97333	621340	Physical Therapists
Northwest Energy Works Inc	1815 NW Juniper Pl	Corvallis	OR	97330	541990	Services NEC
Maciel, Flor, Guadalupe	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Lenee Bluhm, Tracy	1300 NW Harrison Blvd	Corvallis	OR	97330-6277	624190	Miscellaneous Individual and Family Services
Professional Compounding Pharmacy	996 NW Circle Blvd	Corvallis	OR	97330	456110	Pharmacies

Optical Testing Laboratory	2601 NE Jack London St	Corvallis	OR	97330-6914	541380	Laboratory testing services
Nicolas, Joey, B, LPN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Practitioners
Linus Pauling Middle School	1111 NW Cleveland Ave	Corvallis	OR	97330-2063	611110	Elementary, middle and high schools
Corvallis Golf Course	1850 SW Whiteside Dr	Corvallis	OR	97333-1445	713910	Recreational Clubs
Xfinity Store By Comcast	1550 NW 9th St	Corvallis	OR	97330-4692	516120	Television Broadcasting Stations
Nejad, Yasmin May	3521 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Minuteman Press	252 SW Jefferson Ave	Corvallis	OR	97333	323111	Printers (Mfrs)
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
McFee, Scott	340 SW 2nd St	Corvallis	OR	97333	621399	Psychologists
Mid Columbia Bus Co	6995 SW West Hills Rd	Corvallis	OR	97333-2659	485410	School and Employee Bus Transportation
FedEx Office Print & Ship Center	1175 NW 9th St	Corvallis	OR	97330	541860	Mailing & Shipping Services
Columbia Seeds LLC	887 NW Grant Ave	Corvallis	OR	97330	424910	Seeds & Bulbs-Wholesale
First United Methodist Church	1165 NW Monroe Ave	Corvallis	OR	97330-6098	813319	Miscellaneous social service advocacy organizations
The Beaver Hut	108 NW 16th St	Corvallis	OR	97330	722511	Restaurants
Jon's Headlight Restoration LLC	NULL	Corvallis	OR	97333	811111	Automobile Repairing & Service
Seguancia, Kingston K	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
T-Mobile	1830 NW 9th St	Corvallis	OR	97330-2368	517112	Wireless Telecommunications Carriers (except Satellite)
Myers, Breanne N	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Wildlife Conservation Trust	NULL	Corvallis	OR	NULL	924120	State Government-Land/Mineral/Wildlife/Forest Conservation
Rainbow Yard Service	6940 NW Oak Creek Dr	Corvallis	OR	97330	561730	Lawn & Grounds Maintenance
Willamette Valley Cancer Institute and Research Center	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Ham & Associates	2515 NW Mulkey Ave	Corvallis	OR	97330	561730	Landscape Contractors
Murphy's on the River	118 NW Jackson Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Christian Science Reading Room	468 SW Madison Ave	Corvallis	OR	97333	813410	Christian Science Reading Rooms
Corvallis Commercial Sprayers	2615 SW Morris Ave	Corvallis	OR	97333	561730	Tree Service
Frome Keith DDS	1759 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Cal's Moving Help	456 SW Monroe Ave	Corvallis	OR	97333-4781	484110	General Freight Trucking, Local
Benton County Schools Credit Union	2101 NW Professional Dr	Corvallis	OR	97330-3888	522130	Credit Unions
La Roquita	370 SW Western Blvd	Corvallis	OR	97333	722511	Restaurants
Newman Center	2127 NW Monroe Ave	Corvallis	OR	97330	813110	Church Organizations
Izzy's	2475 NW 9th St	Corvallis	OR	97330	722511	Pizza
Davenport, Winston D	325 Valley Football Ctr	Corvallis	OR	97331	621340	Physical Therapists
C Rob Farms LLC	6425 NW Sisters Pl	Corvallis	OR	97330	111998	Farms
Translations Com Inc	230F SW 3rd St	Corvallis	OR	97333	541930	Translators & Interpreters
OSU Folk Club	144 NW 2nd St	Corvallis	OR	97330	813410	Clubs
Designs By Dru	2757 NW Johnson Ave	Corvallis	OR	97330	423940	Jewelers-Wholesale
Healing Motion Physical Therapy	1122 NE 2nd St	Corvallis	OR	97330-6227	621340	Physical, occupational, speech therapists and audiogists' clinics
Vestis	1801 SW Airport Ave	Corvallis	OR	97333	812331	Uniform Supply Service
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Todd, Ryan, J, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Safeway	590 NE Circle Blvd	Corvallis	OR	97330	445110	Grocers-Retail
Herman, Michael D	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Fontenot, Nicole, Amalie, Psyd	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Evashevski Elliott Cihak	745 NW Van Buren Ave	Corvallis	OR	97330	541110	Attorneys
Ilangovan, Preethi MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Romeo Sebrowski	3075 NW Harrison Blvd	Corvallis	OR	97330	238320	Painting Contractors-Commercial & Ind
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Leman, Richard, Farwell, MD	2702 NW Garfield Ave	Corvallis	OR	97330	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Pta Oregon Congress	1205 NW Garfield Ave	Corvallis	OR	97330	813910	Associations
Oregon State University Department of Crop & Soil Science	31 Crop Science Bldg	Corvallis	OR	97331-8531	611310	Schools offering baccalaureate or graduate degrees
Fanning, Tyler, MD	1112 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Kings Boulevard One-Hour CLNRS	908 NW Kings Blvd	Corvallis	OR	97330-2505	812320	Pickup and drop-off sites for drycleaners and laundries
Kell' S Koffee	136 SW 2nd St	Corvallis	OR	97333-4716	722515	Snack & Nonalcoholic Beverage Bars
Precision Measurements & Instruments Corporation	3665 SW Deschutes St	Corvallis	OR	97333	541380	Testing Laboratories & Services
Coastal Center For Collaborative Health	260 SW Madison Ave	Corvallis	OR	97333	621420	Outpatient Mental Health & Substance Abuse Centers

Oregon State University Interfraternity Council	314 Student Experience Ctr	Corvallis	OR	97330	813410	Civic Organizations
Stevenson, Jovan	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Milestones Women's Program	442 NW 4th St	Corvallis	OR	97330-6409	813319	Miscellaneous social service advocacy organizations
Jacobsen, Catherine	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
K W Mid-Willamette	1121 NW 9th St	Corvallis	OR	97330	531210	Real Estate
Columbia Concrete Sawing Co	5462 SW Philomath Blvd	Corvallis	OR	97333-1039	238910	Site Preparation Contractors
Eagle Point Roofing LLC	3223 NW Johnson Ave	Corvallis	OR	97330	238160	Roofing Contractors
Corvallis Police-Investigative	180 NW 5th St	Corvallis	OR	97330	922120	Police Departments
Allevia Health Inc	922 NW Circle Blvd	Corvallis	OR	97330	423450	Physicians & Surgeons Equip & Supls-Whls
Bursky, Kathleen, Theresa	887 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
2 Towns Ciderhouse	5123 SW Hout St	Corvallis	OR	97333	312111	Beverages-Manufacturers
Hoffmann, Elizabeth	120 SW 4th St	Corvallis	OR	97333	621340	Physical Therapists
Corvallis Public Library	645 NW Monroe Ave	Corvallis	OR	97330	519210	Libraries-Public
Pinion Property Management	1605 NW Monroe Ave	Corvallis	OR	97330	531210	Real Estate Management
James, Sara M	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Kneeland, Daniel J	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Downtown Dance	223 NW 2nd St	Corvallis	OR	97330	611610	Dancing Instruction
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Montessori School	2730 NW Greeley Ave	Corvallis	OR	97330	611110	Schools
Insight Pest Solutions	408 SW Monroe Ave	Corvallis	OR	97333	561710	Pest Control
Superior Janitorial & Maintenance	39021 Rifle Range Rd	Corvallis	OR	97330	561720	Janitor Service
Soto-Leon, Diego	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Merchant, Garrett	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corvallis Pest Control	5060 SW Philomath Blvd	Corvallis	OR	97333	561710	Pest Control
Country Vitamins	919 NW Circle Blvd	Corvallis	OR	97330	456191	Health & Diet Foods-Retail
Security First Advisors Inc	2657 NW Rolling Green Dr	Corvallis	OR	97330	523150	Stock & Bond Brokers
Gebhardt, Alison	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Williams, Tim	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Christensen, Gregory J	804 SW 4th St	Corvallis	OR	97333	541110	Attorneys
Cardiovascular Consultants	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Saint Anne Orthodox Church	6000 NE Elliott Cir	Corvallis	OR	97330	813110	Churches
Claggett, Kailey, Janet	4185 SW Research Way	Corvallis	OR	97333	624190	Counselors
Eccentric Acres LLC	1046 NW 9th St	Corvallis	OR	97330	236115	General Contractors
McMann, Ashley, Hennessey, MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Interzone	1563 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Quickcare By the Corvallis Clinic	2001 NW Monroe Ave	Corvallis	OR	97330-5567	621111	Physicians' clinics
Paul Cooke Plumbing Service LLC	NULL	Corvallis	OR	97330	238220	Plumbing Contractors
Merry Maids	6875 SW Philomath Blvd	Corvallis	OR	97333	238990	House Cleaning
Southside Community Church	2065 SE Debord St	Corvallis	OR	97333	813110	Churches
St Mary's Cemetery	501 NW 25th St	Corvallis	OR	97330-5415	812220	Cremation services
US Environmental Protection Agency	200 SW 35th St	Corvallis	OR	97333	924110	Federal Government-Air/Water/Solid Waste Management
Debbie Brand	455 NW Tyler Ave	Corvallis	OR	97330-6436	531390	Other Activities Related to Real Estate
Corvallis Landscape Supply LLC	5700 SW Reservoir Ave	Corvallis	OR	97333	444240	Landscaping Equipment & Supplies
American Pharmacists Assn Academy of Student Pharmacists	1601 SW Jefferson Ave	Corvallis	OR	97331	813910	Business & Trade Organizations
Pierce III, James F DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
OSU Department of Food Science & Tech	3051 SW Campus Way	Corvallis	OR	97331-8649	541690	Scientific and technical consulting services (except environmental)
Muchmore, Steffen, Allen	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Breeland Equestrian School	2500 SW Leonard St	Corvallis	OR	97333	713990	Stables
Yours Truly 'a Beauty Bar	879 NW Grant Ave	Corvallis	OR	97330	812112	Beauty Salons
Jessica Thornburg-COUNTRY Financial	201 NW 3rd St	Corvallis	OR	97330	524210	Insurance
Electric Charging Station	220 NW 26th St	Corvallis	OR	97330	457120	Electric Charging Station
Corvallis DMV	870 NE Circle Blvd	Corvallis	OR	97330	926120	Department Of Motor Vehicles
Post Carbon Institute	800 SW Washington Ave	Corvallis	OR	97333	813910	Associations
Lenhof, Joshua, Jacob, DO	845 SW 30th St	Corvallis	OR	97331	621111	Physicians & Surgeons
Berri Products LLC	1325 NW Heather Dr	Corvallis	OR	97330	456110	Health Care Products
Corvallis Optometry Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Future Farmers of America State Associations & Local Chapter	108 Strand Ag Hall	Corvallis	OR	97331-8521	813410	Community clubs
Quest Diagnostics	450 SW 3rd St	Corvallis	OR	97333	621511	Laboratories-Medical
Strategic Networks	2940 SW 3rd St	Corvallis	OR	97333	541511	Information Technology Services
Oak Park Apartments	1219 SW 26th St	Corvallis	OR	97333	531110	Apartments
Oakley, Theresa, Renee	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Butler, Kassandra, Ashley	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Shen, Connie G MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
New York Bagels	1999 NW Circle Blvd	Corvallis	OR	97330	722515	Bagels
De Moss-Durdan Funeral Home	815 NW Buchanan Ave	Corvallis	OR	97330	812210	Funeral Directors
Milstein, Samuel B DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Electric Charging Station	335 NW 4th St	Corvallis	OR	97330	457120	Electric Charging Station
Willamette Valley Christian Supply	916 NW Kings Blvd	Corvallis	OR	97330	813110	Religious Organizations
Pacifica Seafood Market	1925 SE 3rd St	Corvallis	OR	97333	445250	Seafood-Retail
USPS Blue Collection Box	5800 NW Highway 99	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Peak Elite	6880 SW West Hills Rd	Corvallis	OR	97333	611620	Gymnastic Instruction
Valley Springs Church	968 NW Circle Blvd	Corvallis	OR	97330	813110	Churches
Timberhill Spine Care	2721 NW 9th St	Corvallis	OR	97330	621310	Chiropractors DC
Winddancer Photography	5640 SW Bluestem Pl	Corvallis	OR	97333	541921	Photographers-Portrait
Cardv	2208 SW 3rd St	Corvallis	OR	97333	624221	Domestic Abuse Information & Treatment
Beaver Cab	450 NW Buchanan Ave	Corvallis	OR	97330	485310	Taxicabs & Transportation Service
Sizemore, Joshua	2075 NW Grant Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Michelle McVay LMT	442 NW 3rd St	Corvallis	OR	97330-6403	621111	Physicians' clinics
Gatien, Charlotte	1555 SW 53rd St	Corvallis	OR	97333	621330	Pharmacists
Fred Meyer Pharmacy	777 NW Kings Blvd	Corvallis	OR	97330-5620	456110	Pharmacies and Drug Retailers
Samaritan Endocrinology	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Mid-Valley Gastroenterology	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Phan, Sang Tzun	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Pendragon, Elizabeth, Tyrell, MD	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Forest Engineering Inc	3895 NW Lincoln Ave	Corvallis	OR	97330	541330	Engineers-Training & Publishing
Sigma Pi Fraternity	410 NW 25th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Rinaldi, Ariel, Nicole Barr, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Domain at Corvallis	4240 NW Duniway Dr	Corvallis	OR	97330-4794	721310	Shared facilities housing
Honorable Locke A Williams	120 NW 4th St	Corvallis	OR	97330	921120	Government Offices-State
National Council-the Paper Industry	NULL	Corvallis	OR	NULL	541720	Historical Research
Brannon-Vasquez, Aurora, Belle	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Ray, Kira	2075 NW Grant Ave	Corvallis	OR	97330	621330	Social Workers
Anderson, Jonathon G MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Koker, Patty, J	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Danforth, Olivia M MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
T Woods Construction LLC	3013 NE Newcastle Pl	Corvallis	OR	97330	236115	General Contractors
Waucomah Automotive	700 NW Cornell Ave	Corvallis	OR	97330	811111	Automobile Repairing & Service
Narcolepsy Network	420 NW 7th St	Corvallis	OR	97330-6308	621498	Miscellaneous outpatient care clinics
Optikleen	1265 SW 35th St	Corvallis	OR	97333	561720	Janitor Service
Yu, Yan, Wen	501 NW Elks Dr	Corvallis	OR	97330	621330	Pharmacists
Doug Phillips LMT	442 NW 3rd St	Corvallis	OR	97330-6403	621111	Physicians' clinics
Reploeg, Angela K	990 NW Circle Blvd	Corvallis	OR	97330	621399	Nurses-Practitioners
Barber, Jackson, Taylor, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Goodwill	1325 NW 9th St	Corvallis	OR	97330	459510	Thrift Shops
Oak Crest Family Housing	3530 NE Lancaster St	Corvallis	OR	97330	531110	Apartments
Pareek, Pallav, MD	1112 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Grant Avenue Baptist Church	1625 NW Grant Ave	Corvallis	OR	97330	813110	Churches
Clark-Harmon, Maria R NP	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Dynamic Self Recovery	310 NW 5th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Heck & Barry LLP	2338 NW Professional Dr	Corvallis	OR	97330	541211	Accountants
Finley, Brian M	525B SW 4th St	Corvallis	OR	97333-4489	621340	Physical, occupational, speech therapists and audiogists' clinics
Hollingsworth & Vose	1115 SE Crystal Lake Dr	Corvallis	OR	97333	322120	Paper-Manufacturers

OSU-Graduate School Heckart Lodge	2900 SW Jefferson Way	Corvallis	OR	97331-1102	611310	Schools offering baccalaureate or graduate degrees
Loftin, Keith, Aaron, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rodriguez, Crystal, Marie	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Physicians Assistants
Valley Rock Gym	401 SW Jefferson Ave	Corvallis	OR	97333	713940	Gymnasiums
Society of Phi Zeta	700 SW 35th St	Corvallis	OR	97333	813410	Educational Associations
Farm Home School	NULL	Corvallis	OR	NULL	611110	Schools
McCorkhill, Ashley, Claire, DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Cox, Mary Ann RN	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
Hut Portland Airport Shuttle	580 SW Twin Oaks Cir	Corvallis	OR	97333	485510	Buses-Charter & Rental
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Blake, Emma B RN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
Corvallis Clinic Walnut CME Only	2350 NW Century Dr	Corvallis	OR	97330-3495	621111	Physicians' clinics
Gessel, Andrew DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Valley Eye Care	1505 NW Harrison Blvd	Corvallis	OR	97330	621320	Optometrists OD
Love, Tessa	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Willamette Graystone	121 SW McKenzie Ave	Corvallis	OR	97333	327120	Brick-Clay Common & Face-Manufacturers
Radiant Heat Solutions Inc	NULL	Corvallis	OR	97330	423720	Solar Energy Equipment-Wholesale
Prime Communications-AT&T Authorized Retailer	335 NW 4th St	Corvallis	OR	97330	517112	Cellular Telephones (Services)
Pelleg, Tomer	3600 NW Samaritan Dr	Corvallis	OR	97330-5472	621111	Physicians' clinics
Childrens Farm Home	4455 NE Highway 20	Corvallis	OR	97330	621111	Physicians & Surgeons
Young, Jason J DC	985 NW 23rd St	Corvallis	OR	97330	621310	Chiropractors DC
Bluhming Therapy & Wellness	420 NW 2nd St	Corvallis	OR	97330	621999	Wellness Programs
Oregon State University Intr Library Loan	210 Gilkey Hall	Corvallis	OR	97331-8585	519210	Libraries and Archives
Minarsich, Kijrstin	564 SW 3rd St	Corvallis	OR	97333	621340	Physical Therapists
Premier Electric	275 SW Avery Ave	Corvallis	OR	97333	238210	Electric Contractors
Electric Charging Station	2855 NW 29th St	Corvallis	OR	97330	457120	Electric Charging Station
Beggs, Riley Cole	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Blind Works	2860 NW Highland Dr	Corvallis	OR	97330	238990	Venetian Blinds-Cleaning
Rice 'n' Spice Oriental Foods	1075 NW Van Buren Ave	Corvallis	OR	97330	445110	Grocers-Retail
Michaels	1550 NW 9th St	Corvallis	OR	97330	459120	Craft Supplies
Rutledge, Sarah	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Freeman, Clarissa DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Aylett III, Leon R	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Ipmnet News	235 Weniger Hall	Corvallis	OR	97331-8574	459210	Book Retailers and News Dealers
AA Bowman Locksmith & Key	NULL	Corvallis	OR	97330	423420	Safes & Vaults (Whls)
Oregon Ffa Foundation	108 Strand Ag Hall	Corvallis	OR	97331-8521	541720	Sociology research and development (R&D)
Home Life	745 NW 25th St	Corvallis	OR	97330	813311	Disability Services
O'Neill, Paul F MD	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Clean Energy	110 NE Walnut Blvd	Corvallis	OR	97330	238220	Energy Management Systems & Products
Mandehr, Kellen, Franklyn, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kingdom Hall of Jehovahs Witnesses	1330 SW 35th St	Corvallis	OR	97333	813110	Churches
Charter Mechanical HP Site	932 NE Circle Blvd	Corvallis	OR	97330	238210	Mechanical Contractors
Flowers From the Heart	1575 NW 9th St	Corvallis	OR	97330	459310	Florists-Retail
Koski-Vogt, Mary, Megan Wilki	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Midwives
Mid-Valley Dental Associates	2300 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Keller, Michelle R	3615 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Pierson, Matthew, OD	1597 SW 53rd St	Corvallis	OR	97333	621320	Optometrists OD
Spartan Booster Club	1400 NW Buchanan Ave	Corvallis	OR	97330-5838	813410	Community clubs
May, Samantha A MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Domino's	2455 NW Monroe Ave	Corvallis	OR	97330	722511	Pizza
The Corvallis Clinic Surgery Center	601 NW Elks Dr	Corvallis	OR	97330	621493	Freestanding ambulatory surgical and emergency clinics
Layas, Mohammed F MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Optometry Clinic	444 NW Elks Dr	Corvallis	OR	97330-3758	621111	Physicians' clinics
Nectar Creek Honeywine	33848 SE Eastgate Cir	Corvallis	OR	97333	312130	Wineries (Mfrs)
A & D Refrigeration Inc	2321 NW 9th St	Corvallis	OR	97330	238220	Heating Contractors

Albany General Hospital	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	622110	General diagnostic and medical treatment hospitals
Piercey Neurology	305 SW C Ave	Corvallis	OR	97333	621111	Physicians & Surgeons
Muchmore, Samuel, Peter, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Punsalan, Connor, Austin	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Historical Society	411 SW 2nd St	Corvallis	OR	97333	712110	Museums
OfficeMax	1834 NW 9th St	Corvallis	OR	97330-2143	459410	Office Supplies and Stationery Retailers
Macer, Kate	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Atkinson, Sarah, Jo, MD	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
335 4th Ave LLC	903 NW Beca Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Benton County Sheriff	180 NW 5th St	Corvallis	OR	97330	921120	Government Offices-County
Ravi Chikkalingaiah MD PC	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Kevins Automotive Repair	625 NE Conifer Blvd	Corvallis	OR	97330	811111	Automobile Repairing & Service
Hearthstone Skilled Nursing	160 NE Conifer Blvd	Corvallis	OR	97330	623110	Nursing & Convalescent Homes
State Farm	2535 NW Kings Blvd	Corvallis	OR	97330-3988	524210	Insurance Agencies and Brokerages
Guild Mortgage-Brent Norlander	435 NW 5th St	Corvallis	OR	97330	522292	Real Estate Loans
Kweenb Mortgage Service Inc	2922 NW Audene Dr	Corvallis	OR	97330	522292	Real Estate Loans
Nick Chorak Mowing & Tilling	395 SE Kiger Island Dr	Corvallis	OR	97333	541320	Landscape Architectural Services
KCD Farms	3125 SW 53rd St	Corvallis	OR	97333	111998	Farms
Lear-Konold, Melinda NP	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Johnson & Associates Business Service LLC	905 NW Kings Blvd	Corvallis	OR	97330	561990	Business Services NEC
Jones, Richard R DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Progressive Design Builders	4475 Blue Heron Ln	Corvallis	OR	97333	236220	Building Contractors
McCullough, Paul B MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Meeker, Kaila, Dawn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corvallis Counseling LLC	636 SW 2nd St	Corvallis	OR	97333	624110	Counseling Services
GoWireless, Inc	2389 NW Kings Blvd	Corvallis	OR	97330-3986	999990	Unclassified Establishments
Greenbelt Land Trust	101 SW Western Blvd	Corvallis	OR	97333	813319	Non-Profit Organizations
Samaritan Family Medicine Resident Clinic	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
USPS Blue Collection Box	600 NW Monroe Ave	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Lorenz, Bonnie, Arent	456 SW Washington Ave	Corvallis	OR	97333	621399	Acupuncture
Programming Services Inc	NULL	Corvallis	OR	NULL	541511	Computers-System Designers & Consultants
Enterprise Rent-A-Car	1414 NW 9th St	Corvallis	OR	97330-4511	532111	Car Rental Agencies
Motley, Ashley	626 NW 4th St	Corvallis	OR	97330	624190	Counselors
Tyee Software Inc	2719 SW Titleist Cir	Corvallis	OR	97333-1183	513210	Software Publishers
Rhoads, Christianna	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Quail Pine LLC	2780 NW Sulphur Springs Rd	Corvallis	OR	97330	999990	Nonclassified Establishments
Tedesco, Nicholas S DO	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
JJB Contractors LLC	2397 NW Kings Blvd	Corvallis	OR	97330	236115	General Contractors
Biotech Research & Consulting Inc	2340 SE Ryan St	Corvallis	OR	97333	541714	Environmental & Ecological Services
Lon Jensen DDS	2444 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
7-Eleven	2641 NW 9th St	Corvallis	OR	97330	445131	Convenience Stores
Daren Schell	6735 SW Country Club Dr	Corvallis	OR	97333	621340	Physical Therapists
Wildlife Society Ore Chapter	NULL	Corvallis	OR	NULL	711510	Sculptors
Jessop, Kristy, Lane, MD	3521 NW Samaritan Dr	Corvallis	OR	97330-4744	621111	Physicians' clinics
Jamil, Fahad, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Powlison, Rebecca	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
American Procurement Services LLC	425 SW Madison Ave	Corvallis	OR	97333	221122	Electric & Other Services-Combined
Calvin Presbyterian Church	1736 NW Dixon St	Corvallis	OR	97330	813110	Churches
Oregon State University-Security & It Policies	500 SW Jefferson Ave	Corvallis	OR	97333	611310	University-College Dept/Facility/Office
Brown, Jeremy Don DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Seth Waddell-Windermere Williamette Valley	2725 NW Walnut Blvd	Corvallis	OR	97330	531311	Real Estate Buyers & Brokers
Babineau, Shayna	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Vue Corvallis	517 SE 2nd St	Corvallis	OR	97333	711310	Event Centers
Goodman-Strong, Sarah	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corvallis Environmental Center	116 SW 4th St	Corvallis	OR	97333	813312	Environmental Conservation/Ecologcl Org
Purvis, Heidi	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Thayer, Douglas B MD	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Active Wellness LLC	120 SW 4th St	Corvallis	OR	97333	621340	Physical Therapists
Vian, Chantelle	1830 NW 9th St	Corvallis	OR	97330	621399	Dental Hygienists
Fontenot, Ashleigh M MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Classy Auto Glass	565 SE Corliss Ave	Corvallis	OR	97333	444180	Glass-Auto Plate & Window & Etc
Corvallis Country Club	1850 SW Whiteside Dr	Corvallis	OR	97333	813410	Clubs
Buys, Jennifer, Dawn	927 NW Grant Ave	Corvallis	OR	97330	621399	Acupuncture
Habitat For Humanity ReStore	4840 SW Philomath Blvd	Corvallis	OR	97333	459510	Building Materials-Used
Samaritan Endocrinology	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Beta Alpha PSI National Council	302 Austin Hall	Corvallis	OR	97331	813410	Fraternal Organizations
Thomas, Bailey	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benco NW 29th	2135 NW 29th St	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
Thompson Timber Co	6860 SW Winding Way	Corvallis	OR	97333	423310	Timber & Timberland Companies (Whls)
Corvegas Inc	160 NW Jackson Ave	Corvallis	OR	97330	722511	Restaurants
Amazon Locker	2075 NW Circle Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Davis, James, William, DO	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sanjup J Lee MD LLC	975 NW Spruce Ave	Corvallis	OR	97330	621111	Physicians & Surgeons
Foundry Collective	257 SW Madison Ave	Corvallis	OR	97333-4757	999990	Unclassified Establishments
Fred Meyer Jewelers	777 NW Kings Blvd	Corvallis	OR	97330	458310	Jewelers-Retail
Corvallis Mammography	3600 NW Samaritan Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Cyberlock	1105 NE Circle Blvd	Corvallis	OR	97330-4255	334290	Other Communications Equipment Manufacturing
Wavelength References Inc	1800 SW 3rd St	Corvallis	OR	97333	334290	Communications Equipment NEC (Mfrs)
Hauck, Catherine J PA	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Addison Avenue Investment Services	1044 NE Circle Blvd	Corvallis	OR	97330	523940	Financial Planning Consultants
US Plant Material Center	3415 NE Granger Ave	Corvallis	OR	97330	921120	Government Offices-Federal
Amittay, Ayelet	975 NW Spruce Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Whelen, Amanda, Michele THR	887 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Nelson Macneil Rayfield Trial Attorneys PC	435 NW 4th St	Corvallis	OR	97330-6408	541110	Attorney Offices/Private Practices
Allstate Insurance	470 NW Buchanan Ave	Corvallis	OR	97330	524210	Insurance
Top Deck Hobbies	2001 NW Monroe Ave	Corvallis	OR	97330	459120	Hobby & Model Constr Supplies-Retail
Oregon Tilth Inc	106th St	Corvallis	OR	97333	115116	Farm Management Services
Mierau, Angela	999 NW Circle Blvd	Corvallis	OR	97330	621330	Social Workers
Rankin, Sherri Ann	4455 NE Highway 20	Corvallis	OR	97330	621399	Physicians Assistants
Coinstar	777 NW Kings Blvd	Corvallis	OR	97330	541990	Coin & Bill Counting/Sorting Svc Kiosks
Lyrical Learning	8008 Cardwell Hill Dr	Corvallis	OR	97330	513130	Publishers-Book (Mfrs)
Klug, Matthew L DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Pepsoil Concrete	1880 SW 3rd St	Corvallis	OR	97333	238110	Concrete Contractors
Nacse	2000 Kelley Engineering Ctr	Corvallis	OR	97331	541330	Engineers' offices
Peace Literacy Institute	922 NW Circle Blvd	Corvallis	OR	97330	813410	Educational Associations
Phaly, Duece	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Floyd, Emily Rose	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Dumancas, Cydney, Lee	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Tau Beta Pi Association Inc	151 Batcheller Hall	Corvallis	OR	97331-8523	813410	Community clubs
Samaritan Physical Rehabilitation	815 NW 9th St	Corvallis	OR	97330-6173	621340	Physical, occupational, speech therapists and audiogists' clinics
The Scarlet Jail Tattoo Parlor	1750 SW 3rd St	Corvallis	OR	97333	812199	Tattooing
Bi-Mart	2045 NW 9th St	Corvallis	OR	97330-1492	455110	Department Stores
William L Finley Refuge	26208 Finley Refuge Rd	Corvallis	OR	97333	921120	Government Offices-Federal
Mishra, Sean, Paul	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Mercier, Courtney, Denise	3509 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Dutch Bros Coffee	425 NW Harrison Blvd	Corvallis	OR	97330-4816	722515	Snack & Nonalcoholic Beverage Bars
First Baptist Church of Corvallis Oregon	125 NW 10th St	Corvallis	OR	97330-6184	813110	Religious societies
Shaller-Gerwec, Jessica L	4455 NE Highway 20	Corvallis	OR	97330	621340	Physical Therapists
PT Northwest	335 NW 4th St	Corvallis	OR	97330	621340	Physical Therapists
Bonanza Trucking Inc	6860 SW Winding Way	Corvallis	OR	97333	484230	Trucking
Susan Hetherington, Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531390	Real Estate Consultants
Breitinger, Anne M MD	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Ravi Chikkalingaiah MD PC	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Riverbottom Stables	28970 Highway 34	Corvallis	OR	97333	713990	Stables
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Morris, Jason	201 Plageman Bldg	Corvallis	OR	97331-8567	621330	Psychoanalysts' clinics (except MDs and Dos)
Townsley, Jasmine, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Coleman Custom Builders	29157 Blake Dr	Corvallis	OR	97330	236220	Building Contractors
McDougall, Kindra, Marie, DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Wang, Rong, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton County Health Department	530 NW 27th St	Corvallis	OR	97330	923120	County Government-Public Health Programs
Hughes, Keely Kelly	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Milk Skateboard Store	252 SW Madison Ave	Corvallis	OR	97333-4891	459110	Sporting Goods Retailers
Samaritan Internal Medicine	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Merkl, Elizabeth A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Beaver Sports Medicine	1128 NE 2nd St	Corvallis	OR	97330	621399	Physicians Assistants
Tom, Matthew	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
USPS Blue Collection Box	100 Milam Hall	Corvallis	OR	97331	541860	Mailing & Shipping Kiosks
Taufaasau, Edward	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Five Star Sports	219 SW Madison Ave	Corvallis	OR	97333	458210	Shoes-Retail
Advantage Accounting LLC	260 SW Madison Ave	Corvallis	OR	97333-4739	541211	Accountants/CPAs offices/private accounting practices
Linn Benton Community College-Benton Center	757 NW Polk Ave	Corvallis	OR	97330	611210	Junior-Community College-Tech Institutes
Oregon State Credit Union	4800 SW Research Way	Corvallis	OR	97333	522130	Credit Unions
Oregon State University Chemistry	153 Gilbert Hall	Corvallis	OR	97331-8546	611310	Schools offering baccalaureate or graduate degrees
WW Studio @ Corvallis Community Center	2601 NW Tyler Ave	Corvallis	OR	97330-5410	812191	Weight loss centers
Cat's Meow	411 SW 3rd St	Corvallis	OR	97333	459510	Thrift Shops
Bird, Julio, J, IV MD	3517 NW Samaritan Dr	Corvallis	OR	97330-3768	621111	Physicians' clinics
Cooley, Eliza	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Midwives
Kimberley & Daniel Golletz	1300 NW Harrison Blvd	Corvallis	OR	97330	621399	Psychologists
Sarepta Therapeutics, Inc	4575 SW Research Way	Corvallis	OR	97333	541714	Biotechnology Products & Services
Pancoast, Sarah E MD	2350 NW Century Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cowgirl 911	29155 Hurlburt Rd	Corvallis	OR	97333-9424	813410	Community clubs
Anderson Jewelers	457 SW Madison Ave	Corvallis	OR	97333-4718	458310	Jewelry Retailers
Benco NW Maxine	610 NW Maxine Ave	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
nexTC Corporation	1110 NE Circle Blvd	Corvallis	OR	97330	332813	Plastics-Coating (Mfrs)
Willamette Financial	518 SW 3rd St	Corvallis	OR	97333	523940	Financial Advisory Services
Sunset Dental	5208 SW Philomath Blvd	Corvallis	OR	97333	621210	Dentists
Park, Sunyoung, DMD	2350 NW Century Dr	Corvallis	OR	97330	621210	Dentists
Rebhuhn, Carrie	204 Rogers Hall	Corvallis	OR	97331-8569	999990	Unclassified Establishments
Corvallis Fire Department-Station 3	1310 NW Circle Blvd	Corvallis	OR	97330-1302	922160	Fire Protection
Dr William Simonson PharmD	7777 NW Oxbow Dr	Corvallis	OR	97330	621330	Pharmacists
Lisko, Tanya, Sue, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kim, Margaret, Youngah, DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
AAK Inc	6455 NW Concord Dr	Corvallis	OR	97330	999990	Federal Government Contractors
Work Unlimited	515 SW Western Blvd	Corvallis	OR	97333	923130	State Government-Social/Human Resources
Subway	421 SW 3rd St	Corvallis	OR	97333-4440	722511	Full-Service Restaurants
Sorensen, Megan, Jaye	2727 NW 9th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Fred Meyer Fuel Center	1535 NW 9th St	Corvallis	OR	97330-4512	457120	Other Gasoline Stations
Sawtooth Snow & Ice	5505 NW Shasta Ave	Corvallis	OR	97330	455219	Ice
Mr Nice Guy	687 SW 15th St	Corvallis	OR	97333	459991	Cannabis Dispensary
Samaritan Cardiology	3640 NW Samaritan Dr	Corvallis	OR	97330-3738	621111	Physicians' clinics
Angry Beaver Grill	349 SW 4th St	Corvallis	OR	97333	722511	Restaurants
Benevolent & Protective Order of the Elks USA	1400 NW 9th St	Corvallis	OR	97330	813410	Fraternal Organizations
JTST LLC	802 NW Sunnybrook Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Thukral, Monica K NP	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Donovan & Donovan	5720 SW Donovan Pl	Corvallis	OR	97333	812990	Wedding Chapels
Delta Tau Delta Fraternity	2251 SW Jefferson Waysec 325	Corvallis	OR	97331	813410	Fraternal Organizations
Diamond Clean	NULL	Corvallis	OR	NULL	238990	Ventilating Systems-Cleaning

R.G. Smith Electric and Plumbing	5480 SW Philomath Blvd	Corvallis	OR	97333	238210	Electric Contractors
Tiburon Fisheries LLC	1925 SE 3rd St	Corvallis	OR	97333	112511	Fishery Consultants
Sacred Art Tattoo LLC	1425 NW Monroe Ave	Corvallis	OR	97330	812199	Tattooing
Porquez, Jess	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
Top Crop Corvallis	1945 NW 9th St	Corvallis	OR	97330	459991	Cannabis Dispensary
Skinner, Scott, Richard, RN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
Oregon Anesthesiology Group	601 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bowman, Shane	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Okeefe, Gwendolyn, B, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cardv Advocacy Center	2208 SW 3rd St	Corvallis	OR	97333	624190	Marriage & Family Counselors
Ezdatamd LLC	6127 SW Grand Oaks Dr	Corvallis	OR	97333	541690	Scientists-Consulting
Guillaumot, Julien J PHD	408 SW Monroe Ave	Corvallis	OR	97333	621399	Psychologists
Wilson Consulting Partners LLC	3260 NW Circle Blvd	Corvallis	OR	97330	541611	Administrative & General Management Consulting Services
Chen, Rensa, DO	1112 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Radiology	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Big River Grains LLC	NULL	Corvallis	OR	NULL	424510	Grain-Dealers (Whls)
Oregon State Univ Ofc For Sponsored Research & Award Admin	306 Kerr Administration Bldg	Corvallis	OR	97331-8517	611310	Schools offering baccalaureate or graduate degrees
OSU Beaver Beginnings	102 Childcare Ctr	Corvallis	OR	97331-8502	624410	Nursery schools
Foster, Kevin, PT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Doublecheck Writing Editing	NULL	Corvallis	OR	97330	711510	Editorial Services
Benton County Records & Licenses	120 NW 4th St	Corvallis	OR	97330	921120	Government Offices-County
Milestones Women's Program	306 SW 8th St	Corvallis	OR	97333	813319	Alcoholism Information & Treatment Ctrs
Samaritan Endoscopy Center	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bashey, Jaffer H	3640 NW Samaritan Dr	Corvallis	OR	97330	541715	Medical Research
Samaritan Sleep Center	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Goodnature, Sonny Shawn	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Arain, Hamid, Umer, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dorris, Jalien K DO	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Silvermasters	440 NW Elks Dr	Corvallis	OR	97330	812112	Beauty Salons
The Dry Farming Institute	5253 SW Secher Ln	Corvallis	OR	97333	813319	Non-Profit Organizations
Brown, Emi Sumida	922 NW Circle Blvd	Corvallis	OR	97330	621399	Psychologists
Corvallis Finance Department	500 SW Madison Ave	Corvallis	OR	97333-4610	921130	Public monetary activities
Mierisch, Cay, Michael, MD	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bob Grant Construction	NULL	Corvallis	OR	97330	236115	Construction Companies
Hess, Deeanna MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sanda Communications Inc	815 NW 9th St	Corvallis	OR	97330	517810	Communications
Mother Culture LLC	33809 SE Eastgate Cir	Corvallis	OR	97333	541110	Attorneys
Zadourian, Adena, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Wastewater Reclamation	1304 NE 2nd St	Corvallis	OR	97330-6219	924110	Administration of Air and Water Resource and Solid Waste Management Programs
T.J. Thomas Fence Deck & Patio	2840 NW Skyline Dr	Corvallis	OR	97330	236118	Patio & Deck Builders
Kerle, Elizabeth Lac	37043 Belden Creek Rd	Corvallis	OR	97330	621399	Acupuncture
Burger King	5000 SW Philomath Blvd	Corvallis	OR	97333-1044	722511	Full-Service Restaurants
CoinFlip Bitcoin ATM	820 NW 9th St	Corvallis	OR	97330	523160	Virtual Currency Conversion Kiosk/ATM
Electric Charging Station	33900 SE Eastgate Cir	Corvallis	OR	97333	457120	Electric Charging Station
Hair Body & Sole Salon	2611 NW 9th St	Corvallis	OR	97330	812113	Manicuring
OSU Foundation	4238 SW Research Way	Corvallis	OR	97333	813219	Fund Raising Counselors & Organizations
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Henke Family and Cosmetic Dentistry	2605 NW Rolling Green Dr	Corvallis	OR	97330	621210	Dentists
Afi Associates Inc	2107 NW Fillmore Ave	Corvallis	OR	97330	541330	Engineers-Consulting
Pennell-Walkli, Ian J MD	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
WW (Weight Watchers)	781 NE 2nd St	Corvallis	OR	97330	812191	Weight Control Services
Emily Wakefield, Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531210	Real Estate
Wing Street	700 NE Circle Blvd	Corvallis	OR	97330	722511	Restaurants
Audubon Society of Corvallis	NULL	Corvallis	OR	NULL	813319	Non-Profit Organizations
Millet, Austin	4185 SW Research Way	Corvallis	OR	97333	621399	Psychologists
Jennifer Buys, L.A.C., LMT, LLC	620 NW Van Buren Ave	Corvallis	OR	97330-4846	812199	Miscellaneous self grooming services (except hair, nail, facial, nonpermanent makeup, nonmedical diet services)

Oregon State University-Beaver Athletic Scholarship Fund	154 Peavy Hall	Corvallis	OR	97331-8614	561599	Miscellaneous travel arrangement and reservation services
Burgher, Carina	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kellogg, Matthew, Maxwell, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Nold, Kay-Lee L	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corvallis Housing First	2311 NW Van Buren Ave	Corvallis	OR	97330	999990	Federal Government Contractors
Samaritan Endocrinology	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Church of the Good Samaritan	333 NW 35th St	Corvallis	OR	97330	813110	Churches
Endex Tech LLC	116 NW 3rd St	Corvallis	OR	97330	999990	Nonclassified Establishments
Oregon State University Center	2750 SW Campus Way	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
USPS Blue Collection Box	500 NW Van Buren Ave	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Alden, Jillian	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
Caliber Collision	325 NE Circle Blvd	Corvallis	OR	97330	811121	Automobile Body-Repairing & Painting
Spindler, Summer, Rayne	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Peterson, Don DC	400 NW Walnut Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Summit Bar & Grill Co	109 NW 15th St	Corvallis	OR	97330	722511	Restaurants
Benco Supported Living	974 NW Circle Blvd	Corvallis	OR	97330	623312	Residential Care Homes
Hebert, Jessica, Lee	230 SW 3rd St	Corvallis	OR	97333	621340	Physical Therapists
Benton Community Health Center	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Family Toy Storage	6300 SW Reservoir Ave	Corvallis	OR	97333	493190	Recreational Vehicles-Storage
Howerton Hopkin Kennedy Clark	2125 NW Professional Dr	Corvallis	OR	97330	621210	Dental Surgeons
L & G Customs	423 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Burchell, Mary Fowler MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ellis, Micah	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Samaritan Mental Health Family	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Lance Joshua Caddy MD	2725 SW Fairmont Dr	Corvallis	OR	97333	621111	Physicians & Surgeons
Campus Downward Dog	2305 NW Monroe Ave	Corvallis	OR	97330-5324	722410	Bars
W & V Phillips LLC	3004 NW Snowberry Pl	Corvallis	OR	97330-3518	115310	Support Activities for Forestry
White, Chelsie, Kay	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Reynolds Farms Inc	4715 NE Highway 20	Corvallis	OR	97330	111998	Farms
Benton County Fairgrounds	110 SW 53rd St	Corvallis	OR	97333	711190	Fairgrounds
Eastgate Veterinary Clinic	33888 SE Peoria Rd	Corvallis	OR	97333	541940	Veterinarians
Gray, Christopher Agt	310 NW 5th St	Corvallis	OR	97330	524210	Insurance
Markesteyn, Miranda L PA	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Smith, Kara K PT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Stoneyburn Gallery	1740 NW 17th St	Corvallis	OR	97330-1919	459920	Art Dealers
Delta Gammacorvallis	715 NW 23rd St	Corvallis	OR	97330-5689	813910	Business organizations
Pneu Medical Inc	2319 NW 9th St	Corvallis	OR	97330	423450	Physicians & Surgeons Equip & Supls-Whls
Amazon Locker	2415 NW Kings Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Samaritan Urgent Care Walk-in Clinic	5234 SW Philomath Blvd	Corvallis	OR	97333	621111	Physicians & Surgeons
Sky High Brewing	160 NW Jackson Ave	Corvallis	OR	97330	722511	Restaurants
Little Caesars	1329 NW 9th St	Corvallis	OR	97330	722511	Pizza
Moment Ministries	7165 SW Airport Rd	Corvallis	OR	97330	813110	Religious Organizations
Bowman, Emma	1128 NE 2nd St	Corvallis	OR	97330	621340	Physical Therapists
Natural Gourmet Eatery, Inc	1115 SE 3rd St	Corvallis	OR	97333	722511	Restaurants
Samaritan Hematology Oncology	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
USPS Blue Collection Box	815 NW 9th St	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
RMT International Corp	2851 NW 9th St	Corvallis	OR	97330	541614	Business Management Consultants
Benco Rha	965 NW Garfield Ave	Corvallis	OR	97330	531110	Apartments
Kantorowitz, David, A, MD	501 NW Elks Dr	Corvallis	OR	97330-3757	621111	Physicians' clinics
Chase Electrical Construction	3537 NW Mink Pl	Corvallis	OR	97330	238210	Electric Contractors
Llamamovers.com LLC	1990 NW Brownly Heights Dr	Corvallis	OR	97330	484210	Used Household & Office Goods Moving
Judd, Jasmine	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Tammy Woodman Certified Residential Appraiser	1641 NW 11th St	Corvallis	OR	97330	531320	Real Estate Appraisers
Hasbun, Sonia C DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Oregon Anastesia Group	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Nickev Management Company LLC	415 NE Circle Blvd	Corvallis	OR	97330	449121	Floor Coverings-Retail
LBR, LLC	39046 Trillium Ln	Corvallis	OR	97330	541611	Administrative & General Management Consulting Services
OSU Dept of Food Science & Tech	100 Wiegand Hall	Corvallis	OR	97331	541618	Food Facilities-Consultants
Habitat For Humanity	4840 SW Philomath Blvd	Corvallis	OR	97333	624190	Social Service & Welfare Organizations
Samaritan Endoscopy Center	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Stover Evey & Jackson	809 SW Western Blvd	Corvallis	OR	97333	811412	Appliances-Household-Major-Repairing
Hite, Danielle, Rene	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Rainbow Communications	471 NW Hemlock Ave	Corvallis	OR	97330	517810	Communications
Daley, Robert, Jr	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Olson, Arik R MD	2300 NW Walnut Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Germane & Wise Mental Health Services Consulting LLC	2727 NW 9th St	Corvallis	OR	97330	999990	Nonclassified Establishments
The Foam Man	551 SW 4th St	Corvallis	OR	97333-4429	424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers
Golden Crane	110 SW 3rd St	Corvallis	OR	97333	458110	Women's Apparel-Retail
Avery Square	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Law Office of Thomas A Hill, PC	230 SW 6th St	Corvallis	OR	97333	541110	Attorneys
Oaklawn Cemetery Office	2245 SW Whiteside Dr	Corvallis	OR	97333	812220	Cemeteries
Michael Stattel Counseling LPC	4900 NW Shiloh Pl	Corvallis	OR	97330-9781	621330	Psychoanalysts' clinics (except MDs and Dos)
Wagner, Joy Marie	3600 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Downtown Dental	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Sally Beauty	2015 NW Circle Blvd	Corvallis	OR	97330-1314	456120	Cosmetics, Beauty Supplies, and Perfume Retailers
Acorn Dentistry For Kids	1731 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Edmonds Beeara	2017 SE Stone St	Corvallis	OR	97333	621999	Health Services
Into OSU	1701 SW Western Blvd	Corvallis	OR	97331-8701	611630	Language Schools
US Forestry Science Lab	3200 SW Jefferson Way	Corvallis	OR	97331-8550	921120	Legislative assemblies
Lisa Burner, LPC	4185 SW Research Way	Corvallis	OR	97333	622210	Mental Health Services
Econo Lodge Corvallis Near University	935 NW Garfield Ave	Corvallis	OR	97330	721110	Hotels & Motels
Wali, Deepika MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Gao, Yuning	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
American Hero Carpet Cleaning	7315 NE Logsdon Rd	Corvallis	OR	97330	561740	Carpet & Rug Cleaners
Antioch House	127 NW 13th St	Corvallis	OR	97330	813110	Religious Organizations
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Roethlisberger, Hillary E	114 SW 8th St	Corvallis	OR	97333	621330	Social Workers
Alpine Animal Hospital PC	5120 NW Highland Dr	Corvallis	OR	97330-9763	541940	Animal hospitals, clinics, and veterinarians
Harms Darryl Surveyor	720 NE Granger Ave	Corvallis	OR	97330	541370	Surveyors-Land
K & H RV Storage	550 SW Wake Robin Ave	Corvallis	OR	97333	531130	Storage-Household & Commercial
Home Life Inc	2068 NW Fillmore Ave	Corvallis	OR	97330	813311	Disability Services
Hennessy T E Properties	NULL	Corvallis	OR	97330	531210	Real Estate
Samaritan Family Medicine	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Moore, Ryan	3600 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Straub Landscape	6320 SW Reservoir Ave	Corvallis	OR	97333-2939	561730	Land maintenance services
Benton County Corrections Division	190 NW 4th St	Corvallis	OR	97330	921120	Government Offices-County
Studio Cloud 9 Pilates Yoga	165 SW Washington Ave	Corvallis	OR	97333	611699	Yoga Instruction
Carts & Tools Supply Inc	7171 NE Highway 20	Corvallis	OR	97330	444140	Tools-New & Used
At Home Properties Inc	300 SW 2nd St	Corvallis	OR	97333	531210	Real Estate
Staggs, Charla	2358 NW Kings Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Willamette River Rocks	541 SW Wake Robin Ave	Corvallis	OR	97333	561730	Rock Lawns & Rockscaping
Alan R Wells Revocable Trust Dated October 28, 2011	202 NW 6th St	Corvallis	OR	97330	523991	Trust Companies
Samaritan Endocrinology	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
U-Haul Neighborhood Dealer	435 NE Circle Blvd	Corvallis	OR	97330	532120	Truck Renting & Leasing
Corvallis Pain Management	2175 NW Professional Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Lai, Forest, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Allstate Insurance Agent	2101 NW Professional Dr	Corvallis	OR	97330	524210	Insurance
Fernwood Circle Guest Houses	1110 NW Fernwood Cir	Corvallis	OR	97330	531311	Vacation Rentals
Muslim Community in Corvallis	620 NW Kings Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Schaefers Stove & Spa	1425 NW 9th St	Corvallis	OR	97330-4510	449110	Furniture Retailers
Comcoa Inc PRNTRS	701 NW 11th St	Corvallis	OR	97330-6014	517810	All Other Telecommunications

Osondu, Blessing, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Willamette Valley Cancer Institute	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Beravol, Poojitha, Reddy, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Tuttle, Nancy A NP	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
GameStop	1580 NW 9th St	Corvallis	OR	97330	459120	Games & Game Supplies
Nails Now	5256 SW Philomath Blvd	Corvallis	OR	97333	812113	Manicuring
Corvallis Radiology PC	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Sunni Modaffari, Counselor	4185 SW Research Way	Corvallis	OR	97333	622210	Mental Health Services
Brother's Cleaning	301 SW 4th St	Corvallis	OR	97333	561740	Carpet & Rug Cleaners
Fulford Marty Agt	1109 NW 9th St	Corvallis	OR	97330	531210	Real Estate
Romano's Italian Soda	244 NW 2nd St	Corvallis	OR	97330	722511	Restaurants
GBC Construction	1925 NW 9th St	Corvallis	OR	97330	236115	General Contractors
Bella Vino Gift Baskets	5095 SW Hillview Ave	Corvallis	OR	97333	459420	Gift Baskets & Parcels
725 13th LLC	913 NW Grant Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Thai Express	1335 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Park West Apartments	975 SW 15th St	Corvallis	OR	97333	531110	Apartments
Bender, Edward M MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
UPS Access Point Location	1550 NW 9th St	Corvallis	OR	97330	541860	Mailing & Shipping Services
Lawson, Melissa	557 NW Monroe Ave	Corvallis	OR	97330	624190	Counselors
Koning, Rob	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Geco Holdings	508 SW Jefferson Ave	Corvallis	OR	97333	551112	Holding Companies (Non-Bank)
Eesi	2200 NW 9th St	Corvallis	OR	97330	541330	Engineers-Consulting
Sotelo, Maria, Eugenia	333 NW 35th St	Corvallis	OR	97330-4908	621330	Psychoanalysts' clinics (except MDs and Dos)
Savage 908	27630 Llewellyn Rd	Corvallis	OR	97333	999990	Nonclassified Establishments
Altmann, Stefanie L DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Andrews Cooper	2141 NE Jack London St	Corvallis	OR	97330-6946	333998	All Other Miscellaneous General Purpose Machinery Manufacturing
James Heating & Air Conditioning	NULL	Corvallis	OR	97330	238220	Plumbing, Heating, and Air-Conditioning Contractors
Autumn Seed Company	5995 NE Highway 20	Corvallis	OR	97330	424910	Seeds & Bulbs-Wholesale
Inked Playmats	1800 SW 3rd St	Corvallis	OR	97333	459120	Games & Game Supplies
Adebola, Adetola S MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Lind, Matthew S	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Mid-Valley Dental Associates	2300 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
USDA Agriculture Research	3420 NW Orchard Ave	Corvallis	OR	97330-5014	926140	Regulation of Agricultural Marketing and Commodities
Petco	2365 NW Kings Blvd	Corvallis	OR	97330-3986	459910	Pet and Pet Supplies Retailers
Unimeasure	4175 SW Research Way	Corvallis	OR	97333	339112	Physicians & Surgeons Equip & Supls-Mfrs
Power Volkswagen of Corvallis	705 NW Buchanan Ave	Corvallis	OR	97330-6216	441110	New Car Dealerships
Schumer, Jean E	216 NW 6th St	Corvallis	OR	97330	621330	Social Workers
Electric Charging Station	6862-6994 SW W Hills Rd	Corvallis	OR	97333	457120	Electric Charging Station
Moling, Shawn M	685 NW 5th St	Corvallis	OR	97330	624190	Counselors
Jejuchan LLC	5270 SW Philomath Blvd	Corvallis	OR	97333	999990	Nonclassified Establishments
Togo's	2317 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Mentis Law Group	3730 NW Harrison Blvd	Corvallis	OR	97330	541110	Attorneys
McDonald's	2250 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Parker-Meyers, Lilia E	887 NW Grant Ave	Corvallis	OR	97330	621330	Social Workers
Thormahlen Harp Musical Instrs	1876 SW Brooklane Dr	Corvallis	OR	97333	339992	Musical Instruments-Manufacturers
Bryers, Gage Aaron	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Schroder, Charity	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Tracy, Heather J MD	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Renfro, Danielle	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Industrial Welding Supply Inc	880 NE Circle Blvd	Corvallis	OR	97330	423840	Welding Equipment & Supplies (Whls)
Hydroville	1011 Als	Corvallis	OR	97331	541611	Business Management Consulting Services
Stone, Clara	441 NW Elks Dr	Corvallis	OR	97330	621399	Physicians Assistants
McGee, Autryana N	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
First Alternative Natural Food Co-op South Store	1007 SE 3rd St	Corvallis	OR	97333	445110	Grocers-Retail
Brenna Murphy Stylist	521 SW 2nd St	Corvallis	OR	97333	812112	Beauty Salons
American Liberty Rights	905 NW 10th St	Corvallis	OR	97330	541690	Economic Development Agencies

The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Platt Electric Supply	133 SW Hopkins Ave	Corvallis	OR	97333-1175	423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
Ellis, Danielle P	557 NW Monroe Ave	Corvallis	OR	97330	624190	Counselors
Western Hotel Brokers Inc	5994 NW Rosewood Dr	Corvallis	OR	97330	531210	Real Estate Investments
Linn Benton Rental Housing Association	NULL	Corvallis	OR	NULL	813910	Business & Trade Organizations
Liang, Griffith E MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Campana's Dos Auto Repair	5260 NW Highway 99	Corvallis	OR	97330	811111	Automobile Repairing & Service
Samaritan Pharmacy Service	3521 NW Samaritan Dr	Corvallis	OR	97330	456110	Pharmacies
Inpria	1100 NE Circle Blvd	Corvallis	OR	97330	334413	Semiconductors & Related Devices (Mfrs)
Calvary Corvallis	2125 NW Lester Ave	Corvallis	OR	97330	813110	Churches
Aberha, Haile L	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Shanghai Wok	1104 NW Van Buren Ave	Corvallis	OR	97330	722511	Restaurants
AAA	1836 NW 9th St	Corvallis	OR	97330-2370	561599	Miscellaneous travel arrangement and reservation services
Espinoza, Brian	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Zoa Realty	225 SW Madison Ave	Corvallis	OR	97333	531210	Real Estate
Edward Jones	320 SE Atwood Ave	Corvallis	OR	97333	523940	Financial Advisory Services
Khan, Zafar, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Columbia Hemp Trading Company	4515 NE Elliott Cir	Corvallis	OR	97330-9402	513210	Software Publishers
Skyline Auto Sales	578 SW Twin Oaks Cir	Corvallis	OR	97333	441120	Automobile/Trucks Dealers-Used
1 O D Telecom Inc	410 NW Walnut Blvd	Corvallis	OR	97330	423690	Telecommunication Equip/Syst-Whls/Mfrs
Bertoni, Danielle M MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon Cultural Trust Partners	700 SW Madison Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Avis	1885 NW 9th St	Corvallis	OR	97330	532111	Automobile Renting
Wade L Haslam, DMD PC	2657 NW Rolling Green Dr	Corvallis	OR	97330	621210	Dentists
Corvallis Community Band	7575 NW Hood View Cir	Corvallis	OR	97330-9532	711410	Talent agents and agencies
Sweetheart Dessert LLC	1327 NW 9th St	Corvallis	OR	97330-4877	722511	Full-Service Restaurants
Theta Chi Fraternity	361 NW 26th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Goldner, Alan Paul MD	3600 Good Samaritan Dr	Corvallis	OR	97330	621111	Physicians' clinics
Oregon State University Technology Across the Curriculum	109 Kidder Hall	Corvallis	OR	97331-8553	611310	Schools offering baccalaureate or graduate degrees
Waterman, Adam, T, DO	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bitz, Alex	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Coffee Culture Timberhill	2499 NW Kings Blvd	Corvallis	OR	97330	445298	Coffee & Tea
Mick's Glass Service	1417 NW 9th St	Corvallis	OR	97330	444180	Glass-Auto Plate & Window & Etc
State Farm Insurance	153 NW 4th St	Corvallis	OR	97330-4702	524210	Insurance Agencies and Brokerages
All in One Electric	5060 SW Philomath Blvd	Corvallis	OR	97333-1044	811210	Electronic and Precision Equipment Repair and Maintenance(Unclassified)
Healthy Human LLC	2340 SW Leonard St	Corvallis	OR	97333	621610	Home Health Service
Frye, Lindsay DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Arms Hotel/Apartments	205 SW 2nd St	Corvallis	OR	97333	531110	Apartments
Benton County District Attorney	120 NW 4th St	Corvallis	OR	97330-4788	921120	Legislative assemblies
Gene Kiel & Associates	226 SW 7th St	Corvallis	OR	97333	524210	Insurance
Music For All-Corvallis, Inc	154 NW 31st St	Corvallis	OR	97330	813319	Non-Profit Organizations
Samaritan Obstetrics & Gynecology	3640 NW Samaritan Dr	Corvallis	OR	97330-3784	621111	Physicians' clinics
Dean, Brandon D PA	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Rebalance Physical Therapy	305 SW C Ave	Corvallis	OR	97333-4400	621340	Physical, occupational, speech therapists and audiogists' clinics
Ram Z Fab Inc	4920 SW 3rd St	Corvallis	OR	97333	332710	Machine Shops (Mfrs)
U-Haul Trailer Hitch Super Center of Corvallis	1048 NW 5th St	Corvallis	OR	97330	441330	Trailer Hitches
Pastini-Corvallis-Market Center	1580 NW 9th St	Corvallis	OR	97330-4689	722511	Full-Service Restaurants
Williamson, Spencer	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
McHenry Funeral Home & Cremation Services	206 NW 5th St	Corvallis	OR	97330	812210	Funeral Directors
Regency Park Place	2595 NE Jack London St	Corvallis	OR	97330	623312	Residential Care Homes
OSU Foundation	204 Peavy Hall	Corvallis	OR	97331-8615	541720	Sociology research and development (R&D)
Corvallis Optometry Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Therapeutic Associates	996 NW Circle Blvd	Corvallis	OR	97330	621340	Physical Therapists
Marty Fulford-Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330-6492	531210	Real Estate Agencies and Brokerages
Wallace, Allison	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Schiedler, Michael R DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

That Jason Young	867 NW 23rd St	Corvallis	OR	97330	999990	Nonclassified Establishments
Valley Library	121 The Valley Library	Corvallis	OR	97331	519210	Libraries-Institutional
Eager Beaver Subs LLC	1557 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Penske Truck Rental	850 NE Walnut Blvd	Corvallis	OR	97330	532120	Truck Renting & Leasing
Zonta Club of Corvallis	NULL	Corvallis	OR	NULL	813410	Clubs
Good Samaritan Regional Medical Center	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sada Sushi & Izakaya	151 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Blackberrymowing.com	NULL	Corvallis	OR	97330	444230	Outdoor Power Equipment Retailers
Simono	305 SW C Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
STH Machining	6555 NW Sumac Dr	Corvallis	OR	97330	332710	Machine Shops (Mfrs)
Kendal S Wood	869 NW 23rd St	Corvallis	OR	97330	455219	Wood Products
Grass Roots Books & Music	227 SW 2nd St	Corvallis	OR	97333	449210	Audio-Visual Equipment-Dealers
Terrestrial Ecosystems	200 SW 35th St	Corvallis	OR	97333	541720	Historical Research
McConville, Sea-Oh, DO	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ketcham, John, Patrick, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
B & R Auto Wrecking	3065 SF 3rd St	Corvallis	OR	97339	423140	Automobile Wrecking (Whls)
WL Construction Inc	922 NW Circle Blvd	Corvallis	OR	97330-1483	236115	New Single-Family Housing Construction (except Operative Builders)
Archer, Shayla	1300 NW Harrison Blvd	Corvallis	OR	97330	621330	Social Workers
Topinabee LLC	853 NW Monroe Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Red Viking LLC	1562 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
USPS Blue Collection Box	105 NE 3rd St	Corvallis	OR	97333	541860	Mailing & Shipping Kiosks
French Bee Publishing	806 NW Buchanan Ave	Corvallis	OR	97330	513199	Publishers (Mfrs)
Samaritan Regional Cancer Center Radiation Oncology	501 NW Elks Dr	Corvallis	OR	97330-3757	621111	Physicians' clinics
Dubuque, Christopher MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
V V Landscape Maintenance	NULL	Corvallis	OR	97330	236220	Maintenance Contractors
Starbucks	5082 SW Philomath Blvd	Corvallis	OR	97333-1044	722515	Snack & Nonalcoholic Beverage Bars
Corvallis Acupuncture & Wellness Center	107 SW 2nd St	Corvallis	OR	97333	621399	Acupuncture
Fusting, Erin, M, DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Hartenberger, Dylan, Lucas	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Elliott Stan Real Estate	1355 NW Forest Dr	Corvallis	OR	97330	531210	Real Estate
Red Hat, Inc	560 SB Ave	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Powell, Kristen	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Koning, Angela M	223 SW 8th St	Corvallis	OR	97333	624190	Counselors
A Computer Hero	3097 SE Midvale Dr	Corvallis	OR	97333-3103	811210	Electronic and Precision Equipment Repair and Maintenance(Unclassified)
Berry, Alalia, MD	2358 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Sigma Alpha Epsilon	2929 NW Harrison Blvd	Corvallis	OR	97330	541810	Advertising-Personnel Recruitment
Conway, Katlynn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Ferrellgas	1750 SW 3rd St	Corvallis	OR	97333-2726	457210	Fuel Dealers
Aukerman, Douglas F MD	325 Valley Football Ctr	Corvallis	OR	97331	621111	Physicians & Surgeons
Coyle Outside LLC	NULL	Corvallis	OR	NULL	999990	Nonclassified Establishments
New Morning Bakery	219 SW 2nd St	Corvallis	OR	97333	311811	Bakers-Retail
Mona Lisa's Custom Framing	133 SW 2nd St	Corvallis	OR	97333	455219	Picture Frames-Dealers
The Whisper Project	1845 NW Circle Blvd	Corvallis	OR	97330	722410	Bars
Phils Transmissions Inc	34005 NE Velle St	Corvallis	OR	97333	811114	Transmissions-Automobile
Mosaic Management Inc	6000 SW Mosaic Dr	Corvallis	OR	97333	623110	Nursing & Convalescent Homes
North Point Dental Group PC	2222 NW Lincoln Ave	Corvallis	OR	97330	621210	Dentists
Eugene Self Storage, LLC	202 NW 6th St	Corvallis	OR	97330	531130	Storage-Household & Commercial
Emergency Dept, Good Samaritan Regional Medical Center	3600 NW Samaritan Dr	Corvallis	OR	97330	622110	Emergency Medical & Surgical Service
Corvallis Radiology	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Zenbreeze-Laura Iverson	3232 SW Cascade Ave	Corvallis	OR	97333-1538	541990	Miscellaneous Professional, Scientific, and Technical Services
Farmers Insurance	435 NW 5th St	Corvallis	OR	97330-6492	524210	Insurance Agencies and Brokerages
Allstate Financial Services	310 NW 5th St	Corvallis	OR	97330	523940	Financial Advisory Services
Lafountain, Allison	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Giblin Markham, PH D PHD	1300 NW Harrison Blvd	Corvallis	OR	97330	621399	Psychologists
Benton Community Health Center	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Witham Village Apartments	4400 NW Walnut Blvd	Corvallis	OR	97330	531110	Apartments

Cronen, Miah Ann	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Juicy's LLC	582 NW Van Buren Ave	Corvallis	OR	97330	722511	Restaurants
Doug Phillips LMT	442 NW 3rd St	Corvallis	OR	97330-6403	812199	Miscellaneous self grooming services (except hair, nail, facial, nonpermanent makeup, nonmedical diet services)
Coughlin, Hayley, Alexis	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Next Chapter Mediation	230 SW 3rd St	Corvallis	OR	97333	541199	Arbitration Services
Pannebaker, Joshua, E, DPT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Truck Pros	257 NW Van Buren Ave	Corvallis	OR	97330	423120	Truck Accessories (Whls)
UPS Drop Box	525 NW 2nd St	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Lichtenstein, Isaac, Anson	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wilco	1905 NE Four Acre St	Corvallis	OR	97330	455219	Farmers Co-Op Retail Stores
KeyMe	2080 NW 9th St	Corvallis	OR	97330	561622	Key Duplicating Service Kiosks
Gomez, Isaiah, Abraham	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Johnson, Ladonna, Mae, DO	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Blatt, Diana R	3615 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Cottle, Jocelyn, Rose, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Feist, Jordan, Keiser	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rountree, Mary, Catherine, DO	850 SW 26th St	Corvallis	OR	97331-8624	621111	Physicians' clinics
Mobile Veterinary Clinic	NULL	Corvallis	OR	97330	541940	Veterinarians
Honeycomb Salon	200 NW 2nd St	Corvallis	OR	97330	812112	Beauty Salons
Sunni Modaffari, LPC	4185 SW Research Way	Corvallis	OR	97333	622210	Mental Health Services
Terrall, Willy, Zebulon, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wortman, Rachel	3600 NW Samaritan Dr	Corvallis	OR	97330	621340	Physical Therapists
Cellular Sales-Verizon Authorized Retailer	922 NW Circle Blvd	Corvallis	OR	97330-1483	517112	Wireless Telecommunications Carriers (except Satellite)
Northwest Alliance For Computational Science & Engineering	218 CH2M Hill Alumni Ctr	Corvallis	OR	97331-6300	541330	Engineers' offices
Orient Yang	1420 NW 9th St	Corvallis	OR	97330-4511	722513	Limited-Service Restaurants
Crespo, Shayna	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Sorenson, Jodi K NP	108 SW Memorial Pl	Corvallis	OR	97331	621399	Nurses-Practitioners
Taleff, Claire	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Oregon Counseling	887 NW Grant Ave	Corvallis	OR	97330	622210	Mental Health Services
Uprise	1110 NW Van Buren Ave	Corvallis	OR	97330	459420	Gift Shops
Yun, Christopher MD	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Coffee Culture	1195 NW Kings Blvd	Corvallis	OR	97330	445298	Coffee & Tea
Samaritan Physicians Referral	3600 NW Samaritan Dr	Corvallis	OR	97330	621999	Physicians & Surgeons Information Bureau
Laster Tom DDS	2444 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
NALC	216 SW Madison Ave	Corvallis	OR	97333	813930	Labor Organizations
Ringo Stuber Ensor & Hadlock	605 SW Jefferson Ave	Corvallis	OR	97333	541110	Attorneys
Boyle & Associates Inc	508 SW Jefferson Ave	Corvallis	OR	97333	541614	Business Management Consultants
Shogun Bowl	2461 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Beer 30	1835 SE 3rd St	Corvallis	OR	97333	445320	Beer & Ale-Retail
Crystal Nail Beauty Salon	113 SW 3rd St	Corvallis	OR	97333-4713	812113	Manicure and pedicure salons
Monica Baez-State Farm Insurance Agent	153 NW 4th St	Corvallis	OR	97330-4702	524210	Insurance Agencies and Brokerages
Grewal, Aman K DDS	530 NW 27th St	Corvallis	OR	97330	621210	Dentists
BC Dems	NULL	Corvallis	OR	NULL	813940	Political action committees (PACs)
Herman, Danee, Rebecca	3680 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Integrated Youthcare	673 NW Jackson Ave	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Clinic Neurology	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Knowles, Kira Noel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Giles, Jennifer M MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Westlake, Babe C DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Coocoos Cookies	NULL	Corvallis	OR	97333	722511	Restaurants
Radiance By Design	136 SW Washington Ave	Corvallis	OR	97333	459510	Antiques-Dealers
Bruner, Cathleen D DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Regional Cancer Center	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Dental Care	1799 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Stenger, Daniel E PA	845 SW 30th St	Corvallis	OR	97331	621399	Physicians Assistants

Shelter Management	825 NW 23rd St	Corvallis	OR	97330	531110	Apartments
Devnw	257 SW Madison Ave	Corvallis	OR	97333	813319	Non-Profit Organizations
Hill Farm Stables	1230 NW Lewisburg Ave	Corvallis	OR	97330-9728	713990	Recreational Halls
Unified Insurance	320 SW 3rd St	Corvallis	OR	97333	524210	Insurance
Lach, Daniel DC	2721 NW 9th St	Corvallis	OR	97330	621310	Chiropractors DC
Pace Heating & Air	1557 SE Crystal Lake Dr	Corvallis	OR	97333	238220	Air Conditioning Contractors & Systems
Timberhill Dental	2356 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
Randell, Jay Scott DMD	530 NW 27th St	Corvallis	OR	97330	621210	Dentists
Butts Electric Inc	5939 NE Elliott Cir	Corvallis	OR	97330-9427	541512	Computer-aided design (CAD), engineering (CAE), manufacturing (CAM) systems integration design services
Hobbs, Kyli-Natach, Jansons	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Mak Landscape & Irrigation	5467 SW Windflower Dr	Corvallis	OR	97333	561730	Lawn & Grounds Maintenance
Russell, Joshua	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Maple Creek Landscaping	28856 Highway 34	Corvallis	OR	97333	561730	Lawn & Grounds Maintenance
Ayres Properties LLC	29974 Highway 99W	Corvallis	OR	97333	531210	Real Estate Management
Corvallis Bicycle Collective	707 NW 11th St	Corvallis	OR	97330	459510	Bicycles-Dealers-Used
Fix It Man LLC	1855 NW Circle Pl	Corvallis	OR	97330	236118	Handyman Services
Affordable Home Repair-Chimney	NULL	Corvallis	OR	NULL	236118	Home Improvements
Priest	650 SW Sandalwood St	Corvallis	OR	97333	999990	Nonclassified Establishments
Mahi, Dustin	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Live Sound & Light	541 SW Wake Robin Ave	Corvallis	OR	97333	541990	Services NEC
All Family Vision Care	1597 SW 53rd St	Corvallis	OR	97333-2630	621320	Doctors of optometry clinics
Alliance Appraisal Group	6253 SW Grand Oaks Dr	Corvallis	OR	97333	531320	Real Estate Appraisers
Sisneros, Contessa	530 NW 27th St	Corvallis	OR	97330	621399	Physicians Assistants
Beaver Sports Medicine	1128 NE 2nd St	Corvallis	OR	97330	621111	Physicians & Surgeons
Bodhi Juice LLC	500 SW 2nd St	Corvallis	OR	97333-4444	445230	Produce Markets
Frasieur, Amy Mae	108 SW Memorial Pl	Corvallis	OR	97331	621399	Dietitians
Lennard, Colleen M MD	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Commercial Cabinet Repair	5060 SW Philomath Blvd	Corvallis	OR	97333	238350	Cabinet Makers
The Corvallis Clinic	3680 NW Sarmantin Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sara A Austin P C	2363 NW Grant Ave	Corvallis	OR	97330	621210	Dentists
Cashco	927 NW Circle Blvd	Corvallis	OR	97330	522291	Loans
Samaritan Pastega Regional Cancer	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ochman, Lisa Kelly DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Arc	928 NW Beca Ave	Corvallis	OR	97330-4502	813319	Miscellaneous social service advocacy organizations
Miro, Adelaida M MD	NULL	Corvallis	OR	NULL	621111	Physicians & Surgeons
Corvallis Community Acupuncture	1898 SW 3rd St	Corvallis	OR	97333	621399	Acupuncture
United Way	NULL	Corvallis	OR	NULL	813319	Social Services NEC
Samaritan Heart & Vascular	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Frunzi, Johnathan J MD	3700 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jennings, Nicole	420 NW 2nd St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Honorable David B Connell	120 NW 4th St	Corvallis	OR	97330	921120	Government Offices-State
Bug Zapper Pest Control	460 SW Madison Ave	Corvallis	OR	97333	561710	Pest Control
Trautman, Hope	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Griffin, Austin, Audley Alle	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
AFSCME Local # 3563	536 SW 2nd St	Corvallis	OR	97333	813930	Labor Organizations
Corvallis Knights Baseball	301 SW 4th St	Corvallis	OR	97333	711211	Sports Teams
Staton, Kassandra, Skye	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Hunking Law LLC	566 NW Van Buren Ave	Corvallis	OR	97330	541110	Attorneys
After School Program Harding	510 NW 31st St	Corvallis	OR	97330-5158	624410	Nursery schools
Home Pro Home Inspection Service	4750 SW Hollyhock Cir	Corvallis	OR	97333	541350	Inspection Service
Foundation Engineering	820 NW Cornell Ave	Corvallis	OR	97330	541330	Engineering
Hanks, Kourtney, L	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Midwives
Homeport Property Management	605 NW 5th St	Corvallis	OR	97330-6420	531210	Real Estate Agencies and Brokerages
Corvallis Market	1621 NW 9th St	Corvallis	OR	97330	445110	Grocers-Retail
Connelly, Nicole	306 SW 8th St	Corvallis	OR	97333	624190	Counselors

Munoz, Asusena	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hand & Hand Elc	2800 NW Tyler Ave	Corvallis	OR	97330	624410	Child Care Service
TacoTime	1105 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Corvallis Southside Market	1750 SW 3rd St	Corvallis	OR	97333	445110	Grocers-Retail
Axman, Stephanie A MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Julvia Technologies Inc	2396 NW Kings Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Hanson Insurance Group	3913 NW Clarence Cir	Corvallis	OR	97330	524210	Insurance
Donnelly, Chelsea	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Yannelli, Kris, Paget	2396 NW Kings Blvd	Corvallis	OR	97330	621330	Social Workers
Corvallis Cyclery Co	344 SW 2nd St	Corvallis	OR	97333	459110	Bicycles-Repairing
Afternoon Toxicology Consulting	991 NE Kirsten Pl	Corvallis	OR	97330	621511	Toxicologists
Presson, Raechel	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Practitioners
Goss Stadium at Coleman Field	430 SW Langton Pl	Corvallis	OR	97331	711310	Stadiums Arenas & Athletic Fields
Bobahead Corvallis LLC	1555 NW Monroe Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Eastgate Veterinary Clinic	33888 SE Peoria Rd	Corvallis	OR	97333	541940	Veterinarians
Yogurt Extreme	922 NW Circle Blvd	Corvallis	OR	97330	445298	Yogurt
Muro, Kristi	712 NW 4th St	Corvallis	OR	97330	621330	Social Workers
Mid-Valley Health Care Advcts	NULL	Corvallis	OR	NULL	541820	Lobbyists
Stein, Susan, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Simply Biscotti	2888 NW 29th St	Corvallis	OR	97330	424490	Groceries & Related Products NEC (Whls)
Sletta, Lauren	260 SW Madison Ave	Corvallis	OR	97333	621340	Physical Therapists
Wholistic Physical Therapy	5460 SW Philomath Blvd	Corvallis	OR	97333	621340	Physical Therapists
Heck, Nicholas	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Northern Star	124 SW 3rd St	Corvallis	OR	97333	458110	Clothing-Retail
Benson's Interiors	415 NE Circle Blvd	Corvallis	OR	97330	449122	Venetian Blinds-Retail
Yummy Yummy	930 NW Kings Blvd	Corvallis	OR	97330-2505	722511	Full-Service Restaurants
St Mary's Catholic Church	501 NW 25th St	Corvallis	OR	97330	813110	Church Organizations
Trillium Children's Farm Home	4455 NE Highway 20	Corvallis	OR	97330	621111	Physicians & Surgeons
Chun, Truman Ray DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Viable Alternatives	1853 SW Airport Ave	Corvallis	OR	97333	812910	Pet Boarding Sitting & Kennels
Papa Murphy's Take 'n' Bake	960 NW Circle Blvd	Corvallis	OR	97330-1410	722511	Full-Service Restaurants
OSU Student Health Center	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Catholic Campus Ministry	2127 NW Monroe Ave	Corvallis	OR	97330	813110	Religious Organizations
Korean Presbyterian Church	1736 NW Dixon St	Corvallis	OR	97330	813110	Churches
Mojo Physical Therapy LLC	2211 NW Professional Dr	Corvallis	OR	97330-3892	621340	Physical, occupational, speech therapists and audiogists' clinics
David A Hart MD PC	1300 NW Harrison Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Laundry & Espresso Drive Thru	1118 NW 9th St	Corvallis	OR	97330	812320	Laundries
Avery Jones Warehouse	30553 Smith Loop	Corvallis	OR	97333	111998	General Farms-Primarily Crop
Electric Charging Station	2251 SW Jefferson Way	Corvallis	OR	97330	457120	Electric Charging Station
Infogrouplbg	545 SW 2nd St	Corvallis	OR	97333-4920	523940	Portfolio Management and Investment Advice
Shirkey, Kylee, LPN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Practitioners
Electric Charging Station	350 SW 4th St	Corvallis	OR	97333	457120	Electric Charging Station
Corvallis Birth & Womens Health Center LLC	2314 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Electric Charging Station	4444 NW Highland Dr	Corvallis	OR	97330	457120	Electric Charging Station
Hoppin, Erin, Sommer, DO	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Reed, Mary, Kathryn	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Arbuck, Marina MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bright Beginnings Preschool	NULL	Corvallis	OR	97330	624410	Schools-Pre-School/Kindergarten-Academic
UPS Drop Box	1600 SW Western Blvd	Corvallis	OR	97333	541860	Mailing & Shipping Kiosks
Oregon State University Business Affairs	100 Kerr Administration Bldg	Corvallis	OR	97331-8519	611310	Schools offering baccalaureate or graduate degrees
Irrigation For the Future Inc	815 NW James Ave	Corvallis	OR	97330	423820	Irrigation Systems & Equipment (Whls)
Osl Partners	560 SW 15th St	Corvallis	OR	97331-8518	541511	Computer Programming and Software Development Services
A Little Wind in My Sail	425 SW Madison Ave	Corvallis	OR	97333	621330	Therapy
Californegon LLC	1215 NW Spring St	Corvallis	OR	97330	999990	Nonclassified Establishments
Close, Alyssa	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Vu, Vien Duy	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Panera Bread	335 NW 4th St	Corvallis	OR	97330	722511	Restaurants
Cokeley, Elijah	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Sleep Center	908 NW 9th St	Corvallis	OR	97330	449110	Mattresses
Crossroads Where World Friendships Begin Inc	NULL	Corvallis	OR	NULL	813311	Charitable Institutions
Dutch Bros Coffee	661 SW 26th St	Corvallis	OR	97331-8622	722515	Snack & Nonalcoholic Beverage Bars
Unity Shelter	4515 SW West Hills Rd	Corvallis	OR	97333	813311	Charitable Institutions
Church, Skotti D MD	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Grace City Church	4000 SW Western Blvd	Corvallis	OR	97333	813110	Churches
Keys, Amie, Lu	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Corvallis Colonics LLC	NULL	Corvallis	OR	NULL	621999	Colonic Irrigation
Phi Gamma Delta	348 NW 25th St	Corvallis	OR	97330-5496	813410	Community clubs
Peak Sports	135 & 207 NW 2nd St	Corvallis	OR	97330	459110	Sporting Goods-Retail
Beauty By Cristina Landeros	879 NW Grant Ave	Corvallis	OR	97330	812112	Beauty Salons
Benton Community Health Center	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Eastgate Veterinary Clinic	33888 SE Peoria Rd	Corvallis	OR	97333-2318	541940	Animal hospitals, clinics, and veterinarians
American Volkssport Association Inc	1038 NW Fillmore Ave	Corvallis	OR	97330	813410	Educational Associations
Corvallis Birth & Women's Health Center, LLC	2314 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Alliance Storage Corvallis	252 NE Lancaster St	Corvallis	OR	97330	531130	Storage-Household & Commercial
Willamette Valley Cancer Institute	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Corvallis Clinic Neurology	444 NW Elks Dr	Corvallis	OR	97330-3758	621111	Physicians' clinics
Tommy's 4th Street Bar & Grill	350 SW 4th St	Corvallis	OR	97333	722511	Restaurants
Briar Ridge Apartments	2604 NW Garryanna Dr	Corvallis	OR	97330	531110	Apartments
Milwaukee Electronics Co	33840 SE Eastgate Cir	Corvallis	OR	97333	449210	Electronic Equipment & Supplies-Retail
Byte Federal Bitcoin ATM (Unique Mart)	5500 SW Philomath Blvd	Corvallis	OR	97333	523160	Virtual Currency Conversion Kiosk/ATM
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Arcade Apartments	440 NW 23rd St	Corvallis	OR	97330	531110	Apartments
Stutz, Kathleen N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon Junior Livestock Expo	112 Withycombe Hall	Corvallis	OR	97331-8576	813410	Community clubs
Mai, Tammy H DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
El Sol De Mexico	1597 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Assistance League of Corvallis	547 NW 9th St	Corvallis	OR	97330	813319	Non-Profit Organizations
OSU Student Health Center	108 SW Memorial Pl	Corvallis	OR	97331	621111	Physicians & Surgeons
Money Tree Software	2358 NW Professional Dr	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Dalal, Farrah	260 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Pats Construction	7200 NW Grandview Dr	Corvallis	OR	97330	236115	Construction Companies
Hegewald, Conor DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bob's Towing & Expert Auto Repair	785 NW Cornell Ave	Corvallis	OR	97330	488410	Wrecker Service
SIGA Technologies Inc	4575 SW Research Way	Corvallis	OR	97333	325412	Pharmaceutical Preparation (Mfrs)
Nicolynn Properties	707 SW 10th St	Corvallis	OR	97333	531210	Real Estate
Embrace Kindness Bodywork LLC	927 NW Grant Ave	Corvallis	OR	97330	812199	Massage Therapists
U-Haul Neighborhood Dealer	252 NE Lancaster St	Corvallis	OR	97330	532120	Truck Renting & Leasing
AmeriGas Propane Exchange	5270 SW Philomath Blvd	Corvallis	OR	97333	457210	Propane Tank Kiosks
Center Against Rape & Dome	4786 SW Philomath Blvd	Corvallis	OR	97333	999990	Unclassified Establishments
Centerspace Software, LLC	622 NW 32nd St	Corvallis	OR	97330-5025	513210	Software Publishers
Squirrels Tavern	100 SW 2nd St	Corvallis	OR	97333-4716	722410	Bars
Kraken Cards	1800 SW 3rd St	Corvallis	OR	97333	459420	Collectibles
Johnson, Jeffrey C	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Trader Joe's	1550 NW 9th St	Corvallis	OR	97330	445110	Grocers-Retail
Lupa, Inc	1115 NW 9th St	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Odfw Fish Health Services	226 Nash Hall	Corvallis	OR	97331-8542	921120	Legislative assemblies
Crowell, Cathleen	220 Langton Hall	Corvallis	OR	97331-8534	621340	Physical, occupational, speech therapists and audiogists' clinics
Adams, Daniel J	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Choi, David, D, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Johnson, Jordan	990 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Macfarlane, Scott, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Northwest Self Storage	505 NW Buchanan Ave	Corvallis	OR	97330-6215	531130	Landlords of Miniwarehouses and Self-Storage Units
Sherwin-Williams	2495 NW 9th St	Corvallis	OR	97330	444120	Paint-Retail
Future Planning Systems	655 NW Jackson Ave	Corvallis	OR	97330	523940	Financial Advisory Services
Skelton, Jessica	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Brian Tufteskog-COUNTRY Financial Representative	201 NW 3rd St	Corvallis	OR	97330	524210	Insurance
Corvallis Pharmacy	3680 NW Samaritan Dr	Corvallis	OR	97330	456110	Pharmacies
Corvallis Optometry Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Precision Approach Engineering Inc	5125 SW Hout St	Corvallis	OR	97333	541330	Engineering
1478-1480 20th LLC	913 NW Grant Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
DJM Resav LLC	5700 SW Reservoir Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Roberts, Mary, Fay, DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Andrew S Noonan PC	310 NW 7th St	Corvallis	OR	97330	541110	Attorneys
Mackin, Marley Anne	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Devereux, Addison	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Jaime Fuller Photography LLC	260 SW Madison Ave	Corvallis	OR	97333	541921	Photography
Midvalley Tile	907 NW Sycamore Ave	Corvallis	OR	97330	238340	Tile-Ceramic-Contractors & Dealers
Brown, Charlene, Nichole	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
CSE Engineering Inc	835 NW 23rd St	Corvallis	OR	97330	541330	Engineers-Structural
Lifestance Health	4185 SW Research Way	Corvallis	OR	97333-1783	624190	Miscellaneous Individual and Family Services
Veterinary Acupuncture	1562 SW 3rd St	Corvallis	OR	97333	621399	Acupuncture
Freebird Body & Paint	29136 Highway 34	Corvallis	OR	97333-2218	811111	Car repair shops
The Research Group	456 SW Monroe Ave	Corvallis	OR	97333	541910	Economic Research & Analysis
Qdoba Mexican Eats	2001 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Prentiss Properties X LLC	2397 NW Kings Blvd	Corvallis	OR	97330	531210	Real Estate Management
Bucks Sanitary Service	2397 NW Kings Blvd	Corvallis	OR	97330	562998	Sanitary Services NEC
American Institute of Aeronautics & Astronautics	2000 SW Monroe Ave	Corvallis	OR	97331	813410	Educational Associations
Amanda Loman Photography	994 NW Hayes Ave	Corvallis	OR	97330	541921	Photography
Special Occasions	4314 SW Research Way	Corvallis	OR	97333	459310	Florists-Retail
Kirsten Starkey, Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531390	Real Estate Consultants
Bain, Hillary	301 SW 4th St	Corvallis	OR	97333	621340	Physical Therapists
Fuhrman, Vikki	995 NW Circle Blvd	Corvallis	OR	97330	621340	Physical Therapists
Anovation Group LLC	3923 NW Jameson Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Cricket Wireless Authorized Retailer	1329 NW 9th St	Corvallis	OR	97330	517112	Cellular Telephones (Services)
Cates, Ellie	260 SW Madison Ave	Corvallis	OR	97333	624190	Counselors
Muncey, Kevin R	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Lonestar LLC	1585 SW 53rd St	Corvallis	OR	97333	236115	General Contractors
CTS Commuter Bus Station-Downtown	5th Street & Madison Ave	Corvallis	OR	97330	485119	Transit Station
Bull Frog Landscape	2665 SW 53rd St	Corvallis	OR	97333	561730	Landscape Contractors
Renewable Energy Associates	2210 NW Hayes Ave	Corvallis	OR	97330-2466	541612	HR consulting services
Blue Rhino	2335 NW Kings Blvd	Corvallis	OR	97330	457210	Propane Tank Kiosks
Stoutt, William DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
E-Msion, Inc	28645 Highway 34	Corvallis	OR	97333-2227	999990	Unclassified Establishments
Long, Katherine, R, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Athletic Medicine Center	845 SW 30th St	Corvallis	OR	97331-8629	621111	Physicians' clinics
Cindy's Hallmark Shop	922 NW Circle Blvd	Corvallis	OR	97330-1483	459420	Gift, Novelty, and Souvenir Retailers
Kartano, Amanda	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corvallis Dental Group	2318 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Delicias Valley Cafe	933 NW Circle Blvd	Corvallis	OR	97330	722511	Restaurants
WVT Is Now Rize Laboratory	545 SW 2nd St	Corvallis	OR	97333-4466	541714	Research-Devmnt In Biotechnology (Except Nanobio)
Burn Boot Camp	2479 NW Kings Blvd	Corvallis	OR	97330	713940	Health Clubs Studios & Gymnasiums
Paye Inc	316 SW Washington Ave	Corvallis	OR	97333	813311	Charitable Institutions
Windstone Editions	728 SW Wake Robin Ave	Corvallis	OR	97333	327110	Giftwares-Manufacturers
Stress Solutions LLC	2255 NW 25th St	Corvallis	OR	97330-1211	624190	Miscellaneous Individual and Family Services
Yost, Joel, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Pain Management	545 SW 2nd St	Corvallis	OR	97333	621111	Physicians & Surgeons
Friends of CHS Band	1400 NW Buchanan Ave	Corvallis	OR	97330	711130	Orchestras & Bands

Patel, Sugat, K, MD	3640 NW Samaritan Dr	Corvallis	OR	97330-3787	621111	Physicians' clinics
7-Eleven	1467 NW Monroe Ave	Corvallis	OR	97330	445131	Convenience Stores
Optum Behavioral Care of Colorado, PC	887 NW Grant Ave	Corvallis	OR	97330-4539	622210	Rehabilitation hospitals
Town Pump	820 NW Kings Blvd	Corvallis	OR	97330	457120	Service Stations-Gasoline & Oil
Clothes Tree	204 SW Madison Ave	Corvallis	OR	97333	458110	Women's Apparel-Retail
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dunbar, Jessica, Kaylee	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
Battery X-Change	947 NW 9th St	Corvallis	OR	97330-6142	441330	Automotive Parts and Accessories Retailers
Gaia Landscapes Inc	33735 SE Peoria Rd	Corvallis	OR	97333	444230	Lawn & Garden Equip & Supplies-Retail
Cheema, Gagandeep DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Apsco Inc	922 NW Cir	Corvallis	OR	97330	423930	Waste Disposal Equipment (Whls)
Well Covenant Church	2601 NW Tyler Ave	Corvallis	OR	97330	813110	Churches
Kellie Cleaver, PCA	4185 SW Research Way	Corvallis	OR	97333	622210	Mental Health Services
Corvallis Folklore Society	NULL	Corvallis	OR	NULL	813319	Non-Profit Organizations
Home Grown Gardens	4845 SE 3rd St	Corvallis	OR	97333	444240	Garden Centers
Jimmy John's	1830 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Benton County	110 SW 4th St	Corvallis	OR	97333-4712	624190	Miscellaneous Individual and Family Services
Eagle Digital Imaging Inc	5665 SW Plumley St	Corvallis	OR	97333	481219	Photographers-Aerial
McLellan Temporaries	800 SW Washington Ave	Corvallis	OR	97333	561320	Employment Contractors-Temporary Help
Ascerted LLC	340 SW 2nd St	Corvallis	OR	97333-4650	611710	Educational Assistance Services
Tolbert, Shaun, David	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Barbara Garretson MSW, LCSW, PC	1300 NW Harrison Blvd	Corvallis	OR	97330	621330	Social Workers
Evergreen Indian Restaurant	136 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Pierson, Shanlee	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Nurses-Practitioners
Araiza, Erin	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Cutaway Inc	NULL	Corvallis	OR	97333	238910	Site Development Contractors
USPS Blue Collection Box	5300 SW Technology Loop	Corvallis	OR	97333	541860	Mailing & Shipping Kiosks
Samaritan Family Medicine Southwest	5234 SW Philomath Blvd	Corvallis	OR	97333-1042	621111	Physicians' clinics
Scarborough, Athena, Jay	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Lotus Nails	924 NW Kings Blvd	Corvallis	OR	97330	812113	Manicuring
4S, Inc	33866 SE Eastgate Cir	Corvallis	OR	97333-2248	423990	Other Miscellaneous Durable Goods Merchant Wholesalers
Samaritan Plastic Surgery	996 NW Circle Blvd	Corvallis	OR	97330-1485	621399	Offices of All Other Miscellaneous Health Practitioners
Samaritan Village	285 NW 35th St	Corvallis	OR	97330	623110	Nursing & Convalescent Homes
Corvallis City Recorder	501 SW Madison Ave	Corvallis	OR	97333-4601	921190	Other General Government Support
Terrestrial Ecosystem Research	316 SW Washington Ave	Corvallis	OR	97333	541910	Research Service
Mid-Willamette Valley Transgender Support Network	2945 NW Circle Blvd	Corvallis	OR	97330	813311	Charitable Institutions
Fresh Start House Cleaning	120 SW Avery Ave	Corvallis	OR	97333	238990	House Cleaning
Snyder, Karla J CNM	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Registered RN
Lion's Touch Massage & Reiki	340 SW 2nd St	Corvallis	OR	97333	812199	Massage Therapists
Jul Orr Vocational Services	120 SW 4th St	Corvallis	OR	97333	561311	Employment Agencies & Opportunities
Stone, Lynette E	3600 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Enrich Health LLC	2955 NW Monterey Dr	Corvallis	OR	97330	621999	Health Services
Beckley, Ethan Hayes MD	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Kelly Stepp-Financial Advisor, Ameriprise Financial Services, LLC	777 NE 2nd St	Corvallis	OR	97330	523940	Financial Advisory Services
Town & Country Animal Clinic	2621 NW 9th St	Corvallis	OR	97330	812910	Pet Services
He, Junfeng PHD	260 SW Madison Ave	Corvallis	OR	97333	621399	Acupuncture
Benton County Health Department	180 NW 5th St	Corvallis	OR	97330	923120	County Government-Public Health Programs
Willamette Valley Cancer Institute & Research Center	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Oregon State University Office of Human Resources	236 Kerr Administration Bldg	Corvallis	OR	97331-8578	611310	Schools offering baccalaureate or graduate degrees
Hatch, Zach	1500 SW Jefferson Ave	Corvallis	OR	97331	621340	Physical Therapists
Whimsy Hill Gardens	1717 NW Grant Ave	Corvallis	OR	97330	712130	Gardens
Brown, Katy Jane DO	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Children's Clinic	1835 NW Kings Blvd	Corvallis	OR	97330-1907	621111	Physicians' clinics
Bazaar	2240 SW 3rd St	Corvallis	OR	97333	459510	Flea Markets
Electric Charging Station	205 NW 5th St	Corvallis	OR	97330	457120	Electric Charging Station
Benton County Dog Control	180 NW 5th St	Corvallis	OR	97330-4703	921120	Legislative assemblies

McDonald Upholstery	5240 NW Highway 99	Corvallis	OR	97330	811420	Upholsterers
Carmi Repairs & Remodels LLC	2305 SE Crystal Lake Dr	Corvallis	OR	97333-2016	811310	Commercial and industrial machinery and equipment restoration and support
Rainey, Jennifer, Gilman	444 NW Elks Dr	Corvallis	OR	97330	621399	Physicians Assistants
Guild Mortgage-Brianna Norlander	435 NW 5th St	Corvallis	OR	97330	522292	Real Estate Loans
Corvallis Radiology	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Dollar Tree	2001 NW Circle Blvd	Corvallis	OR	97330-1314	455219	All Other General Merchandise Retailers
Jimenez, Daniel A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Scrivens, Brian P DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton County Historical	1400 NW Buchanan Ave	Corvallis	OR	97330	712110	Museums
AT&T Authorized Retailer	1705 NW 9th St	Corvallis	OR	97330-2100	517112	Wireless Telecommunications Carriers (except Satellite)
Citizens Bank	275 SW 3rd St	Corvallis	OR	97333-4648	522110	Commercial banks
B & R Auto Wrecking Co	3065 SE 3rd St	Corvallis	OR	97333	423140	Automobile Wrecking (Whls)
Hartman, Cherry	4948 SW Aster St	Corvallis	OR	97333	624190	Counselors
Williams, Stephen	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
Oregon State University Wood Science & Engineering College	119 Richardson Hall	Corvallis	OR	97331-8582	611310	Schools offering baccalaureate or graduate degrees
Camille, Trevor Scot	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Bloominati Cannabis Corp	240 SW Washington Ave	Corvallis	OR	97333	459991	Cannabis Dispensary
Memorial Union Concourse Gallery	Jefferson St	Corvallis	OR	97331-8592	611610	Fine Arts Schools
Aspire Design Salon	533 SW 4th St	Corvallis	OR	97333	812112	Beauty Salons
Electric Charging Station	360 SW Avery Ave	Corvallis	OR	97333	457120	Electric Charging Station
Jordan, Amanda	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Sis Development Inc	808 NW Buchanan Ave	Corvallis	OR	97330	541614	Business Management Consultants
Creative Trail Designs, LLC	3434 NW Maxine Cir	Corvallis	OR	97330	237990	Heavy & Civil Engineering Construction
Furniture Exchange	210 NW 2nd St	Corvallis	OR	97330	459510	Furniture-Used
My Corvallis Dentist	2055 NW Grant Ave	Corvallis	OR	97330-4366	621210	Dentists' clinics
Carlin, Andrew, Pearce, PT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Bilby Chiropractic	970 NW Circle Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Trench Line Excavation	33871 SE Eastgate Cir	Corvallis	OR	97333	237110	Water-Sewer Pipeline & Comms/Power Line
Willen, Ryan, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Steve Peterson	29414 SE Becker Dr	Corvallis	OR	97333	711510	Magicians
Rinehart, Abby Lynn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Mumford House	1675 NW Division St	Corvallis	OR	97330	813311	Disability Services
Hodges, Holly Jo L MD	2300 NW Walnut Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Lincoln School Health Center	121 SE Viewmont Ave	Corvallis	OR	97333-1968	621111	Physicians' clinics
Sugar J's LLC	134 SW 1st St	Corvallis	OR	97333-4720	722511	Full-Service Restaurants
Benton Soil & Water	136 SW Washington Ave	Corvallis	OR	97333	115112	Soil Conservation Service
Loranger, Austin	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Audiology Associates	1861 NW Kings Blvd	Corvallis	OR	97330	621340	Speech Pathologists
Postman, Rachael FNP	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Research in Imaging	1144 NW Solar Pl	Corvallis	OR	97330	541910	Research Service
Corrim	8200 NW Chaparral Dr	Corvallis	OR	97330	813319	Non-Profit Organizations
Benton County-or	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
Chintimini Senior & Community Center at Chintimini Park	2601 NW Tyler Ave	Corvallis	OR	97330	624120	Senior Citizens Service
Deeper Well Psychotherapy & Counseling, LLC	311 SW 2nd Street	Corvallis	OR	97333	621399	Psychologists
Kings Circle Assembly of God	2110 NW Circle Blvd	Corvallis	OR	97330-3902	813110	Religious societies
Shepherd of the Valley Lutheran Church	2650 NW Highland Dr	Corvallis	OR	97330	813110	Churches
St Vincent de Paul	501 NW 25th St	Corvallis	OR	97330	624210	Food Banks
Inet Realtors	525 SW 4th St	Corvallis	OR	97333	531210	Real Estate
Riha, Lori	685 NW 5th St	Corvallis	OR	97330	624190	Counselors
Pub	2115 NE Highway 20	Corvallis	OR	97330	722410	Bars
Perera, Jorge, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Coravllis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621399	Psychologists
COUNTRY Financial	728 NW 4th St	Corvallis	OR	97330	524210	Insurance
Horning Farms Inc	27771 Horning Ln	Corvallis	OR	97333	111150	Corn
Benton County Law Library	559 NW Monroe Ave	Corvallis	OR	97330	519210	Libraries-Public

Samaritan Sleep Disorders Center	NULL	Corvallis	OR	97330	621999	Sleep Disorders-Diagnostic/Treatment
Webb, Colleen Sue	685 NW 5th St	Corvallis	OR	97330	624190	Counselors
Corvallis Dental Care	1799 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Rest & Repair Massage Clinic	833 NW Buchanan Ave	Corvallis	OR	97330	812199	Massage Therapists
Bostwick, Jade, M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Proprint	563 NW Monroe Ave	Corvallis	OR	97330	323111	Commercial Printing NEC (Mfrs)
Samaritan Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330-4714	621111	Physicians' clinics
Oregon Ki Society	535 NW 4th St	Corvallis	OR	97330-6410	611620	Sports and Recreation Instruction
Corvallis Fire Department-Station 6	544 NW Lewisburg Ave	Corvallis	OR	97330-9603	922160	Fire Protection
Smith Christopher PA	2175 NW Professional Dr	Corvallis	OR	97330-3886	999990	Unclassified Establishments
Wilson Elementary School	2701 NW Satinwood St	Corvallis	OR	97330	611110	Schools
The Church of Jesus Christ of Latter-Day Saints	1205 NW Walnut Blvd	Corvallis	OR	97330-3638	813110	Religious societies
Walgreens Pharmacy Inside Bi-Mart	1555 SW 53rd St	Corvallis	OR	97333-2630	456110	Pharmacies and Drug Retailers
Stoneyburn Gallery	NULL	Corvallis	OR	NULL	322120	Card & Paper Finishing (Mfrs)
Samaritan Mental Health Family	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Clara A Bozievich, MD, PC	971 NW Spruce Ave	Corvallis	OR	97330	621111	Physicians & Surgeons
Foss, Dawn A	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Cardiovascular Consultants	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Paeth, Molly, Marie	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Heresco Chiropractic	408 NW 7th St	Corvallis	OR	97330	621310	Chiropractors DC
Hise Studio	127 NW 2nd St	Corvallis	OR	97330	541921	Photographers-Portrait
University Honda	2150 NW 9th St	Corvallis	OR	97330-1553	441110	New Car Dealerships
Bentley, Jeffery, Lee	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621399	Offices of All Other Miscellaneous Health Practitioners
Thayer Construction	5460 SW Philomath Blvd	Corvallis	OR	97333-2095	236115	New Single-Family Housing Construction (except Operative Builders)
Good Samaritan Regional Medical Center	3600 NW Samaritan Dr	Corvallis	OR	97330	622110	Hospitals
Paragon Realty	6300 SW Reservoir Ave	Corvallis	OR	97333	237210	Property Management-Commercial
Juicys Conscious Concessions	NULL	Corvallis	OR	NULL	711190	Concessionaires
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621391	Podiatrists
7-Eleven	746 NW Kings Blvd	Corvallis	OR	97330	445131	Convenience Stores
Le Patissier	956 NW Circle Blvd	Corvallis	OR	97330	722511	Restaurants
Samaritan Obstetrics & Gyn	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Smith, Angelo, Armani	845 SW 30th St	Corvallis	OR	97331	621399	Physicians Assistants
Wise, Heidi, Lynn	850 SW 26th St	Corvallis	OR	97331-8624	621340	Physical, occupational, speech therapists and audiogists' clinics
Investment Realty Inc	510 NW 3rd St	Corvallis	OR	97330	531210	Real Estate Investments
Find-A-Physician	444 NW Elks Dr	Corvallis	OR	97330	621999	Physicians & Surgeons Information Bureau
Blackledge Furniture Co	233 SW 2nd St	Corvallis	OR	97333	236118	Home Improvements
Gutierrez, Stephanie D PA	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Wairiri, Loise W MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hughes, Dana, K	971 NW Spruce Ave	Corvallis	OR	97330	621340	Physical Therapists
Corvallis Broadband	561 NW Monroe Ave	Corvallis	OR	97330	518210	Data Processing, Hosting, and Related Services
Ncasi	720 SW 4th St	Corvallis	OR	97333	813319	Non-Profit Organizations
Presbyterian Preschool & Child	114 SW 8th St	Corvallis	OR	97333	624410	Child Care Service
Sankar, Lakshna, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Integrated Plant Protection Center	2040 Cordley Hall	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Bender, Leila, Clark, MD	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Star Nails & Spa	2081 NW Buchanan Ave	Corvallis	OR	97330	812113	Manicuring
Vincent, John, Theodore, MD	3079 NW Snowberry Pl	Corvallis	OR	97330	621111	Physicians & Surgeons
Small World School	1924 NW Division St	Corvallis	OR	97330	624410	Child Care Service
Becker, Pamela A	910 NW Kings Blvd	Corvallis	OR	97330	621330	Pharmacists
Servants Fellowship EFC	2435 NW Harrison Blvd	Corvallis	OR	97330	813110	Churches
Fields, Sandi, Lazette, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Smile Booth	420 NW 14th St	Corvallis	OR	97330	621210	Dentists
Jerry's Precision Muffler	828 NW Buchanan Ave	Corvallis	OR	97330	811114	Mufflers & Exhaust Systems-Engine
Cork & Bottle Shoppe	1875 NW 9th St	Corvallis	OR	97330	445320	Liquors-Retail
SNOWFOX	2335 NW Kings Blvd	Corvallis	OR	97330	722513	Food Service Kiosk

Remarkablearts	460 SW Madison Ave	Corvallis	OR	97333	459920	Art Galleries & Dealers
Red Hat Construction	560 SW B Ave	Corvallis	OR	97333	236115	General Contractors
U-Haul Neighborhood Dealer	1430 NW 9th St	Corvallis	OR	97330	532120	Truck Renting & Leasing
Erickson, Angela	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Magloire, Thamara, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
County-Benton Human Resources	408 SW Monroe Ave	Corvallis	OR	97333	541612	Human Resource Consultants
Benton County	205 NW 5th St	Corvallis	OR	97330-4808	921190	Other General Government Support
Dar's Barber Shop	693 SW 15th St	Corvallis	OR	97333	812111	Barbers
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Afternoon Toxicology Consulting	991 NE Kirsten Pl	Corvallis	OR	97330-6822	999990	Unclassified Establishments
Eastgate Business Center	33900 SE Eastgate Cir	Corvallis	OR	97333-2256	531120	Landlords of Nonresidential Buildings (except Miniwarehouses)
Ross, Dana	1005 NW 30th St	Corvallis	OR	97330	541690	Scientists-Consulting
Aspire Implants & Periodontics	2175 NW Professional Dr	Corvallis	OR	97330-3886	621210	Dentists' clinics
Front Line Ministries Inc	7920 NW Skillings Dr	Corvallis	OR	97330	813110	Religious Organizations
Allied Van Lines	155 SE Lilly Ave	Corvallis	OR	97333	484110	Movers
Huerta-Luna, Ileen	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Harkness, Sara E DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Roberts, Tarah L PA	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Applebee's Grill + Bar	1915 NE Four Acre St	Corvallis	OR	97330	722511	Restaurants
Superette Market & Deli	2531 NW Monroe Ave	Corvallis	OR	97330	445110	Grocers-Retail
Ornong, Deana Anela	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Shari's-Corvallis	1117 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Harrower, Heather	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Farmers Insurance-Michael Baughman	435 NW 5th St	Corvallis	OR	97330-6492	524210	Insurance Agencies and Brokerages
A1 Charlie's Towing Service	3444 SW 3rd St	Corvallis	OR	97333-9240	488410	Motor Vehicle Towing
Corvallis Bookkeeping Service	903 NW Beca Ave	Corvallis	OR	97330-4501	541219	Accountants' (except CPAs) services
Perez, Stevi N	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Roden, Holly Renee RN	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
Mago, Aitofi G	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Dahlke, Tracee, Jon	320 SW 2nd St	Corvallis	OR	97333	621399	Nurses-Practitioners
Powell Construction	2025 SE 3rd St	Corvallis	OR	97333-1727	236115	New Single-Family Housing Construction (except Operative Builders)
Onami	NULL	Corvallis	OR	NULL	541720	Historical Research
Dr William Simonson	7777 NW Oxbow Dr	Corvallis	OR	97330	541199	Legal Services
Washington Street Liquor	575 SW Washington Ave	Corvallis	OR	97333	445320	Beer & Ale-Retail
Spectrum CPA	NULL	Corvallis	OR	NULL	541211	Accountants
Lubejko, Lauren, Anne	530 NW 27th St	Corvallis	OR	97330	621399	Physicians Assistants
Youtopia Skin Care LLC	929 NW Grant Ave	Corvallis	OR	97330	812112	Skin Treatments
Fiserv	4500 SW Research Way	Corvallis	OR	97333	518210	Data Processing Service
Ebert, Daniel, DO	5234 SW Philomath Blvd	Corvallis	OR	97333	621111	Physicians & Surgeons
Samaritan Internal Medicine	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
LibertyX Bitcoin ATM	503 SW 3rd St	Corvallis	OR	97333	523160	Virtual Currency Conversion Kiosk/ATM
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rosendahl, Nicolette, DO	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Doster, Cassandra	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Odens, Tyler DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Beautiful Savior Lutheran Church	2605 NW 13th St	Corvallis	OR	97330	813110	Churches
Pageplus	NULL	Corvallis	OR	97330	492210	Local Messengers and Local Delivery
Hyde, Russell, W, DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Benton Center	757 NW Polk Ave	Corvallis	OR	97330-6379	611310	Schools offering baccalaureate or graduate degrees
Crystal Lake Storage	100 SE Crystal Lake Dr	Corvallis	OR	97333-1258	531130	Landlords of Miniwarehouses and Self-Storage Units
Upe LLC	4987 SW Roseberry St	Corvallis	OR	97333	999990	Nonclassified Establishments
Samaritan Cardiovascular Surgery	3600 NW Samaritan Dr	Corvallis	OR	97330-5472	621111	Physicians' clinics
SCORE Mentors Salem	922 NW Circle Blvd	Corvallis	OR	97330	926110	Federal Government-Economic Program Administration
Insights Now	2101 NE Jack London St	Corvallis	OR	97330	541613	Marketing Programs & Services
Bell, Jessica M	400 NW Walnut Blvd	Corvallis	OR	97330	621399	Physicians Assistants
OSU-Student Experience Center	2251 SW Jefferson Way	Corvallis	OR	97321	611310	University-College Dept/Facility/Office

FHC Faith, Hope, & Charity, Inc	460 SW Madison Ave	Corvallis	OR	97333	813319	Non-Profit Organizations
Copeland, Janet	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
North Point Dental Group PC	2222 NW Lincoln Ave	Corvallis	OR	97330	621210	Dentists
Buck, Brie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Chebbo, Ahmad, Nazih, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
China Blue Restaurant	2307 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Groom, Jeremiah	1975 SE Crystal Lake Dr	Corvallis	OR	97333	541690	Scientists-Consulting
Arby's	2503 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Hamlin Consulting LLC	3830 NE Highway 20	Corvallis	OR	97330	541618	Consultants-Business NEC
Geomobile Innovations	456 SW Monroe Ave	Corvallis	OR	97333	519290	Information & Referral Svcs
Orsborn, Mollyann	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Cisneros, Jon Joseph	444 NW Elks Dr	Corvallis	OR	97330	621399	Psychologists
House Call Pet Service LLC	NULL	Corvallis	OR	NULL	541940	Veterinarians
Brandis Family Holdings LLC	6300 SW Reservoir Ave	Corvallis	OR	97333	551112	Holding Companies (Non-Bank)
Professional Clothing Alterations	1341 NW Dixon St	Corvallis	OR	97330	459510	Childrens & Infants Wear-Used
Bayne, Tabitha	444 NW Elks Dr	Corvallis	OR	97330	621399	Physicians Assistants
Community Health Ctr-Benton	121 SE Viewmont Ave	Corvallis	OR	97333	621111	Physicians & Surgeons
Tunnel Radio	6435 Hyslop Rd	Corvallis	OR	97330	516110	Radio Stations & Broadcasting Companies
Max Command	370 SW Western Blvd	Corvallis	OR	97333	999990	Nonclassified Establishments
Knight, James, C, III MD	3600 NW Samaritan Dr	Corvallis	OR	97330-5472	621111	Physicians' clinics
Burgerville	2300 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Ken Fisher Auto & Truck Repair Inc	2645 SE 3rd St	Corvallis	OR	97333	811111	Automobile Repairing & Service
Dig It Fencing LLC	NULL	Corvallis	OR	97330	423390	Fence (Whls)
Clodfelters Pub	1501 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Destroy the Box Designs LLC	561 NW Van Buren Ave	Corvallis	OR	97330	722511	Restaurants
Cardiopulmonary Medicine	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Subaru of Corvallis	800 NW 5th St	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Cross Town Movers	NULL	Corvallis	OR	NULL	484110	Movers
Reader, Jordan Mark DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Knights of Columbus	501 NW 25th St	Corvallis	OR	97330	813410	Fraternal Organizations
GNC	2317 NW Kings Blvd	Corvallis	OR	97330	456191	Vitamin & Food Supplements
Monte, Kenneth A DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Woodstock's Pizza Parlor	1045 NW Kings Blvd	Corvallis	OR	97330	722511	Pizza
Cain, Ryan, Lee	441 NW Elks Dr	Corvallis	OR	97330	621399	Physicians Assistants
Plant Health Inc	5480 NW Belhaven Dr	Corvallis	OR	97330	541320	Landscape Designers
Corvallis Chamber of Commerce	420 NW 2nd St	Corvallis	OR	97330	813910	Chambers Of Commerce
Regional School of Ballet	120 SW 3rd St	Corvallis	OR	97333	711510	Entertainers
Forks & Corks Catering	1324 NW 9th St	Corvallis	OR	97330	722320	Caterers
Samaritan Internal Medicine	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Best Western Corvallis	925 NW Garfield Ave	Corvallis	OR	97330-2115	721110	Lodging
Oak Craft Manufacturing	7269 NE Birch Ln	Corvallis	OR	97330	337122	Furniture-Designers & Custom Builders
Samaritan Neurosurgery	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dodge, Cleon N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Warnock, Tracy, Faith	4455 NE Highway 20	Corvallis	OR	97330	624190	Marriage & Family Counselors
St Clair, Justus	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Allio, Bryce A MD	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon Game Project Challenge	990 NW Conifer Blvd	Corvallis	OR	97330	459120	Games & Game Supplies
Oregon Traveling Tours LLC	4494 NW Crocus Pl	Corvallis	OR	97330	561520	Tours-Operators & Promoters
Gehr-Seloover, Alia, A	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Valley Eye Care	1505 NW Harrison Blvd	Corvallis	OR	97330	621320	Optometrists OD
Corvallis Physical Therapy	230 SW 3rd St	Corvallis	OR	97333	621340	Physical Therapists
Town & Country Realty	455 NW Tyler Ave	Corvallis	OR	97330	531210	Real Estate
Timberhill Tennis Club	2775 NW 29th St	Corvallis	OR	97330	713940	Tennis Courts-Private
American Chemical Society	Dept Of Chem 153 Gilbert Hall Osu	Corvallis	OR	97331	813410	Educational Associations
Watkins, Hope, Elisabeth	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Greenberry Industrial	2273 NW Professional Dr	Corvallis	OR	97330	332312	Steel-Structural (Mfrs)

Woessner, Emelyne M	260 SW Madison Ave	Corvallis	OR	97333	621399	Psychologists
9th St Salon & Spa	1746 NW 9th St	Corvallis	OR	97330	812112	Beauty Salons
McNeeley Mark Painting	2745 SE Thompson St	Corvallis	OR	97333	238320	Painters
McQuade, Cynthia Ann	2075 NW Grant Ave	Corvallis	OR	97330	621330	Social Workers
Hume, Rosemary I	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Troyer, Kirsti	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Audio Files	2517 NW 9th St	Corvallis	OR	97330	449210	Stereophonic & High Fidelity Equip-Dlrs
Lefay, Sydney, Marie, DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Panda Express	2501 SW Jefferson Way	Corvallis	OR	97331-1101	722511	Full-Service Restaurants
Bottorff, Patrick	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton Community Health Center	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Jessica Walker Wyse-Movement Mortgage	2851 NW 9th St	Corvallis	OR	97330	522292	Real Estate Loans
Employment Division	545 SW 2nd St	Corvallis	OR	97333	624310	Government-Job Training/Voc Rehab Svcs
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330-3785	621399	Offices of All Other Miscellaneous Health Practitioners
Van Tress, Jeremy, Jon	815 NW 9th St	Corvallis	OR	97330-6173	621330	Psychoanalysts' clinics (except MDs and Dos)
Wenger Construction LLC	7175 SW Philomath Blvd	Corvallis	OR	97333	237990	Construction Management
Stability Engineering Inc	777 NE 2nd St	Corvallis	OR	97330-6200	541330	Engineers' offices
Rubberstampmadness Inc	216 SW Madison Ave	Corvallis	OR	97333-4721	513120	Periodical Publishers
Mini Natural Farm	9035 NW Arboretum Rd	Corvallis	OR	97330	999990	Nonclassified Establishments
Ten Rivers Food Web Was Inc	NULL	Corvallis	OR	NULL	624190	Marriage & Family Counselors
Samaritan Gynecology & Surgical Associates	400 NW Walnut Blvd	Corvallis	OR	97330-3876	621111	Physicians' clinics
Xerox Business Solutions West	215 NW Jackson Ave	Corvallis	OR	97330	423420	Copying & Duplicating Machines & Supls
Agricultural Research Service Science	618 Kerr Administration Bldg	Corvallis	OR	97331-8565	926140	Regulation of Agricultural Marketing and Commodities
Moore, Jill M MD	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Albany Duplicate Bridge Club	6222 NW Survista Ave	Corvallis	OR	97330	813410	Clubs
Smaritian Plastic Reconstructive & Hand Surgery	966 NW Circle Blvd	Corvallis	OR	97330	621399	Nurses-Registered RN
Pro Works	517 SW 2nd St	Corvallis	OR	97333	541511	Software/Application/Platform Developers & Programmers
Corvallis Acupuncture & Functional Medicine, LLC	1760 SW 3rd St	Corvallis	OR	97333	621399	Acupuncture
Guiliano Lichy, Erin E DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Coinstar	590 NE Circle Blvd	Corvallis	OR	97330	541990	Coin & Bill Counting/Sorting Svc Kiosks
Oregon State University Foundation	4238 SW Research Way	Corvallis	OR	97333	541720	Foundation-Educ Philanthropic Research
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Pro-Tech Alarm Sales & Service	NULL	Corvallis	OR	97330	423610	Security Control Equip & Systems-Whls
Northwest Health & Healing Center	999 NW Circle Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Davis, Cynthia R	501 NW Elks Dr	Corvallis	OR	97330	621340	Physical Therapists
Corvallis Clinic the Corvallis	NULL	Corvallis	OR	97330	621111	Physicians' clinics
Copack	720 NE Granger Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
White, Justin, Wayne	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Kelleher, Shannon R	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Kirby, Amelia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
AmeriGas Propane Exchange	450 SW 3rd St	Corvallis	OR	97333	457210	Propane Tank Kiosks
Premier Systems Carpet	302 NE Plymouth Cir	Corvallis	OR	97330	561740	Carpet & Rug Cleaners
Coinstar	5270 SW Philomath Blvd	Corvallis	OR	97333	541990	Coin & Bill Counting/Sorting Svc Kiosks
Corvallis Family Medicine	2400 NW Kings Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Kiefer Nissan of Corvallis	900 NW 4th St	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Corvallis Radiology	2314 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Hendrickson, Mackenzie A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Trimmer Engineering	2484 NW Maser Dr	Corvallis	OR	97330	541330	Engineers-Consulting
K9 Kountry Grooming	5280 NW Highway 99	Corvallis	OR	97330	812910	Pet Washing & Grooming
Hemophilia Foundation of Oregon	456 SW Monroe Ave	Corvallis	OR	97333-4781	541720	Sociology research and development (R&D)
Rylaarsdam, Andrew, David, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rise Marshall Arts	1750 SW 3rd St	Corvallis	OR	97333	611620	Martial Arts Instruction
KeyMe	777 NW Kings Blvd	Corvallis	OR	97330	561622	Key Duplicating Service Kiosks
Hilberg, Beth, Alyne	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Smith Glass	544 SW 4th St	Corvallis	OR	97333	238130	Patio Doors-Suppliers & Installers
Santoni, Megan	845 SW 30th St	Corvallis	OR	97331	621399	Physicians Assistants

Fenton, Kayla, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Avis	1070 NE Circle Blvd	Corvallis	OR	97330-4241	532111	Car Rental Agencies
Tirado, Erica DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
OnPoint Community Credit Union	777 NW Kings Blvd	Corvallis	OR	97330-5620	522130	Credit Unions
David Ispas Realtor-Town	455 NW Tyler Ave	Corvallis	OR	97330	531210	Real Estate
Blue Rhino	1555 SW 53rd St	Corvallis	OR	97333	457210	Propane Tank Kiosks
Thomas, Sara, Lee	2397 NW Kings Blvd	Corvallis	OR	97330	621399	Dietitians
Kutsch, Kristopher, Michael	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Eastwood, Alexis	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Osborn Aquatic Center	1940 NW Highland Dr	Corvallis	OR	97330	713940	Swimming Pools-Public
Vega, Jessica, Christine	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Allann Bros Beanery Caf+	2541 NW Monroe Ave	Corvallis	OR	97330	722515	Coffee Shops
Farmers Insurance-Veronica Hennessey	620 NW Van Buren Ave	Corvallis	OR	97330-4846	524126	Property Insurance
Samatitam Medical Center	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
AmeriGas Cylinder Propane Refill	1245 SE 3rd St	Corvallis	OR	97333	457210	Gas-Propane-Refilling Stations
Lopez, Norma	4455 NE Highway 20	Corvallis	OR	97330	624190	Marriage & Family Counselors
Dairy Queen Grill & Chill	303 SW 3rd St	Corvallis	OR	97333-4626	722511	Full-Service Restaurants
Emerald National Laboratory	132 SW 4th St	Corvallis	OR	97333	541714	Laboratories
Macdow, Rebecca, OD	1597 SW 53rd St	Corvallis	OR	97333	621320	Optometrists OD
Holland Smith	2200 NW 9th St	Corvallis	OR	97330-1793	541110	Attorney Offices/Private Practices
Black Stone Physical Medicine	2314 NW Kings Blvd	Corvallis	OR	97330-3925	621511	Medical labs
Naegle, Helen T	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Bob's Mirror & Glass	445 SW 2nd St	Corvallis	OR	97333-4445	449129	All Other Home Furnishings Retailers
Jacobs Engineering Group Inc	725 SW 26th St	Corvallis	OR	97331	541330	Engineers-Consulting
Corvallis School District 509J	1555 SW 35th St	Corvallis	OR	97333-1130	611110	Elementary, middle and high schools
Newhart, Bradley T PA	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Samaritan Corvallis Mammography	3615 NW Samaritan Dr	Corvallis	OR	97330	621512	Diagnostic Imaging Centers
Mower Repair Guy	NULL	Corvallis	OR	97330	811411	Lawn Mowers-Sharpening & Repairing
McDonald's	300 NW 3rd St	Corvallis	OR	97330	722511	Restaurants
River Center	4000 SW Western Blvd	Corvallis	OR	97333	813110	Churches
Benton County Finance Department	4077 SW Research Way	Corvallis	OR	97333	921120	Government Offices-County
Wu, Erin	530 NW 27th St	Corvallis	OR	97330	621330	Pharmacists
Jackson, Bethany, D	530 NW 27th St	Corvallis	OR	97330	621399	Dental Hygienists
Meek, Tiffany	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hanks, Kourtney, L	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Midwives
Upperleft	459 SW Madison Ave	Corvallis	OR	97333	425120	Maps-Publishers & Distrs (Whls)
Lock Pro	NULL	Corvallis	OR	NULL	561622	Locks & Locksmiths
Illuminailtions	3425 NE Canterbury Cir	Corvallis	OR	97330	812113	Manicuring
Claywell, Jordan N	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Stalmann, Courtney K	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Edwards, Renee NP	656 NW Mirador Pl	Corvallis	OR	97330	621399	Nurses-Practitioners
G & J Auto Center	355 NW 3rd St	Corvallis	OR	97330	811111	Automobile Repairing & Service
First Presbyterian Church	114 SW 8th St	Corvallis	OR	97333	813110	Churches
Legacy ATM of Oregon	3173 NW Foxtail Pl	Corvallis	OR	97330	423420	ATM Sales & Service (Whls)
Limbwalker Tree Care Co	NULL	Corvallis	OR	NULL	561730	Tree Service
Oregon State University Student Health Services	850 SW 26th St	Corvallis	OR	97331-8624	621111	Physicians' clinics
Winstead, Sydney	3600 NW Samaritan Dr	Corvallis	OR	97330	621340	Physical Therapists
Arredondo, Jose	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Crowbar	214 SW 2nd St	Corvallis	OR	97333	722511	Restaurants
Adler, Benjamin A MD	4455 NE Highway 20	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Health Services	777 NW 9th St	Corvallis	OR	97330-6169	621111	Physicians' clinics
Chavira, Aaron M DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Umpqua Bank	415 NW 3rd St	Corvallis	OR	97330	522110	Banks
Hassouneh, Samia DMD	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Oregon Anesthesiology Group	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
U.S. Bank Branch	2501 SW Jefferson Way	Corvallis	OR	97331	522110	Banks

Alexander PTL LLC	560 SW B Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Pta Oregon Congress	110 SE Alexander Ave	Corvallis	OR	97333	813910	Associations
Perks Cleaning Service	4185 NW Walnut Pl	Corvallis	OR	97330	561720	Janitor Service
Samcare Express	990 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Arnold, Bryce L DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
National Intramural Recreational	4185 SW Research Way	Corvallis	OR	97333	541690	Recreation Program Consultants
White, Sabrina C	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Paz, Julia, L, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ball Studio	564 SW Adams Ave	Corvallis	OR	97333	541921	Photographers-Portrait
Taylor, Shaloma, Rose, CNM	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Midwives
Translations.com Inc	127 SW 4th St	Corvallis	OR	97333-4711	541930	Language interpretation/translation services
Alpha Omega Computer Systems	1032 NW 36th St	Corvallis	OR	97330	449210	Computer & Equipment Dealers
Daryl B Downey MD	2075 NW Grant Ave	Corvallis	OR	97330	621111	Physicians & Surgeons
McDonald-Dunn Forest	NULL	Corvallis	OR	97331	712190	Nature Reserves
Arc of Benton County	928 NW Beca Ave	Corvallis	OR	97330	813319	Non-Profit Organizations
Herrick, Violet, Ann	455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Wan Wan Walkers	3930 NW Witham Hill Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Anslow, Nellyda M NP	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Crider, Carly A DO	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Work Un Ltd	150 SW Monroe Ave	Corvallis	OR	97333-7229	513210	Software Publishers
Stoneybrook Senior Living	4650 SW Hollyhock Cir	Corvallis	OR	97333	623312	Residential Care Homes
Oregon Society of Radiologic	NULL	Corvallis	OR	NULL	999990	Nonclassified Establishments
Sarah Anderson-Wilk MSW	2005 NW Grant Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Gawn, Hailey M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Judson's Plumbing Inc	939 NW Circle Blvd	Corvallis	OR	97330-1409	238220	Plumbing, Heating, and Air-Conditioning Contractors
Worsham, Myles	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Luczkiw, Laura	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Rogers, Lynn RN	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
El Patron Mexican Restaurant	1110 NW 2nd St	Corvallis	OR	97330	722511	Restaurants
Luna Design & Construction	1709 NE Conifer Blvd	Corvallis	OR	97330	236115	Home Builders
Chippewa Kennel LLC	28304 Holder Ln	Corvallis	OR	97333	812910	Pet Boarding Sitting & Kennels
First Church of Christ Scientist	310 NW 16th St	Corvallis	OR	97330	813110	Churches
Evitts, Matthew, P, DO	1760 SW 3rd St	Corvallis	OR	97333	621111	Physicians & Surgeons
Dr Leslie Berman DC	2438 NW Professional Dr	Corvallis	OR	97330-3991	621310	Chiropractors' clinics
Stock Market	300 SW 4th St	Corvallis	OR	97333-4623	445131	Convenience Retailers
Golden Naga Martial Arts Center	857 SW Western Blvd	Corvallis	OR	97333	611620	Martial Arts Instruction
DISH Network	NULL	Corvallis	OR	97330	516120	Television-Cable & Catv
Corvallis Plumbing Inc	29000 Tampico Rd	Corvallis	OR	97330	238220	Plumbing Contractors
Batteries Plus Bulbs	1755 NW 9th St	Corvallis	OR	97330	441330	Batteries-Storage-Retail
Jeanne Smith & Associates	104 SW 2nd St	Corvallis	OR	97333	541110	Attorneys
Kaady Car Wash	1811 NW 9th St	Corvallis	OR	97330	811192	Car Washing & Polishing
Spinware	1869 NW 9th St	Corvallis	OR	97330	517112	Cellular Telephones (Services)
Fueled LLC	7276 SE Berg Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Rivas Taco Shod	360 NW 5th St	Corvallis	OR	97330	722511	Restaurants
Ogd Consulting PC	NULL	Corvallis	OR	97330	541330	Engineers-Geotechnical
Saif, Syed, Saad	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sara A Austin P C	2363 NW Grant Ave	Corvallis	OR	97330	621210	Dentists
The Bark Place Inc	6725 SW Philomath Blvd	Corvallis	OR	97333	327991	Cut Stone & Stone Products (Mfrs)
Cornerstone Associates Inc	1445 SE Crystal Lake Dr	Corvallis	OR	97333-1203	624120	Services for the Elderly and Persons with Disabilities
Corvallis Academy of Ballet	108 NW 2nd St	Corvallis	OR	97330	611610	Dancing Instruction
Jennifer Brown DO LLC	975 NW Spruce Ave	Corvallis	OR	97330	621111	Physicians & Surgeons
SS EQ Inc	NULL	Corvallis	OR	NULL	999990	Nonclassified Establishments
Long Realty LLC	33201 SE Peoria Rd	Corvallis	OR	97333	531210	Real Estate Management
Denning, Shannon, Lynne	4170 SW Research Way	Corvallis	OR	97333	624190	Counselors
Oak Vale Apartments	3930 NW Witham Hill Dr	Corvallis	OR	97330	531110	Apartments

Community Services Consortium	536 SW 2nd St	Corvallis	OR	97333	541990	Services NEC
Thai Express	1335 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Geiger, Trevor, RN	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Registered RN
Baumgartner, Natalie F	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hazadapt, Inc	3200 SE Midvale Dr	Corvallis	OR	97333	519290	Information & Referral Svcs
Rogers, Thomas M ND	442 NW 4th St	Corvallis	OR	97330	621399	Physicians-Naturopathic
Beaver Pads	260 SW Madison Ave	Corvallis	OR	97333-4739	999990	Unclassified Establishments
Alvarado, Magnus	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Rybolt, Dawn	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
Gienger, Daniel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Willamette Woodworks Inc	7241 NW Madrone Way	Corvallis	OR	97330	238350	Woodworkers
S & J Corvallis, LLC	202 SW 1st St	Corvallis	OR	97333	541110	Attorneys
Amazon Locker	2501 SW Jefferson Way	Corvallis	OR	97331	541860	Mailing & Shipping Kiosks
Mistry Investments, LLC	5995 NE Elliott Cir	Corvallis	OR	97330	561621	Security Systems
Leupitzpest Control	NULL	Corvallis	OR	97330	561710	Pest Control
Fitness Over 50	6735 SW Country Club Dr	Corvallis	OR	97333-1987	713940	Gymnasium (gym)
American Dream Pizza	214 SW 2nd St	Corvallis	OR	97333	722511	Pizza
Superior Carpet Cleaning-Air	621 SW 11th St	Corvallis	OR	97333-4247	561740	Furniture cleaning services
Baguette	121 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Steve's Lock Pro	4001 SW Western Blvd	Corvallis	OR	97333	236118	Home Improvements
Willamette Investment Advisors	520 NW Oak Ave	Corvallis	OR	97330	523910	Investments
Uncommon Cabinetry Inc	6842 SW Plymouth Dr	Corvallis	OR	97333	337110	Cabinets-Manufacturers
Qigong Association of America	310 NW 5th St	Corvallis	OR	97330	812191	Health & Fitness Program Consultants
Sam's Station	1210 NW 29th St	Corvallis	OR	97330	445298	Coffee & Tea
Dorr, Taylor	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Summit Orthotics & Prosthetics	2851 NW 9th St	Corvallis	OR	97330-3898	456199	All Other Health and Personal Care Retailers
Stukey, Kiera, T	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Muddy Creek Charter School	30252 Bellfountain Rd	Corvallis	OR	97333-9524	611110	Elementary, middle and high schools
Ravi Chikkalingaiah MD PC	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hina Collective	2517 NW 9th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Simpson, Emma, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hood Szivek, Pamela	1650 SW 45th Pl	Corvallis	OR	97333	621340	Physical Therapists
Sorenson, Jodi K NP	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Benton Community Health Center	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Padilla, Jariko, N	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Little Beavers Preschool	4940 NW Highway 99	Corvallis	OR	97330-9487	624410	Nursery schools
Sranna, Ramanjit K	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Timberhill Rentals LLC	3627 NW Oleander Pl	Corvallis	OR	97330	532310	Rental Service-Stores & Yards
Kimberley & Daniel Golletz	1300 NW Harrison Blvd	Corvallis	OR	97330	621399	Psychologists
Rotary International	NULL	Corvallis	OR	NULL	813410	Civic Organizations
Mid Valley Poker Inc	1750 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Pavlosek, Libor, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Honey Comb Hair Salon	355 SW Madison Ave	Corvallis	OR	97333	812112	Beauty Salons
Custom Computer Services	1180 NW Overlook Dr	Corvallis	OR	97330	449210	Computer & Equipment Dealers
Wilt Farms	31567 Highway 99W	Corvallis	OR	97333	111998	Farms
Corvallis Clinic	2350 NW Century Dr	Corvallis	OR	97330-3495	621340	Physical, occupational, speech therapists and audiogists' clinics
Luca Corvallis LLC	4035 NE Fair Acres Dr	Corvallis	OR	97330	999990	Nonclassified Establishments
Grant Avenue Pre-School	1625 NW Grant Ave	Corvallis	OR	97330	624410	Schools-Pre-School/Kindergarten-Academic
Juniper Beauty	728 NW 4th St	Corvallis	OR	97330-6415	812112	Beauty Shops
Pin, Caitlyn	530 NW 27th St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Crest Properties Inc	2604 NW Garryanna Dr	Corvallis	OR	97330	531110	Apartments
Backcountry Fly Fishing Guide	900 NW Kings Blvd	Corvallis	OR	97330	459110	Fishing Tackle-Dealers
CrossFit Train 97333	1780 SW 3rd St	Corvallis	OR	97333	713940	Health Clubs Studios & Gymnasiums
Oregon State Univ SCH of Chem Biological & Environ Engrng	103 Gleeson Hall	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Studio 311	215 SW 2nd St	Corvallis	OR	97333-4633	339910	Jewelry and Silverware Manufacturing(Unclassified)
Giles, Michael, Dean	456 SW Washington Ave	Corvallis	OR	97333	621340	Physical Therapists

A & S Accounting	316 SW Washington Ave	Corvallis	OR	97333-4406	541211	Accountants/CPAs offices/private accounting practices
Tezcan, Haluk, MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Copy Center	905 NW Kings Blvd	Corvallis	OR	97330	561439	Copying & Duplicating Service
P K Furniture Repair & Refinishing	5270 NW Highway 99	Corvallis	OR	97330	811420	Furniture-Repairing & Refinishing
Heather Webster-Henry LMFT	260 SW Madison Ave	Corvallis	OR	97333-4739	621399	Offices of All Other Miscellaneous Health Practitioners
Ants on A Log Cafe	401 SW Jefferson Ave	Corvallis	OR	97333	445298	Coffee & Tea
Benton Bowmen Archery Club	NULL	Corvallis	OR	NULL	459110	Archery Equipment & Supplies
Womack, Mialee	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Lissman, Thomas, L, MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Mitchell, Dara B MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon State University Alumni Association	204 CH2M Hill Alumni Ctr	Corvallis	OR	97331	813410	Universities/Colleges-Alumni Assn/Club
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dennis-Walker, Tayah, Alexis	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
NG, Janet	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Monroe Avenue Dental Care	853 NW Monroe Ave	Corvallis	OR	97330-6352	621210	Dentists' clinics
Renaissance Code Development	310 NW 5th St	Corvallis	OR	97330	541511	Software/Application/Platform Developers & Programmers
Crevola, Amy Ruth	980 NW Spruce Ave	Corvallis	OR	97330	624190	Counselors
Griffo Brothers Ironmonger Works	744 NW 9th St	Corvallis	OR	97330-6139	811111	Car repair shops
Barber, Erin, DMD	1769 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Ransom, Laurel	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Silbernagel, Olivia G	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Local Boyz Hawaiian Cafe	1425 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Zinkus Consulting Group	2229 NW Kinderman Dr	Corvallis	OR	97330	541618	Consultants-Business NEC
Cochran, Raymond J	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Chameleon Communications Inc	1000 NE Circle Blvd	Corvallis	OR	97330	517810	Communications Services NEC
Samaritan Mental Health Family	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wolpoe, Matthew, E, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Enoch-Wysham, Bryce, William	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Soriano, Katrina, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Manner	160 NE Conifer Blvd	Corvallis	OR	97330	621340	Physical Therapists
Top Dawg Painting Co	NULL	Corvallis	OR	97330	238320	Painters
College of Public Health and Human Science	160 SW 26th St	Corvallis	OR	97331-8618	621999	Miscellaneous health care providers
Animal Crackers Pet Supply	949 NW Kings Blvd	Corvallis	OR	97330-2504	459910	Pet and Pet Supplies Retailers
Hart, Ryushin	865 NW Reiman St	Corvallis	OR	97330	624190	Counselors
Advantage Accounting LLC	260 SW Madison Ave	Corvallis	OR	97333-4739	541219	Accountants' (except CPAs) services
Schumacher, Shawn D MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Canvas Enclosures Now	2511 NW 9th St	Corvallis	OR	97330-1536	236118	Residential Remodeling Contractors
Estupinian, Edwar J	139 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Brinckerhoff, Tatiana, Zupekan, MD	777 NW 9th St	Corvallis	OR	97330-6169	621111	Physicians' clinics
David Evans & Associates	1128 NE 2nd St	Corvallis	OR	97330	541330	Engineers-Consulting
Superior Lawn Care	NULL	Corvallis	OR	97330	561730	Lawn & Grounds Maintenance
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Olson, Jennifer MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton Soil & Water Conservation District	136 SW Washington Ave	Corvallis	OR	97333	999990	Federal Government Contractors
Good Samaritan Regional Medical Center	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hang' N Healthy	211 SW 2nd St	Corvallis	OR	97333	621999	Health Services
Ueng, Timothy MD	5234 SW Philomath Blvd	Corvallis	OR	97333	621111	Physicians & Surgeons
National Society of the Daughters of the American Revolution	2780 NW 29th St	Corvallis	OR	97330	813410	Fraternal Organizations
Davis, Bridgett M	1760 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Tomlinson, Sara	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Spitz, Aleysa D	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Geomobile Innovations Inc	2006 NW Brownl	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
AMC CLASSIC Corvallis 12	750 NE Circle Blvd	Corvallis	OR	97330-4207	512131	Cinemas
Samaritan Neurosurgery	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Barros, Fiona, Justine H	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
The Red Fox Cafe	2305 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants

Oregon State University Press	102 Adams Hall	Corvallis	OR	97331	513120	Periodicals-Publishing & Printing (Mfrs)
South Corvallis Food Bank	1800 SW 3rd St	Corvallis	OR	97333	624210	Food Banks
Gale Technologies LLC	223 SW 8th St	Corvallis	OR	97333-4544	541511	Computer Programming and Software Development Services
Merle Norman Cosmetic Studio	922 NW Circle Blvd	Corvallis	OR	97330	456120	Cosmetics & Perfumes-Retail
Zion Lutheran School	2800 NW Tyler Ave	Corvallis	OR	97330	611110	Schools
Market of Choice	922 NW Circle Blvd	Corvallis	OR	97330	445110	Grocers-Retail
Williams, Michaela	996 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Corvallis Sport & Spine Physical Therapy	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Heilig Misfeldt & Armstrong	310 NW 7th St	Corvallis	OR	97330	541110	Attorneys
Corvallis Clinic	2350 NW Century Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Vineyard Mountain Park & Recreation District	1420 NW Worden Cir	Corvallis	OR	97330	111332	Vineyards
Neumann, Kaylee A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Budd, Kara, Diane Rae	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Gentle Dental Corvallis	1830 NW 9th St	Corvallis	OR	97330	621210	Dentists
UPS Drop Box	2396 NW Kings Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Pacifica Coffee Ltd	NULL	Corvallis	OR	NULL	424490	Coffee & Tea-Wholesale
Olsen, Jessica L	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Pratzner Dinsm, Donna Lee	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Community Outreach, Inc.	865 NW Reiman St	Corvallis	OR	97330	531311	Housing Authorities
E & S Environmental Chemistry Inc	2161 NW Fillmore Ave	Corvallis	OR	97330	541620	Environmental Consulting Services
Revolve	103 SW 2nd St	Corvallis	OR	97333	459510	Consignment Shops
O'Daniel, Annmarie	230 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Mercer, Kent J PAC	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Halcyon Painting	116 NW 3rd St	Corvallis	OR	97330	238320	Painters
Beaver Plumbing & Heating Inc	946 NW Circle Blvd	Corvallis	OR	97330	238220	Plumbing Contractors
John's Automotive Repair	611 SW 3rd St	Corvallis	OR	97333	811111	Automobile Repairing & Service
Jones, Amanda	3600 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Corvallis Sport & Spine	2101 NW Professional Dr	Corvallis	OR	97330	621340	Physical Therapists
Spaeth Lumber-Corvallis, Oregon	1585 NW 9th St	Corvallis	OR	97330	444110	Building Materials
M & H Well Drilling	7235 NW Appaloosa Ln	Corvallis	OR	97330	237110	Drilling & Boring Contractors
Masenko LLC	5610 SW Redtop Pl	Corvallis	OR	97333	999990	Nonclassified Establishments
Northwest Alliance For Computational Science & Engineering	0 Oregon State University	Corvallis	OR	97331-8506	541330	Engineers' offices
Jacobs Engineering Group Inc	1100 NE Circle Blvd	Corvallis	OR	97330	541330	Engineers-Consulting
Field, Lisa RN	1650 SW 45th Pl	Corvallis	OR	97333	621399	Nurses-Registered RN
Pill Box Health Center Pharmacy	906 NW Kings Blvd	Corvallis	OR	97330	456110	Pharmacies
Bagley, Alexander	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Nunez, Elijah, Matthew	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Law Offices of Kara Daley	1717 NW Grant Ave	Corvallis	OR	97330	541199	Bankruptcy Service
Wilson Motors	1105 NW 5th St	Corvallis	OR	97330-6209	441110	New Car Dealerships
Nepal, Shristi, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Core Vitality Clinic	650 SW 3rd St	Corvallis	OR	97333	621111	Physicians & Surgeons
Samaritan Mental Health Family Center	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bergh, Joshua	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
University Inn Corvallis	350 SW 4th St	Corvallis	OR	97333-4623	721110	Lodging
Staggs, Jesse W PA	3615 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Tepperman, Adrian	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
King Biscuit	2830 NE Garden Ave	Corvallis	OR	97330	722511	Restaurants
Electrosep Inc	33900 SE Eastgate Cir	Corvallis	OR	97333-2256	541330	Engineers' offices
Therapy With Cindy	3140 SW Chintimini Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Alumni Association	725 SW 26th St	Corvallis	OR	97331	813910	Associations
Iparraguirre, Whitney	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Andrea, Tyler, Marcus, DO	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Broadleaf Architecture	534 NW 4th St	Corvallis	OR	97330	541310	Architects
Rosenberger, Sarah, Michelle	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Gruenhagen, Nathan, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Carr, Jules, Rain	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Samaritan Urology	990 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Ofelt, Danika G	922 NW Circle Blvd	Corvallis	OR	97330	621399	Dietitians
Benton County	530 NW 27th St	Corvallis	OR	97330	923120	Public Health Programs Administration
Berry, Holly, Marie	685 NW 5th St	Corvallis	OR	97330	621330	Social Workers
Kohler Design	1750 SW 3rd St	Corvallis	OR	97333	333310	Machinery-Specially Designed & Built
Corvallis Sewing & Vacuum Center	920 NW 9th St	Corvallis	OR	97330	449210	Vacuum Cleaners-Household-Dealers
Vaiau I, Lisa A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corvallis Oregon Fire Department-Corvallis Rural Fire Protec	400 NW Harrison Blvd	Corvallis	OR	97330	922160	Fire Departments
Oregon State University Electric	110 SW Park Ter	Corvallis	OR	97331	238210	Electric Contractors
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
2 Towns Ciderhouse/Traditions	1749 SW Airport Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Westminster Presbyterian Church	865 NW Harman Ln	Corvallis	OR	97330	813110	Churches
Johnson, Taylor, Scott, DO	5234 SW Philomath Blvd	Corvallis	OR	97333	621111	Physicians & Surgeons
Sheriffs Foundation	180 NW 5th St	Corvallis	OR	97330	922120	Sheriff
Creative Carpentry	2200 NW Elmwood Dr	Corvallis	OR	97330	238350	Carpenters
Dutch Bros Coffee	1855 SE 3rd St	Corvallis	OR	97333-1729	722515	Snack & Nonalcoholic Beverage Bars
Investors Research Institute Inc	25945 SW Airport Ave	Corvallis	OR	97333-9349	523940	Portfolio Management and Investment Advice
Gerlach, Matthew E DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Chiappone, Kevin	990 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Duong, Hanh MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wetzel, Blake R	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Kimhoa Kitchen	1875 NW Circle Blvd	Corvallis	OR	97330	722511	Restaurants
Hughes, Sara	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Verhoogen Odde, Lise Anne	887 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Lambda Chi Alpha Fraternity	1015 NW Monroe Ave	Corvallis	OR	97330	813410	Fraternal Organizations
Grocery Outlet	1755 NW 9th St	Corvallis	OR	97330-2298	445110	Grocery Stores and Supermarkets
Marilyn Slizeski, LPC	4185 SW Research Way	Corvallis	OR	97333	622210	Mental Health Services
Trillium Family Services	4455 NE Highway 20	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Municipal Court	560 SW Madison Ave	Corvallis	OR	97333	922110	City Government-Courts
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dinger, James, D, DMD	853 NW Monroe Ave	Corvallis	OR	97330	621210	Dentists
Meeker Jody PC	310 NW 5th St	Corvallis	OR	97330	541110	Attorneys
Corvallis Community Band	1150 NW Oak Ave	Corvallis	OR	97330-1404	711410	Talent agents and agencies
Lamer, Chad R DC	2721 NW 9th St	Corvallis	OR	97330	621310	Chiropractors DC
Nguyen, Tina	3521 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Law Offices of Robert Mauger	310 NW 5th St	Corvallis	OR	97330	541110	Attorneys
Vanguard Realty Group	2851 NW 9th St	Corvallis	OR	97330	531210	Real Estate
Schlundt, Maximillian	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Donald L Klaus Insurance Service	761 NW Harrison Blvd	Corvallis	OR	97330	524210	Insurance
Greg Giles Insurance	2613 SW Brooklane Dr	Corvallis	OR	97333	524210	Insurance
Reyes Rua, Janet, Guadalupe	260 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Design Craft LLC	NULL	Corvallis	OR	NULL	531210	Real Estate
Chew on This Inc	949 NW Kings Blvd	Corvallis	OR	97330	459910	Pet Supplies & Foods-Retail
Blue Sun	887 NW Grant Ave	Corvallis	OR	97330	541612	Personnel Consultants
Anderson Neurological Pain Solutions LLC	2211 NW Professional Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cavagnaro, Christopher, Thomas	1555 SW 35th St	Corvallis	OR	97333	624190	Counselors
Coinstar	1840 NW 9th St	Corvallis	OR	97330	541990	Coin & Bill Counting/Sorting Svc Kiosks
Corvallis Clinic Continence	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon Quality Gutters LLC	5700 SW Reservoir Ave	Corvallis	OR	97333	238160	Gutters & Downspouts
Pathfinder Travel	963 NW Spruce Ave	Corvallis	OR	97330	561510	Travel Agencies & Bureaus
Crash Security	NULL	Corvallis	OR	97330	423610	Security Control Equip & Systems-Whls
Cano-Young, Christina M	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sport Clips	1327 NW 9th St	Corvallis	OR	97330	812111	Barbers
Majeed, Ammara MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Electric Charging Station	220 SW Jefferson Ave	Corvallis	OR	97333	457120	Electric Charging Station

Heying-Sulliva, Sophia B	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
McKelvey, Robin, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
U.S. Bank Branch	375 NW Monroe Ave	Corvallis	OR	97330	522110	Banks
Samaritan Internal Medicine	3521 NW Samaritan Dr	Corvallis	OR	97330-4744	621111	Physicians' clinics
Coca-Cola Airport-Og49	29216 Lakeside Dr	Corvallis	OR	97333	488119	Airports
Edelweiss Cakes	713 NW 36th St	Corvallis	OR	97330	311811	Bakers-Retail
Pedersen, Megan RN	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Registered RN
Timberhill Foot Clinic	2440 NW Professional Dr	Corvallis	OR	97330	621391	Podiatrists
Memco LLC	33844 SE White Oak Rd	Corvallis	OR	97333	561990	Business Services NEC
Samaritan Neurosurgery	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rodriguez, Cynthia NP	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Lupe's LLC	2047 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Pta Oregon Congress	750 NW 18th St	Corvallis	OR	97330	813910	Associations
Cookies Corvallis	255 SW Madison Ave	Corvallis	OR	97333	459991	Cannabis Dispensary
Benco NW Sycamore	982 NW Sycamore Ave	Corvallis	OR	97330	624310	Cognitive Disability-Dev Disability Svcs
Burnett, Jennifer	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Mo's Maintenance, LLC	2923 NE Conser St	Corvallis	OR	97330-6816	236220	Commercial and Institutional Building Construction
La Familia Media West LLC	460 SW Madison Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Corvallis Childrens Clinic	1835 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Fire Department-Station 1	400 NW Harrison Blvd	Corvallis	OR	97330-4816	922160	Fire Protection
Aye, Myo, Sabai, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Samaritan Gynecology-Surgcl	400 NW Walnut Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Elizabeth Irish-CMG Financial MTG Loan Officer Nmls# 1065413	402 NW 5th St	Corvallis	OR	97330	522292	Real Estate Loans
Middendorf, Katharine PHD	3509 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
First Alternative Natural Foods	2855 NW Grant Ave	Corvallis	OR	97330	424440	Eggs (Whls)
Welch Brodie L AC	534 NW 4th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Oregon State University SCH-Electrical Engineering & Compute	1148 Kelley Engineering	Corvallis	OR	97331	611310	Engineering Schools
Funderburg, Linda G MD	3600 NW Samaritan Hospital	Corvallis	OR	97339	621111	Physicians & Surgeons
Taco Bell	2235 NW 9th St	Corvallis	OR	97330-1556	722511	Full-Service Restaurants
Corvallis Pedicab	2510 SE Powell Pl	Corvallis	OR	97333	711510	Entertainers
The Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bridges Enterprise Lic Quest Vocatational Progr	149 NW Lewisburg Ave	Corvallis	OR	97330	622210	Mental Health Services
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Cardtap Systems LLC	725 SW 13th St	Corvallis	OR	97333	999990	Nonclassified Establishments
Corvallis Family Medicine	2400 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
PBM Supply & Manufacturing Inc	2660 SW 3rd St	Corvallis	OR	97333	455219	General Merchandise-Retail
Sautter, Robert T MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330-3771	621111	Physicians' clinics
Starbucks	2305 NW Kings Blvd	Corvallis	OR	97330	722515	Coffee Shops
Beaver Sports Medicine	1128 NE 2nd St	Corvallis	OR	97330	621111	Physicians & Surgeons
Adapa, Prathyush, Sai, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
10 D Technologies	NULL	Corvallis	OR	97333	423690	Telecommunication Equip/Syst-Whls/Mfrs
Food Science & Tech Department	100 Wiegand Hall	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Gomez, Danielle MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Williams, Shanon, DPT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Crossroads	2555 NW Highland Dr	Corvallis	OR	97330	813110	Churches
Goldner, Alexander M PA	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Safeway Pharmacy	590 NE Circle Blvd	Corvallis	OR	97330	456110	Pharmacies
Allen Mike & Associates	410 NW Walnut Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Sharon's Cafe	1894 SW 3rd St	Corvallis	OR	97333	445298	Coffee & Tea
Corvallis Radiology	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Smylie, Alicia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Acme Counseling LLC	310 NW 5th St	Corvallis	OR	97330	813319	Alcoholism Information & Treatment Ctrs
Acupuncture Ecology	370 SW Western Blvd	Corvallis	OR	97333-4378	621399	Offices of All Other Miscellaneous Health Practitioners
Mater Limited	101 SW Western Blvd	Corvallis	OR	97333	115310	Foresters-Consulting
Oregon State University-Memorial Union Business Offices	2501 SW Jefferson Way	Corvallis	OR	97331	561990	Business Services NEC

1335 North Apartments	1335 NW Kings Blvd	Corvallis	OR	97330	531110	Apartments
Cold Stone Creamery	2350 NW 9th St	Corvallis	OR	97330	722515	Ice Cream Parlors
Willamette Dental Group-Corvallis	2420 NW Professional Dr	Corvallis	OR	97330-3977	621210	Dentists' clinics
Willamette Apprentice Ballet	NULL	Corvallis	OR	NULL	611610	Dancing Instruction
UPS Access Point Location	532 NW 3rd St	Corvallis	OR	97330	541860	Mailing & Shipping Services
Gauthier, Amy, Josephine	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Accushoot, Inc	2851 NW 9th St	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Waid, Shyanna	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hi-Tech Inventory	5060 SW Philomath Blvd	Corvallis	OR	97333	561990	Inventory Service
Wagaman, Brandi	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Fahey, Mairin	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Passalaris, Tina M MD	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Obledo, Ulises	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
McCalla, Kit C MD	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Kiwanis	NULL	Corvallis	OR	NULL	561990	Business Services NEC
OSU Student Health Services	201 Plageman Bldg	Corvallis	OR	97331-8567	621111	Physicians' clinics
Judah, Michaela	1650 SW 45th Pl	Corvallis	OR	97333	624190	Marriage & Family Counselors
WL Construction, Inc	275 SW Avery Ave	Corvallis	OR	97333	236115	General Contractors
The Tudor Studio	NULL	Corvallis	OR	97330	712110	Art
Campbell's Cleaners	1120 NW 9th St	Corvallis	OR	97330	812320	Cleaners
Food Handlers' Information	4077 SW Research Way	Corvallis	OR	97333	921120	Government Offices-County
Chen, Minghui MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jefferson Mint & Silver	33894 SE Eastgate Cir	Corvallis	OR	97333	455219	Coin Dealers Supplies & Etc
LPC	223 SW 8th St	Corvallis	OR	97333	999990	Nonclassified Establishments
Valvoline Instant Oil Change	5020 SW Philomath Blvd	Corvallis	OR	97333	811191	Automobile Lubrication Service
Midvalley Gravel Co	985 NW 23rd St	Corvallis	OR	97330	423320	Sand & Gravel (Whls)
Sigma Kappa	231 NW 26th St	Corvallis	OR	97330	813410	Sororities
Visual People Design	3810 NE Highway 20	Corvallis	OR	97330	541430	Graphic Designers
North, Melinda	685 NW 5th St	Corvallis	OR	97330	624190	Counselors
Gjesdal, Taylor	887 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Corvallis Microtechnology Inc	3910 SW 53rd St	Corvallis	OR	97333	334111	Computers-Electronic-Manufacturers
White, Shannon, Elizabeth	230 SW 3rd St	Corvallis	OR	97333	624190	Marriage & Family Counselors
Synergy Respiratory Care	2747 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Williams, Kelsey P PA	996 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Molitor Jr, John J MD	2314 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dee Myers Massage Therapy	534 NW 2nd St	Corvallis	OR	97330	812199	Massage Therapists
Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Must Love Paws	1755 NW 9th St	Corvallis	OR	97330	812910	Pet Services
Homertgen, Kyle DO	610 Dragon Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Great Clips	700 NE Circle Blvd	Corvallis	OR	97330	812112	Beauty Salons
Pagulayan-Sy, Mychall C MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Reeve, Kristen H PA	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Corvallis Clinic	444 NW Elks Dr	Corvallis	OR	97330	621320	Optometrists OD
JD Neebel Construction LLC	2130 NW Highland Dr	Corvallis	OR	97330	236115	Construction Companies
Rebecca Swiff MD, PC	525 NW 2nd St	Corvallis	OR	97330	621111	Physicians & Surgeons
Smith Christopher PA	2175 NW Professional Dr	Corvallis	OR	97330	621399	Physicians Assistants
Suarez, Luis, Felipe	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Prana Physical Therapy	305 SW C Ave	Corvallis	OR	97333	621340	Physical Therapists
Ami LLC	2604 NW Garryanna Dr	Corvallis	OR	97330-1323	921190	Other General Government Support
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Gaipo, Andie Marie	4455 NE Highway 20 Childrens Far	Corvallis	OR	97330	624190	Counselors
WaFd Bank	1111 NW 9th St	Corvallis	OR	97330	522110	Banks
SAP	1600 SW Western Blvd	Corvallis	OR	97333	513210	Software/Application/Platform Publishing
Downtown Corvallis Association Inc	460 SW Madison Ave	Corvallis	OR	97333	813910	Associations
Toastmasters International	1100 NE Circle Blvd	Corvallis	OR	97330	611430	Public Speaking Instruction

Harrington, Alisha, Marie	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
ServiceMaster Restoration	30649 Highway 34	Corvallis	OR	97333	238990	Cleaning Services-Industrial
Rahim, Abdulrahman MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Lynn, Colton, Reed, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Tack Box	28970 Highway 34	Corvallis	OR	97333	459110	Tack
Amorphyx Inc.	508 SW Jefferson Ave	Corvallis	OR	97333	334419	Electronic Instruments-Manufacturers
Crystal Lake Cemetery	360 SW Avery Ave	Corvallis	OR	97333-1139	812220	Cremation services
Mid-Valley Gastroenterology	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Yu, Dane-Fung	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Laurenson, Elizabeth A ND	990 NW Circle Blvd	Corvallis	OR	97330-1967	621399	Offices of All Other Miscellaneous Health Practitioners
AmeriGas Propane Exchange	746 NW Kings Blvd	Corvallis	OR	97330	457210	Propane Tank Kiosks
Rosenhart, Daniel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Familysearch Center	4141 NW Harrison Blvd	Corvallis	OR	97330	812990	Miscellaneous personal services
Principle Property Management	310 NW 5th St	Corvallis	OR	97330	531210	Real Estate Management
Muddy Crik Duck Club LLC	6300 SW Reservoir Ave	Corvallis	OR	97333	813410	Clubs
Lillehei Investments Inc	850 SW 15th St	Corvallis	OR	97333	523150	Investment Securities
Mulukutla, Shilpa MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Northwest Hair Lines	435 NW 3rd St	Corvallis	OR	97330	812112	Beauty Salons
Harrison Counseling & Consulting LLC	1420 NW 20th St	Corvallis	OR	97330	624110	Counseling Services
Pestle, Rebecca, L	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Ramos, Ovidia L	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Robb, Elizabeth A DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Institute of Religion-the Church of Jesus Christ of Latter-Day Saints	100 NW 27th St	Corvallis	OR	97330-5302	611310	Schools offering baccalaureate or graduate degrees
USPS Blue Collection Box	500 SW Madison Ave	Corvallis	OR	97333	541860	Mailing & Shipping Kiosks
Gill Coliseum	660 SW 26th St	Corvallis	OR	97331-8622	711310	Organizers of state and county fairs, concerts, and festivals with facilities
Waddeli & Reed Inc	230 SW 3rd St	Corvallis	OR	97333	523940	Financial Planning Consultants
Stevens, Ryan R	1867 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Holly, Kristin	530 NW 27th St	Corvallis	OR	97330	621330	Social Workers
Donna Bella Lingerie	117 NW 2nd St	Corvallis	OR	97330-4719	458110	Clothing and Clothing Accessories Retailers
McConnell, Yarrow, J, MD	441 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Nail and Spa Center	1830 NW 9th St	Corvallis	OR	97330	812113	Manicuring
Jennison, Katie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Taqueria Alonzo	922 NW Kings Blvd	Corvallis	OR	97330	722511	Restaurants
Freshwaters Illustrated	200 NW 2nd St	Corvallis	OR	97330	512110	Motion Picture Producers & Studios
Reher, Kristi	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Webster, Deborah, A, PHD	444 NW Elks Dr	Corvallis	OR	97330	621399	Psychologists
Holistic Hands Care LLC	6293 SW Timber Ridge Dr	Corvallis	OR	97333	621999	Holistic Health Services
Layton, Alison	1650 SW 45th Pl	Corvallis	OR	97333-1768	624190	Miscellaneous Individual and Family Services
Carlson, Kenneth, Michael, MD	121 SE Viewmont Ave	Corvallis	OR	97333	621111	Physicians & Surgeons
Burrito Heaven	1813 SE 3rd St	Corvallis	OR	97333	722511	Restaurants
Stargazer Premier Florist	925 NW Circle Blvd	Corvallis	OR	97330	459310	Florists-Retail
Buffalo Wild Wings	1820 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Corvallis Sustainability Coalition	228 NW 28th St	Corvallis	OR	97330	813410	Membership Organizations NEC
Veenstra, Steven T DPT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
LifeSafer Ignition Interlock	785 NW Cornell Ave	Corvallis	OR	97330-4514	811111	Car repair shops
Campbell Construction NW	275 SW Avery Ave	Corvallis	OR	97333	236115	Construction Companies
Backup Family LLC	NULL	Corvallis	OR	97330	999990	Nonclassified Establishments
Corvallis Heartspring Wellness Center	990 NW Circle Blvd	Corvallis	OR	97330-1967	621111	Physicians' clinics
Samaritan Endocrinology	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Shoei Electronic Material	1100 NE Circle Blvd	Corvallis	OR	97330	449210	Electronic Equipment & Supplies-Retail
Corvallis Living Guide	150 Snell Hall	Corvallis	OR	97331	513140	Directory and Mailing List Publishers
Corvallis Market Center, A Regency Centers Property	1550 NW 9th St	Corvallis	OR	97330	531120	Shopping Centers & Malls
Center For Developing Hope	2075 NW Grant Ave	Corvallis	OR	97330-4366	621111	Physicians' clinics
M & H Pump Service	7235 NW Appaloosa Ln	Corvallis	OR	97330-9124	238220	Plumbing, Heating, and Air-Conditioning Contractors
Electric Charging Station	110 SE Alexander Ave	Corvallis	OR	97333	457120	Electric Charging Station
Honorable Janet S Holcomb	120 NW 4th St	Corvallis	OR	97330	921120	Government Offices-State

Deshmukh, Praveen MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Gadomski, Tabitha, Louise, RN	121 SE Viewmont Ave	Corvallis	OR	97333	621399	Nurses-Registered RN
Horton's German Auto Repair	480 SW 4th St	Corvallis	OR	97333	811198	Automobile Diagnostic Service
Hicks, Brenda	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Liquor Stores	935 NW Circle Blvd	Corvallis	OR	97330	445320	Liquors-Retail
R Eh	561 NW Van Buren Ave	Corvallis	OR	97330-4823	999990	Unclassified Establishments
Burkart, Brody, Hanson, DPT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Samaritan Endocrinology	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton County Environmental	4077 SW Research Way	Corvallis	OR	97333	921120	Government Offices-County
OSU Soap Creek Unit	28120 Beef Barn Rd	Corvallis	OR	97330	112990	Ranches
Super 8 By Wyndham Corvallis	407 NW 2nd St	Corvallis	OR	97330	721110	Hotels & Motels
Harris, Victoria	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Rose Tian Acupuncture Inc	3204 SE Everglade St	Corvallis	OR	97333	621399	Acupuncture
Kuhl Wholesalers LLC	119 NW 9th St	Corvallis	OR	97330	423920	Wholesalers
Balance Point Acupuncture LLC	2005 NW Grant Ave	Corvallis	OR	97330	621399	Acupuncture
Motlong, Evan	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Simonetti-Eng, Megan, Elizabeth, PHD	444 NW Elks Dr	Corvallis	OR	97330	621399	Psychologists
Stock Market	300 SW 4th St	Corvallis	OR	97333-4623	445131	Convenience Retailers
Farmers Insurance	1805 NW Circle Blvd	Corvallis	OR	97330-1310	524210	Insurance Agencies and Brokerages
Samaritan Kidney Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Beaver Lodge	1360 NW Van Buren Ave	Corvallis	OR	97330	813410	Fraternities & Sororities
Hertz	1746 NW 9th St	Corvallis	OR	97330	532111	Automobile Renting
Lincoln Health Center	121 SE Viewmont Ave	Corvallis	OR	97333	621111	Physicians & Surgeons
Big Mog LLC	777 NE 2nd St	Corvallis	OR	97330	999990	Nonclassified Establishments
Unitarian Universalist	2945 NW Circle Blvd	Corvallis	OR	97330	813110	Churches
Preservationworks	2188 NW Fritz Pl	Corvallis	OR	97330	813319	Non-Profit Organizations
Alpine Sourdough Bakery	220 NW 1st St	Corvallis	OR	97330	311811	Bakers-Retail
Flegel, Linda A	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
Ideal Logic LLC	735 NW 28th St	Corvallis	OR	97330-5230	513210	Software Publishers
Donovan, Erin	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Rogue Sky LLC	257 SW Madison Ave	Corvallis	OR	97333-4757	541330	Engineers' offices
Nash, Ortiz & Demarest, PC	435 NW 4th St	Corvallis	OR	97330	541110	Attorneys
Korvis	2101 NE Jack London St	Corvallis	OR	97330	333120	Machinery-Manufacturers
Vradenburg Clinic	970 NW Circle Blvd	Corvallis	OR	97330	621310	Chiropractors DC
Simplified Consulting LLC	460 SW Madison Ave	Corvallis	OR	97333	541618	Consultants-Business NEC
Pecherskaya, Dzhakhan MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Benton County Jail	180 NW 5th St	Corvallis	OR	97330-4703	922140	Correctional Institutions
Second Glance	312 SW 3rd St	Corvallis	OR	97333	459510	Clothing-Used
Beyond the Chair LLC	312 SW Jefferson Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Mobil	1450 NW 9th St	Corvallis	OR	97330-4511	457120	Other Gasoline Stations
Handlin, Daryl A	444 NW Elks Dr	Corvallis	OR	97330	621330	Social Workers
Cielos Abiertos Upci	1601 NE Conifer Blvd	Corvallis	OR	97330	813110	Churches
Pavco Paving Co LLC	5095 SW Nash Ave	Corvallis	OR	97333	237310	Paving Contractors
Mountain View at Rivergreens	900 SE Centerpointe Dr	Corvallis	OR	97333	531110	Apartments
Cardiovascular Consultants	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Perret, Jay MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Centron Vinales, Patricia, Raquel MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Breast Health Service	3680 NW Samaritan Dr	Corvallis	OR	97330	621999	Health Services
HairMasters	935 NW Kings Blvd	Corvallis	OR	97330	812112	Beauty Salons
Corvallis Clinic-Orthopedics	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Chevron	300 SW 4th St	Corvallis	OR	97333-4623	457120	Other Gasoline Stations
Express Gym Supply	125 SW Hopkins Ave	Corvallis	OR	97333	811310	Repair Shops & Related Services NEC
Bauer, Janet L	2773 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Fallows, Robert Ryan	815 NW 9th St	Corvallis	OR	97330	621399	Psychologists
Elgeziry, Amro, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Santana Court Apartments	2610 SW Western Blvd	Corvallis	OR	97333	531110	Apartments

Foerst, Laura F NP	NULL	Corvallis	OR	NULL	621399	Nurses-Practitioners
Alpha Phi Sorority	357 NW 25th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Terry D Logan Industries	7055 SW Philomath Blvd	Corvallis	OR	97333	811111	Automobile Repairing & Service
Michael Berrey-State Farm Insurance Agent	2535 NW Kings Blvd	Corvallis	OR	97330-3988	524210	Insurance Agencies and Brokerages
Schafer, Theodore MD	3680 NM Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Solberg, Jason	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Minute Key	2335 NW Kings Blvd	Corvallis	OR	97330	561622	Key Duplicating Service Kiosks
Shonnard's	6600 SW Philomath Blvd	Corvallis	OR	97333	444240	Garden Centers
Pretty Good Teleprompters	1190 SW Sunset Dr	Corvallis	OR	97333	999990	Nonclassified Establishments
Excel Painting & Pressure	NULL	Corvallis	OR	97330	238320	Painting and Wall Covering Contractors
Alpha Pi Mu Association	2000 SW Monroe Ave	Corvallis	OR	97331	813410	Educational Associations
Boy's & Girl's Club of Corvallis	1112 NW Circle Blvd	Corvallis	OR	97330	624110	Youth Organizations & Centers
Deb's Mixers	575 SW Washington Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Husky Hiker Mining LLC	804 SW 10th St	Corvallis	OR	97333	212390	Mining Companies
Electric Charging Station	757 NW Polk Ave	Corvallis	OR	97330	457120	Electric Charging Station
Edward Jones	761 NW Harrison Blvd	Corvallis	OR	97330-6323	523940	Portfolio Management and Investment Advice
Deitering, Mitchell	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Southside Youth Outreach Inc	2065 SE Debord St	Corvallis	OR	97333-1704	624110	Children services
Shop N Go Market	1149 NW Van Buren Ave	Corvallis	OR	97330	445131	Convenience Stores
Tyler Street Townhomes LLC	2860 NW Polk Ave	Corvallis	OR	97330	531110	Apartments
Geneos Wealth Management Inc	2657 NW Rolling Green Dr	Corvallis	OR	97330	523940	Financial Advisory Services
Benton County Emergency Management	180 NW 5th St	Corvallis	OR	97330	921120	Government Offices-County
Olufson Designs	215 SW 2nd St	Corvallis	OR	97333-4633	458310	Jewelry Retailers
Appearances Salon	922 NW Circle Blvd	Corvallis	OR	97330-1483	812112	Beauty Shops
Waagmeester, Garrett, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Crossin, Timothy	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Keller Jr, Ronald W	990 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Tawil, Anan	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Vision Center	227 NW 3rd St	Corvallis	OR	97330	456130	Optical Goods-Retail
Keller Williams Realty	1121 NW 9th St	Corvallis	OR	97330	531210	Real Estate
Benton County Board of Commissioners	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
Samaritan Plastic Surgery	996 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Plastic Surgery	996 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
OG Collective Dispensary	414 NW 4th St	Corvallis	OR	97330	459991	Cannabis Dispensary
Tattoos By Delan	408 SW Monroe Ave	Corvallis	OR	97333	812199	Tattooing
Corvallis Aquatic Center	1940 NW Highland Dr	Corvallis	OR	97330	713940	Swimming Pools-Public
Dougher, David T	216 NW 6th St	Corvallis	OR	97330	624110	Counseling Services
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Planning	501 SW Madison Ave	Corvallis	OR	97333-4601	925120	Administration of Urban Planning and Community and Rural Development
Vineyard Mountain Images LLC	1227 NW Overlook Dr	Corvallis	OR	97330	111332	Vineyards
US Tax SVC-Worldwide	418 NW 5th St	Corvallis	OR	97330	541213	Tax Return Preparation & Filing
Palenque Mexican Restaurant & Cantina	1845 NW Circle Blvd	Corvallis	OR	97330	722410	Bars
Beaver Dam Wrestling Regional Training Center	129 Gill Coliseum	Corvallis	OR	97331-8547	813311	Civil liberties organizations
Marco Can Fix It	6935 NW Concord Dr	Corvallis	OR	97330	236118	Handyman Services
Clark Willes Attorney at Law LLC	129 NW 4th St	Corvallis	OR	97330	541110	Attorneys
Chintimini Chamber Music	3910 NW Clarence Cir	Corvallis	OR	97330-6502	541511	Computer Programming and Software Development Services
Schudel Enterprises LLC	800 Ncornell Ave	Corvallis	OR	97330	531210	Real Estate
US Agricultural Department	3420 NW Orchard Ave	Corvallis	OR	97330-5014	926140	Regulation of Agricultural Marketing and Commodities
Corvallis Police Department	180 NW 5th St	Corvallis	OR	97330	922120	Police Departments
Melson, Jimmilynn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
US Nails	2255 NW 9th St	Corvallis	OR	97330	812113	Manicuring
The Corvallis Clinic Administrative Office	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Samaritan Specialty Pharmacy	2300 NW Walnut Blvd	Corvallis	OR	97330	456110	Pharmacies
Timberhill Shopping Center	2359 NW Kings Blvd	Corvallis	OR	97330-3986	531120	Landlords of Nonresidential Buildings (except Miniwarehouses)
Hanson, Michael S	518 SW 3rd St	Corvallis	OR	97333	624190	Counselors

Whimsy Supper Club	460 SW Madison Ave	Corvallis	OR	97333-4702	722511	Full-Service Restaurants
Mat Sense LLC	916 NW Kings Blvd	Corvallis	OR	97330	713940	Gymnasiums
E-B Dental Lab	1360 NW Harrison Blvd	Corvallis	OR	97330	339116	Laboratories-Dental
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ross Dress For Less	2415 NW Kings Blvd	Corvallis	OR	97330-3935	455110	Department Stores
Murray Memorial Library	3600 NW Samaritan Dr	Corvallis	OR	97330	519210	Libraries-Public
Miller, Jennifer A APN	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Irwin, Tiffany	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Ash, Loren Elise	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hart, Jeannine C MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Demers, Melissa	260 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Simpson, Rachel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Healing Tree Massage	564 SW 3rd St	Corvallis	OR	97333	812199	Massage Therapists
Corvallis Benton Chamber CLTN	420 NW 2nd St	Corvallis	OR	97330	813910	Chambers Of Commerce
Marcin Youthcare Service	673 NW Jackson Ave	Corvallis	OR	97330	622210	Mental Health Services
McGarry, Sean, Michael, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Bennett-Reeves, Terra	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
Healing Motion Physical Therapy	1122 NE 2nd St	Corvallis	OR	97330-6227	621340	Physical, occupational, speech therapists and audiogists' clinics
Waste Control Systems Inc	110 NE Walnut Blvd	Corvallis	OR	97330	562219	Waste Disposal
Phagans Beauty College	1565 SW 53rd St	Corvallis	OR	97333	611511	Beauty Schools
Electric Charging Station	705 NW Buchanan Ave	Corvallis	OR	97330	457120	Electric Charging Station
Self Reliance Publications	935 NW Circle Blvd	Corvallis	OR	97330	513199	Publishers (Mfrs)
MSS Inc	215 NW 4th St	Corvallis	OR	97330-4804	531390	Other Activities Related to Real Estate
McMillan, Peter, Troy, DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Lee, Jenny, Tran	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Shirt Circuit	1411 NW 9th St	Corvallis	OR	97330	541490	Embroidery
Prabhu, Andrea M MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Moss, Madeline	530 NW 27th St	Corvallis	OR	97330-5223	621330	Psychoanalysts' clinics (except MDs and Dos)
Lafferty, Deidre Ann	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Bialkin, Steven MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Raymond James	2101 NW Professional Dr	Corvallis	OR	97330	523940	Financial Advisory Services
Better Builders of Oregon Inc	460 SW Madison Ave	Corvallis	OR	97333	236220	Building Contractors
Yung, Jaimie MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Family Medicine-Southwest	5234 SW Philomath Blvd	Corvallis	OR	97333	621111	Physicians & Surgeons
Twin Oaks Mobile Home Park	245 SW Twin Oaks Cir	Corvallis	OR	97333	531190	Mobile Homes-Parks & Communities
Benton County Veterans Memorial Inc	NULL	Corvallis	OR	NULL	921120	Government Offices-County
Reliance CM	33866 SE Eastgate Cir	Corvallis	OR	97333	334418	Printed Circuit-Electronic Assembly (Mfrs)
Oregon State University College of Agricultural Sciences	430 Strand Ag Hall	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Groundhog, LLC	7135 NW Valley View Dr	Corvallis	OR	97330-9799	238910	Site Preparation Contractors
Naga, Osama S DDS	2420 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
Riddle, Madelyn, Paige	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Vanasche, Nancy, J	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Nurses-Practitioners
Johnson, Taylor J	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Downtown Dental	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Boys & Girls Club of America	1112 NW Circle Blvd	Corvallis	OR	97330	624110	Youth Organizations & Centers
Samaritan Infectious Disease	3640 NW Samaritan Dr	Corvallis	OR	97330-3787	621111	Physicians' clinics
Samaritan Internal Medicine	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
White, Megan, Ann	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Jefferson Mint	33894 SE Eastgate Cir	Corvallis	OR	97333-2248	624190	Miscellaneous Individual and Family Services
Imprint Services	2150 NW Jackson Creek Rd	Corvallis	OR	97330	541430	Graphic Designers
Tegeler, Luke	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Shannon, Cheryl, Lynn	3615 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Integrity Floors	729 NW 4th St	Corvallis	OR	97330	238330	Floor Laying Refinishing & Resurfacing
Schrager, Amara	1112 NW Circle Blvd	Corvallis	OR	97330	624190	Counselors
Alpha Kappa PSI Fraternity	443 Austin Hall	Corvallis	OR	97331	813410	Fraternal Organizations
Kaur, Jasmeet, DO	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Beery Enterprises	264 SW Madison Ave	Corvallis	OR	97333	531210	Real Estate
Proworks Corporation	517 SW 2nd St	Corvallis	OR	97333	518210	Internet Service
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Stover Neyhart & Co	777 NW 9th St	Corvallis	OR	97330	541211	Accountants
Eesi-Environmental & Engineering	687 NW 5th St	Corvallis	OR	97330	541330	Engineers
BSM Surgery Center, LLC	1128 NE 2nd St	Corvallis	OR	97330	621111	Physicians & Surgeons
Pleu's TKD Inc	400 SW 4th St	Corvallis	OR	97333	611620	Martial Arts Instruction
Inavale Community Partners Inc	30252 Bellfountain Rd	Corvallis	OR	97333	813410	Educational Associations
Corvallis Gospel Hall	410 SE Alexander Ave	Corvallis	OR	97333	813110	Churches
Benton Community Health Services	530 NW 27th St	Corvallis	OR	97330	621111	Physicians & Surgeons
James D Dinger, DMD, LLC	853 NW Monroe Ave	Corvallis	OR	97330-6352	621210	Dentists' clinics
Natural Dentures & Implant Center	2294 NW Kings Blvd	Corvallis	OR	97330-3923	339116	Dental Laboratories
Vina Moses Center	968 NW Garfield Ave	Corvallis	OR	97330	624190	Social Service & Welfare Organizations
Maia Analytica LLC	3830 NW Boxwood Dr	Corvallis	OR	97330	541715	Physical Engineering & Life Sciences Research & Development
Corvallis Neighborhood Housing Services Inc	2797 NW 9th St	Corvallis	OR	97330	541990	Services NEC
Williams, Donovan C MD	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Avis	1070 NE Circle Blvd	Corvallis	OR	97330-4241	532111	Car Rental Agencies
Barnhisel Willis Barlow Stephens & Costa PC	123 NW 7th St	Corvallis	OR	97330	541110	Attorneys
The Green Room	2521 NW 9th St	Corvallis	OR	97330	459991	Cannabis Dispensary
Nicely, Terri MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Boller, Brandi, L, DO	777 NW 9th St	Corvallis	OR	97330-6169	621111	Physicians' clinics
Holly, A, Okerstrom, DDS	2605 NW Rolling Green Dr	Corvallis	OR	97330	621210	Dentists
Barnhisel Willis Barlow	123 NW 7th St	Corvallis	OR	97330	541110	Attorneys
Harris, Taylor, Alexandra, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Shakibnia-Shirazi, Maysa	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
R Eh	3025 NW McKinley Dr	Corvallis	OR	97330	811210	Computers-Service & Repair
Watkins, Angie L NP	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Practitioners
Family Resource Home Care	456 SW Monroe Ave	Corvallis	OR	97333	621610	Home Health Service
DaVita Linn Benton Dialysis	3580 NW Samaritan Dr	Corvallis	OR	97330-3766	621492	Kidney dialysis clinics
Provaznik, Jill, M, MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
McCutcheon, Marin, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Moonlight Cyclery	865 NW Reiman St	Corvallis	OR	97330	459110	Bicycles-Dealers
Earthsongs	1030 NW Cleveland Ave	Corvallis	OR	97330	512230	Music Publishers (Mfrs)
Electric Charging Station	1710 SW May Ave	Corvallis	OR	97333	457120	Electric Charging Station
Ravi Chikkalingaiah MD PC	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Jade Garden	503 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Henery, Daniel J DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
At Home in Oregon Inc	5060 SW Philomath Blvd	Corvallis	OR	97333	531110	Apartments
Body of Health Chiropractic & Wellness Center	985 NW 23rd St	Corvallis	OR	97330-4309	621310	Chiropractors' clinics
Energy Assistance	545 SW 2nd St	Corvallis	OR	97333	813319	Non-Profit Organizations
Avalon Health Care-Corvallis Manor, LLC	160 NE Conifer Blvd	Corvallis	OR	97330	623110	Nursing & Convalescent Homes
Oregon State University Department	2250 SW Jefferson Way	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Estrada, Cynthia C	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Corley, Jacquelyn, MD	3615 NW Samaritan Dr	Corvallis	OR	97330-3771	621111	Physicians' clinics
Samaritan Orthopedics Sports Medicine & Rheumatology	3620 NW Samaritan Dr	Corvallis	OR	97330-3785	621399	Offices of All Other Miscellaneous Health Practitioners
O'Neal, Shauna	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Midwives
Wise Photo Printing	582 SW Adams Ave	Corvallis	OR	97333	812921	Photo Finishing-Custom
Electric Charging Station	2855 NW Grant Ave	Corvallis	OR	97330	457120	Electric Charging Station
Braziel, Jaclyn R	1555 SW 35th St	Corvallis	OR	97333	624190	Counselors
Ringo, Stuber, Ensor, Hadlock, & Smith, PC	605 SW Jefferson Ave	Corvallis	OR	97333	541110	Attorneys
Safeway	450 SW 3rd St	Corvallis	OR	97333	445110	Grocers-Retail
Stegeman-Olsen, Jenny	444 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
COUNTRY Financial	201 NW 3rd St	Corvallis	OR	97330	524210	Insurance
Taylor Water Treatment Plant	3140 SE Clearwater Dr	Corvallis	OR	97333-2124	924110	Administration of Air and Water Resource and Solid Waste Management Programs
Blue Heron Farm	33180 SE Peoria Rd	Corvallis	OR	97333	444240	Nurserymen
Icon Active LLC	1838 NW 9th St	Corvallis	OR	97330	541110	Attorneys

Light, Jacob Don MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
R 3 Engraving & Signs	1380 SW 3rd St	Corvallis	OR	97333	332812	Engravers-Metal (Mfrs)
Oakes, Brian	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Adams Elementary School	1615 SW 35th St	Corvallis	OR	97333	611110	Schools
Effectv	150 NW Lewisburg Ave	Corvallis	OR	97330	541840	Advertising-Television
Hoover, Sheila	2339 SE Ryan St	Corvallis	OR	97333	541611	Administrative & General Management Consulting Services
Corvallis Caring Place	750 NW 23rd St	Corvallis	OR	97330	623312	Residential Care Homes
Harmony Training Center	4500 SW Nash Ave	Corvallis	OR	97333-9355	541612	HR consulting services
Folded Homes LLC	2824 NW Garryanna Dr	Corvallis	OR	97330	236115	Home Builders
Recovery Milestones Family	442 NW 4th St	Corvallis	OR	97330	813319	Drug Abuse & Addiction Info & Treatment
Abramson, Kandice	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Moore, Jacqueline PA	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Physicians Assistants
Conundrum House	460 SW Madison Ave	Corvallis	OR	97333	711510	Entertainers
River Design Group	311 SW Jefferson Ave	Corvallis	OR	97333	541330	Engineering
Ramsey, Bruce, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Restoration Guy	1800 SW 3rd St	Corvallis	OR	97333	811121	Automobile Restoration-Antique & Classic
Victra-Verizon Authorized Retailer	2389 NW Kings Blvd	Corvallis	OR	97330-3986	517112	Wireless Telecommunications Carriers (except Satellite)
Hendrick & Kellison LLC	520 NW Oak Ave	Corvallis	OR	97330	541211	Accountants
Samaritan Pastega Regional Cancer Center	441 NW Elks Dr	Corvallis	OR	97330-3744	622310	Specialty clinics
US Agricultural Department	33447 SE Peoria Rd	Corvallis	OR	97333	921120	Government Offices-Federal
Oregon Nanoscience & Microtechnologies Institute	1000 NE Circle Blvd	Corvallis	OR	97330	813319	Non-Profit Organizations
The Branch	760 SW Madison Ave	Corvallis	OR	97333	813110	Churches
Tongxing LLC	1420 NW 9th St	Corvallis	OR	97330-4511	999990	Unclassified Establishments
Dixon Creek Dental Center	1885 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Seltzer, David	865 NW Reiman St	Corvallis	OR	97330	624190	Counselors
Faux, Karen M	530 NW 27th St	Corvallis	OR	97330	621399	Dental Hygienists
Oregon State University Student Health Services	108 SW Memorial Pl	Corvallis	OR	97331	621111	Physicians & Surgeons
Wilson's Auto Parts	921 NW 9th St	Corvallis	OR	97330	441330	Automobile Parts & Supplies-Retail-New
Orgul, Onder MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Blaty, Douglas E DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Greenberry Industrial	5330 NE Elliott Cir	Corvallis	OR	97330	236115	General Contractors
Eager Beaver Nursery Inc	29201 Highway 34	Corvallis	OR	97333	561730	Lawn & Grounds Maintenance
Corvallis Eco Laundry	908 NW Kings Blvd	Corvallis	OR	97330	812320	Laundries
Torres, Taiz	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Ravi Chikkalingaiah MD PC	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Health Services	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Corvallis Orthodontics	1857 NW Kings Blvd	Corvallis	OR	97330-1907	621210	Dentists' clinics
Nantze, Karleen	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Block Brewery & Tap Room	3415 SW Deschutes St	Corvallis	OR	97333-9283	312120	Breweries
Chung, Woodam	2450 NW Michelle Dr	Corvallis	OR	97330	115310	Foresters-Consulting
Holland Smith: Allstate Insurance	2200 NW 9th St	Corvallis	OR	97330	524210	Insurance
Wells Investment Properties	202 NW 6th St	Corvallis	OR	97330	531120	Operators Of Nonresidential Buildings
Green & White Rock Product Inc	28054 Payne Rd	Corvallis	OR	97333-9471	238110	Poured Concrete Foundation and Structure Contractors
U-Haul Storage of Corvallis	1050 NW 5th St	Corvallis	OR	97330	532120	Truck Renting & Leasing
Williams, Seth, M, MD	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Schmick, Elizabeth A MD	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Obstetrics-Gynclgy	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dari Mart	440 SW Western Blvd	Corvallis	OR	97333	445131	Convenience Stores
Abdelnour, George J DDS	530 NW 27th St	Corvallis	OR	97330	621210	Dentists
Samaritan Pediatrics	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
North American Assn-Fisheries	NULL	Corvallis	OR	97331	813910	Associations
Hodges, Brian N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
McGee Engineering	804 NW Buchanan Ave	Corvallis	OR	97330-6269	541330	Engineers' offices
Riverside Exchange	1687 NW Division St	Corvallis	OR	97330	999990	Nonclassified Establishments
Coral Controls	430 NW 6th St	Corvallis	OR	97330	999990	Nonclassified Establishments

Calvery, Mikayla A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Lina Soares, LCSW, LLC	636 SW 2nd St	Corvallis	OR	97333	621330	Social Workers
Cyrano's	361 SW 2nd St	Corvallis	OR	97333	459210	Book Dealers-Retail
Leslie B Berman DC	2438 NW Professional Dr	Corvallis	OR	97330	621310	Chiropractors DC
Beatnicks Finest LLC	126 SW Avery Ave	Corvallis	OR	97333-1143	624190	Miscellaneous Individual and Family Services
Lifestance Health	4185 SW Research Way	Corvallis	OR	97333-1783	621330	Psychoanalysts' clinics (except MDs and Dos)
Preetox	545 SW 2nd St	Corvallis	OR	97333-4466	621511	Medical labs
Northwest Mycological	702 NW 4th St	Corvallis	OR	97330	424480	Fruits & Vegetables-Growers & Shippers
Nutritional Healing Center	2721 NW 9th St	Corvallis	OR	97330	812191	Health & Fitness Program Consultants
Farrington, Angela	2001 NW Monroe Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Alexander Seavey Development LLC	257 SW Madison Ave	Corvallis	OR	97333	531210	Real Estate
Almond, Holly, T, NP	441 NW Elks Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Baltazar, Amanda D DPT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Wacky Indoor Bounce	202 NW 3rd St	Corvallis	OR	97330	711190	Kids Entertainment
Arakawa, Tim MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Gibbs, Taylor	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Crystal Lake Apartments	1652 SE Crystal Lake Dr	Corvallis	OR	97333	561110	Management Services
Van Laere, Katryn M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Ghacham, Wael MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Walnut Blvd Self Storage	850 NE Walnut Blvd	Corvallis	OR	97330-6900	531130	Landlords of Miniwarehouses and Self-Storage Units
Mering, Sarah R FNP	108 SW Memorial Pl	Corvallis	OR	97331	621399	Nurses-Practitioners
North American Truffling Library	34197 NE Colorado Lake Dr	Corvallis	OR	97333	519210	Special Interest Libraries
Sheikh, Mohammad S MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
American Federation of State County & Municipal Employees	536 SW 2nd St	Corvallis	OR	97333	813930	Labor Organizations
Coldwell Banker Valley Brokers	1109 NW 9th St	Corvallis	OR	97330	531210	Real Estate
O'Reilly Auto Parts	1921 NW 9th St	Corvallis	OR	97330	441330	Automobile Parts & Supplies-Retail-New
Adair Rural Fire & Rescue-Substation	37096 Soap Creek Rd	Corvallis	OR	97330-9490	922160	Fire Protection
Craig Matthew Shelby LLC	865 NW Raintree Dr	Corvallis	OR	97330	236115	General Contractors
Starbucks	2408 NW 9th St	Corvallis	OR	97330	722515	Coffee Shops
Kessler, Kenneth S PA	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Kapa Landscape Design LLC	2340 SE Crystal Lake Dr	Corvallis	OR	97333-2017	541320	Landscape architects
Corvallis Police Permits	180 NW 5th St	Corvallis	OR	97330-4793	922120	Police Protection
Santiam Broadband	1600 SW Western Blvd	Corvallis	OR	97333	518210	Internet Service
Ticor Title Insurance	400 SW 4th St	Corvallis	OR	97333	541191	Title Companies
Elcano, Joseph, Robert	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Viescas, Dillon M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Mid-Valley Dental Associates	1829 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330-3781	621111	Physicians' clinics
Graand Visions Inc	3710 NW Harrison Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Cothran, Kyle L MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Quantum Spatial	5522 SW Plumley St	Corvallis	OR	97333	481219	Photographers-Aerial
Image Makers	435 NW 3rd St	Corvallis	OR	97330	812112	Beauty Salons
Carex Working Group, LLC	2250 NW 13th St	Corvallis	OR	97330	541690	Scientists-Consulting
Duong, Josiah Van	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
All Pro Moving Cleaning LLC	5060 SW Philomath Blvd	Corvallis	OR	97333	484110	Movers
Bascom, Elise Noel PHD	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Psychologists
American National Insurance	312 SW Madison Ave	Corvallis	OR	97333	524210	Insurance
Orr, Maria P	260 SW Madison Ave	Corvallis	OR	97333	624190	Counselors
Queen B Organizing	130 SW 3rd St	Corvallis	OR	97333-4714	561990	Miscellaneous support services
Kappa Delta	305 NW 25th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Wickham, Margaret C	517 SW 2nd St	Corvallis	OR	97333	621340	Physical Therapists
Drums-A-Lot	1400 NE Granger Ave	Corvallis	OR	97330	999990	Nonclassified Establishments
Downtown Dental	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Thrivent Financial	700 NW 3rd St	Corvallis	OR	97330	523940	Financial Advisory Services
International Order of the Odd Fellows	223 SW 2nd St	Corvallis	OR	97333	813410	Fraternal Organizations
Curtis, Zane MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Noe, Nicolette, Rose, CNM	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Midwives
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Furniture-Direct	233 SW 2nd St	Corvallis	OR	97333	449110	Furniture-Dealers-Retail
Detailed Perfection	1815 SE 3rd St	Corvallis	OR	97333	811192	Automobile Detail & Clean-Up Service
Wirth, Robert, B, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Shaw, Duane	3987 SE Weigel St	Corvallis	OR	97330	621330	Pharmacists
Harris, Danielle, J, DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Davis, Schuyler T	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Greschner, Dimitri MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Franklin Conklin Foundation	4090 NE Morning St	Corvallis	OR	97330	541720	Foundation-Educ Philanthropic Research
OSU Bookstore Inc	663 SW 26th St	Corvallis	OR	97331	458110	Women's Apparel-Retail
Oregon State University Applied Economics	213 Ballard Hall	Corvallis	OR	97331-8538	611310	Schools offering baccalaureate or graduate degrees
Melchior, Sarah	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Kreidel, Kerry, Lynne, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Minta, Sandra Lynn	5234 SW Philomath Blvd	Corvallis	OR	97333-1042	621399	Offices of All Other Miscellaneous Health Practitioners
Bloomcraft Inc	4515 NE Elliott Cir	Corvallis	OR	97330	999990	Nonclassified Establishments
Day, Tarah Lynn PA	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Ioof	223 SW 2nd St	Corvallis	OR	97333	813410	Fraternal Organizations
Home Schoolhouse	410 NW 5th St	Corvallis	OR	97330	611691	Tutoring
Discovery Counseling	885 NW Grant Ave	Corvallis	OR	97330-4578	813319	Miscellaneous social service advocacy organizations
USPS Blue Collection Box	2300 NW Monroe Ave	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Unified Insurance	320 SW 3rd St	Corvallis	OR	97333	524210	Insurance
Jamie Hughes CPA LLC	883 NW Grant Ave	Corvallis	OR	97330-4539	999990	Unclassified Establishments
Pense, Apryl	887 NW Grant Ave	Corvallis	OR	97330	624190	Counselors
Healthletics Chiropractic Clinic	2005 NW Grant Ave	Corvallis	OR	97330-4366	621310	Chiropractors' clinics
Kernutt Stokes CPAs	200 SW 4th St	Corvallis	OR	97333	541211	Accountants
H&R Block	2539 NW Kings Blvd	Corvallis	OR	97330-3988	541213	Tax services
Fawver, Ashlie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Block Distribution	3415 SW Deschutes St	Corvallis	OR	97333	541870	Distribution Services
Shasta Aero LLC	5695 SW Airport Pl	Corvallis	OR	97333	999990	Nonclassified Establishments
Hung, Yi-Lin	112 NW 8th St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Hedrick, Theresa	408 SW Monroe Ave	Corvallis	OR	97333	621399	Dietitians
Cole Surveying LLC	245 NE Conifer Blvd	Corvallis	OR	97330	541370	Surveyors-Land
Timberhill Meadows Apartments	2600 NW Century Dr	Corvallis	OR	97330	531110	Apartments
Juicy's Form to Fork	NULL	Corvallis	OR	NULL	999990	Nonclassified Establishments
Corvallis Endodontics	1811 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Ecnow Tech	2395 NW Maser Dr	Corvallis	OR	97330	541511	Information Technology Services
Maria Blair LMT LLC	995 NW Circle Blvd	Corvallis	OR	97330	812199	Massage Therapists
Community Outreach Inc	865 NW Reiman St	Corvallis	OR	97330	624190	Counselors-Licensed Professional
Academic Media Network Inc	2775 NW Glenwood Dr	Corvallis	OR	97330	532282	Video Tapes & Discs-Renting & Leasing
Oregon State University Uhds Maintenance Center	601 SW 35th St	Corvallis	OR	97331-8632	611310	Schools offering baccalaureate or graduate degrees
Taco Bell	4825 SW Research Way	Corvallis	OR	97333-1099	722511	Full-Service Restaurants
Corvallis Clinic-Orthopedics	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ponderosa Ridge	2983 NW Deer Run St	Corvallis	OR	97330-3572	236115	New Single-Family Housing Construction (except Operative Builders)
Hardtwood Cabinets & Design	7030 SW Deerhaven Dr	Corvallis	OR	97333	337110	Cabinets
Burst's Candies	353 SW Madison Ave	Corvallis	OR	97333	445292	Candy & Confectionery-Retail
Corvallis Radiology PC	938 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Coffee Culture Annex	2215 NW 9th St	Corvallis	OR	97330-1556	722515	Snack & Nonalcoholic Beverage Bars
Timberhill Dental	2356 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
Store-More	34085 Riverside Dr	Corvallis	OR	97330	531130	Storage-Household & Commercial
Big Wood Tree Experts	3370 NE Dorchester Way	Corvallis	OR	97330	561730	Lawn & Grounds Maintenance
Allen Tate Co	1575 NW 9th St	Corvallis	OR	97330	531210	Real Estate
Buckmaster, Shannon M OD	1597 SW 53rd St	Corvallis	OR	97333	621320	Optometrists OD
KeyBank	1817 NW 9th St	Corvallis	OR	97330	522110	Banks
A Wild Hair Salon	425 SW Madison Ave	Corvallis	OR	97333	812112	Beauty Salons
Martin, Billie-Jean MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Highway Department	3700 SW Philomath Blvd	Corvallis	OR	97333	237310	Road Building Contractors
Schupp Plemmons Cook Wealth	2273 NW Professional Dr	Corvallis	OR	97330	523150	Investment Securities
The Maids	833 NW Buchanan Ave	Corvallis	OR	97330	238990	House Cleaning
Corvallis Power Equipment	713 NE Circle Blvd	Corvallis	OR	97330	444230	Lawn & Garden Equip & Supplies-Retail
Byzick & Company-Corvallis	2015 NW Grant Ave	Corvallis	OR	97330-4366	999990	Unclassified Establishments
Guild Mortgage-Thomas Kosta	257 SW Madison Ave	Corvallis	OR	97333-4757	522292	Real Estate Credit Lending
Design By Moonlight Website	1190 SW Sunset Dr	Corvallis	OR	97333	541990	Services NEC
Cathcart, Steven	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Outdoor Insights	935 NW Meadow View Dr	Corvallis	OR	97330	711510	Writers
Ocean Blue Project Inc	922 NW Circle Blvd	Corvallis	OR	97330-1483	238990	All Other Specialty Trade Contractors
Second Pursuits Development Group	6430 NW Burgundy Dr	Corvallis	OR	97330	531210	Real Estate
Eric Erwin-Private Wealth Advisor, Ameriprise Financial Services, LLC	777 NE 2nd St	Corvallis	OR	97330	524210	Insurance
Hammond, Steven C PA	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Knife River	Coffin Butte	Corvallis	OR	97330	237310	Paving Contractors
Willamette Valley Visitors Association	420 NW 2nd St	Corvallis	OR	97330	561591	Convention Information Bureaus
Conley, Shaun D DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Green Room	111 NW 16th St	Corvallis	OR	97330	459991	Cannabis Dispensary
Starker Forests	7240 SW Philomath Blvd	Corvallis	OR	97333	712190	Forest Land
Corvallis Rental Equipment	1245 SE 3rd St	Corvallis	OR	97333	532310	Rental Service-Stores & Yards
Five Guys	845 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Advantage Computing Electronic Service	875 NW Grant Ave	Corvallis	OR	97330	541511	Computers-System Designers & Consultants
Mater Engineering Ltd	101 SW Western Blvd	Corvallis	OR	97333	541611	Consulting Services
Pmic	3665 SW Deschutes St	Corvallis	OR	97333	541714	Testing
Pollen Cafe LLC	2001 NW Monroe Ave	Corvallis	OR	97330-5567	722511	Full-Service Restaurants
Riverstone Massage Therapy	1760 SW 3rd St	Corvallis	OR	97333	812199	Massage Therapists
Northwest Financial Group	310 NW 7th St	Corvallis	OR	97330	523940	Financial Planning Consultants
Yost, Cheyenne	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Conifer Place	213 NE Conifer Blvd	Corvallis	OR	97330	531110	Apartments
Togo's	2501 SW Jefferson Way	Corvallis	OR	97331	722511	Restaurants
Oregon Agriculture Classrm FND	200 Strand Ag Hall	Corvallis	OR	97331-8594	611691	Academic Tutoring and Exam Preparation Services
State Farm Insurance	555 NW Harrison Blvd	Corvallis	OR	97330	524210	Insurance
Crescent Valley Builders Inc	534 NW 4th St	Corvallis	OR	97330	236118	Remodeling & Repairing Building Contractors
Peacock, Heather	996 NW Circle Blvd	Corvallis	OR	97330	621399	Nurses-Registered RN
Bythrow, Erin	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Phi Kappa PSI	140 NW 13th St	Corvallis	OR	97330	813410	Fraternities & Sororities
Butera, Lindsey, Nicole	4455 NE Highway 20	Corvallis	OR	97330	621399	Nurses-Registered RN
Tokyo Japanese Steak House & Sushi Bar	250 SW 3rd St	Corvallis	OR	97333-4630	722511	Full-Service Restaurants
Nelson Macneil Rayfield Trial	435 NW 4th St	Corvallis	OR	97330	541110	Attorneys
Oodles World Wide	259 SW Madison Ave	Corvallis	OR	97333-4705	459420	Gift, Novelty, and Souvenir Retailers
Corvallis Mennonite	101 NW 23rd St	Corvallis	OR	97330	813110	Churches
Neudorfer, Jennifer F PT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Budget Car Rental	1885 NW 9th St	Corvallis	OR	97330	532111	Automobile Renting
HomeSmart	728 NW Kings Blvd	Corvallis	OR	97330	531210	Real Estate
Watershed Sciences Inc	257 SW Madison Ave	Corvallis	OR	97333	561621	Remote Sensing Analysis
Bentson, Lynn A MD	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Farm Home School	4545 NE Highway 20	Corvallis	OR	97330	611110	Schools
Jamba	1580 NW 9th St	Corvallis	OR	97330	722515	Juice Bars
Oregon State University Linus Pauling Institute	307 Linus Pauling Science Ctr	Corvallis	OR	97331	611310	University-College Dept/Facility/Office
Nguyen, Thien Quoc	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Oregon Coffee & Tea	215 NW Monroe Ave	Corvallis	OR	97330	445298	Coffee & Tea
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Christ Central Presbyterian Church	760 SW Madison Ave	Corvallis	OR	97333	813110	Churches
Magnuson, Erin	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Bailey, Candice, DVM	300 Magruder Hall	Corvallis	OR	97331	541940	Veterinarians
Marshall Environmental TR	2870 NW Duchess Pl	Corvallis	OR	97330	541714	Environmental & Ecological Services
Willamette Photography	5652 SW Bluestem Pl	Corvallis	OR	97333	541921	Photography

Corvallis Family Medicine	2400 NW Kings Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Mental Health Family	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Softball Complex at Oregon State University	SW Western Blvd	Corvallis	OR	97333	711310	Stadiums Arenas & Athletic Fields
Corvallis Psychic Shop	1413 NW 9th St	Corvallis	OR	97330	812990	Psychic Mediums
Tax & Wealth Management LLP	2334 NW Professional Dr	Corvallis	OR	97330	541213	Tax Return Preparation & Filing
Empact Africa	791 SW 57th St	Corvallis	OR	97333	999990	Nonclassified Establishments
JCK Restaurant, Inc	800 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Lynch David L Barber Shop	120 SW Avery Ave	Corvallis	OR	97333	812111	Barbers
Arborinas	31407 Fern Rd	Corvallis	OR	97333	444240	Nurserymen
Shabani-Ardali, Alireza, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Hayes & Associates Inc	2390 NW Kings Blvd	Corvallis	OR	97330	541330	Engineering
Edward Jones	1803 NW Kings Blvd	Corvallis	OR	97330-1907	523940	Portfolio Management and Investment Advice
National Guard Armory	1100 NW Kings Blvd	Corvallis	OR	97330	928110	State Government-National Security
Bullfrog Landscape Lawn	2665 SW 53rd St	Corvallis	OR	97333	238160	Gutters & Downspouts
Guertin, Candice M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Metcalfe, Robyn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Dallas, Lauren N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Stock Profits Confidential	1143 NW 31st St	Corvallis	OR	97330	999990	Nonclassified Establishments
Mags Press	2819 NW Mulkey Ave	Corvallis	OR	97330	513120	Periodicals-Publishing & Printing (Mfrs)
Electric Charging Station	900 NW 4th St	Corvallis	OR	97330	457120	Electric Charging Station
Wells Fargo	235 NW Monroe Ave	Corvallis	OR	97330-4731	522110	Commercial banks
Information Management Solutions	2397 NW Kings Blvd	Corvallis	OR	97330-3986	541511	Computer Programming and Software Development Services
James A McKenzie	30390 Smith Loop	Corvallis	OR	97333	484220	Lumber Carriers
Kruger, Regina, Elizabeth	590 NE Circle Blvd	Corvallis	OR	97330	621330	Pharmacists
Hanson Insurance Group	350 NW Elks Dr	Corvallis	OR	97330	524210	Insurance
Oregon Physical Therapy	2865 NW 29th St	Corvallis	OR	97330-3516	621340	Physical, occupational, speech therapists and audiogists' clinics
Soap Creek Schoolhouse Foundation	37465 Soap Creek Rd	Corvallis	OR	97330	541720	Foundation-Educ Philanthropic Research
Electric Charging Station	875 SW 26th St	Corvallis	OR	97331	457120	Electric Charging Station
Metafoundation	800 SW Washington Ave	Corvallis	OR	97333	541720	Foundation-Educ Philanthropic Research
Hall, Carrie	305 SW C Ave	Corvallis	OR	97333	624190	Counselors
Emiko Therapeutic Massage	996 NW Circle Blvd	Corvallis	OR	97330	812199	Massage Therapists
First Christian Disciples in the Heart of Corvallis	602 SW Madison Ave	Corvallis	OR	97333	813110	Churches
Ai Ramen	1830 NW 9th St	Corvallis	OR	97330-2368	722511	Full-Service Restaurants
Scott Meeker CPA PC	2045 NW Grant Ave	Corvallis	OR	97330	541211	Accountants
LibertyX Bitcoin ATM	1117 NW 9th St	Corvallis	OR	97330	523160	Virtual Currency Conversion Kiosk/ATM
Clarity Wealth Development	262 NW Polk Ave	Corvallis	OR	97330	523940	Financial Planning Consultants
Corvallis Hearing Center	975 NW Spruce Ave	Corvallis	OR	97330-2297	423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
Phi Sigma Rho National Sorority	2251 SW Jefferson Way	Corvallis	OR	97331-8660	813410	Community clubs
Didier, Brent, DO	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
TTT Timber Inc	NULL	Corvallis	OR	97330	423310	Timber & Timberland Companies (Whls)
CHF Van Buren LLC	NULL	Corvallis	OR	97330	999990	Nonclassified Establishments
Magenta Restaurant & Snug Bar	137 SW 2nd St	Corvallis	OR	97333-4715	722511	Full-Service Restaurants
Beaver Sports Properties	108 Gill Coliseum	Corvallis	OR	97331-8547	531210	Real Estate Agencies and Brokerages
Torgerson, Michael	815 NW 9th St	Corvallis	OR	97330	621340	Speech Pathologists
Albany Corvallis Duplicate	622 NW Survista Ave	Corvallis	OR	97330	813410	Clubs
City of Corvallis Charging Station	517 SW 2nd St	Corvallis	OR	97333	457120	Electric Charging Station
SSS Investments	200 SW 4th St	Corvallis	OR	97333	523150	Investment Securities
Adult Shops	2315 NW 9th St	Corvallis	OR	97330	711190	Entertainment Bureaus
Ramcharan, David	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Whiteside Theatre	361 SW Madison Ave	Corvallis	OR	97333	512131	Theatres-Movie
Koning, Rob	223 SW 8th St	Corvallis	OR	97333	624190	Counselors
Craft, Travis K	4455 NE Highway 20	Corvallis	OR	97330	621330	Social Workers
Ec Co-Corvallis	940 NE Circle Blvd	Corvallis	OR	97330	236115	General Contractors
Benton County Finance & Tax Office	4500 SW Research Way	Corvallis	OR	97333-1093	921120	Legislative assemblies
Miss Meer's	451 SW Madison Ave	Corvallis	OR	97333	458210	Shoes-Retail

Wright, Landon	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Fidelity National Title	527 NW 3rd St	Corvallis	OR	97330	541191	Title Companies
Hastings, Michelle DO	3509 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Team Dirt	NULL	Corvallis	OR	NULL	813319	Non-Profit Organizations
Samaritan Gynecology & Surgical Associates	400 NW Walnut Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Franz Bakery Outlet	245 SW Avery Ave	Corvallis	OR	97333	311811	Bakers-Retail
E G Solutions Inc	2870 SW Morris Ave	Corvallis	OR	97333	999990	Federal Government Contractors
Mohamed, Nada	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Image By Design	2380 NW Kings Blvd	Corvallis	OR	97330	812112	Beauty Salons
Albin's Plumbing Inc	942 NW 9th St	Corvallis	OR	97330	238220	Plumbing Contractors
SJ Automotive Investments, Inc	800 NW 5th St	Corvallis	OR	97330	523910	Investments
Metro by T-Mobile	700 NE Circle Blvd	Corvallis	OR	97330-4484	517112	Wireless Telecommunications Carriers (except Satellite)
Sunbow Produce	6910 SW Plymouth Dr	Corvallis	OR	97333	445230	Fruits & Vegetables & Produce-Retail
LibertyX Bitcoin ATM	2080 NW 9th St	Corvallis	OR	97330	523160	Virtual Currency Conversion Kiosk/ATM
Rowell, Alexander C	216 NW 6th St	Corvallis	OR	97330	621399	Psychologists
Samaritan Pediatrics	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Christopher L Gray Insurance	761 NW Harrison Blvd	Corvallis	OR	97330	524210	Insurance
Walnut Creek Apartments	980 NE Walnut Blvd	Corvallis	OR	97330	531110	Apartments
Rising Tides 541	120 SW 4th St	Corvallis	OR	97333	999990	Nonclassified Establishments
Pi Kappa Alpha Fraternity	209 NW 14th St	Corvallis	OR	97330	813410	Fraternal Organizations
Bowen, Samuel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Extension Service	4077 SW Research Way	Corvallis	OR	97333	624190	Social Service & Welfare Organizations
Gay, Nicholas W	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
All Star Custom Curb & Concrete	239 NW Polk Ave	Corvallis	OR	97330	238110	Concrete Contractors
Stahlbush Island Farms Inc	3122 SE Stahlbush Island Rd	Corvallis	OR	97333	311412	Frozen Food Processors (Mfrs)
Freitag, Joshua	114 SW 8th St	Corvallis	OR	97333	624190	Counselors
Mountain View RV & Boat Storage	5210 NE Elliott Cir	Corvallis	OR	97330	493190	Recreational Vehicles-Storage
College of Engineering	101 Covell Hall	Corvallis	OR	97331	541330	Engineers
The Franklin Press	5655 SW Philomath Blvd	Corvallis	OR	97333	323111	Printers (Mfrs)
Chateau Home Furnishings	1430 NW 9th St	Corvallis	OR	97330	449110	Furniture-Dealers-Retail
Macarthur, Samantha	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Owens Buildings Inc	935 NW Camellia Dr	Corvallis	OR	97330	236220	Buildings-Metal
Madison Avenue Collective	459 SW Madison Ave	Corvallis	OR	97333-4718	541512	Computer-aided design (CAD), engineering (CAE), manufacturing (CAM) systems integration design services
AmeriGas Cylinder Propane Refill	27678 Highway 99W	Corvallis	OR	97333	457210	Gas-Propane-Refilling Stations
Pedianourish LLC	3000 NW Roosevelt Dr	Corvallis	OR	97330	999990	Federal Government Contractors
Lancaster Bridge Apartments	3384 NE Oxford Cir	Corvallis	OR	97330	531110	Apartments
Madabhushi, Aditi, MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Firestone Complete Auto Care	385 SW 3rd St	Corvallis	OR	97333	811111	Automobile Repairing & Service
Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Home Life	1710 NW Division St	Corvallis	OR	97330	813311	Disability Services
Samaritan Athletic Medicine Center	845 SW 30th St	Corvallis	OR	97331-8629	621111	Physicians' clinics
Lape, Alexandra	NULL	Corvallis	OR	97333	621399	Midwives
Benton County Elections Office	4500 SW Research Way	Corvallis	OR	97333	921120	Government Offices-County
Mendez Bello, Daisy, Michelle	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
The Union Apartments	2750 NW Harrison Blvd	Corvallis	OR	97330-5294	531110	Landlords of Residential Buildings and Dwellings
St Mary's Hosp Neonatal ICU	3615 NW Samaritan Dr	Corvallis	OR	97330-3771	621111	Physicians' clinics
Greene, Deidre, I	3521 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Germane & Wise Mental Health	2727 NW 9th St	Corvallis	OR	97330	622210	Mental Health Services
Benco	165 NE Conifer Blvd	Corvallis	OR	97330	813311	Disability Services
Gardner, Charlotte P	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Physicians Assistants
Wiltbank, Carolyn, Marie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Western Union Agent Location	2641 NW 9th St	Corvallis	OR	97330	522320	Money Order Service
Pacific Payroll LLC	2645 SE 3rd St	Corvallis	OR	97333	541214	Payroll Preparation Service
Samaritan Kidney Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Excel Painting & Pressure	3360 SE Hathaway Dr	Corvallis	OR	97333	238320	Painters
7-Eleven	2405 SE 3rd St	Corvallis	OR	97333	445131	Convenience Stores

Corvallis City Attorney	456 SW Monroe Ave	Corvallis	OR	97333	922130	City Government-Legal Counsel
AmeriGas Propane Exchange	2075 NW Circle Blvd	Corvallis	OR	97330	457210	Propane Tank Kiosks
Manley, Kristy	33461 SE Peoria Rd	Corvallis	OR	97333	621340	Speech Pathologists
Katie Slayden, Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531210	Real Estate
Cardv Center Against Rape	NULL	Corvallis	OR	97330	624110	Crisis Intervention Service
Beaver Bowls	227 SW 6th St	Corvallis	OR	97333	459991	Cannabis Dispensary
Common Fields	545 SW 3rd St	Corvallis	OR	97333	722330	Mobile Food Services
Carter, David	1650 SW 45th Pl	Corvallis	OR	97333	624190	Social Workers-Clinical
Corvallis Organization For Real Empowerment	555 NW 5th St	Corvallis	OR	97330	531210	Real Estate Management
Papa's Pizza Parlor-Corvallis	1030 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Element Graphics	250 NW Tyler Ave	Corvallis	OR	97330	323113	Screen Printing (Mfrs)
Anderson Neurological Pain Solutions	2605 NW Lupine Pl	Corvallis	OR	97330-3537	621111	Physicians' clinics
Hunters of Color	6620 NE Pettibone Dr	Corvallis	OR	97330	813319	Non-Profit Organizations
Armentrout, Courtney	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Raylee Wines	475 NE Conifer Blvd	Corvallis	OR	97330-4195	312130	Wineries
Heart of the Valley Law	2211 NW Professional Dr	Corvallis	OR	97330-3891	541110	Attorney Offices/Private Practices
Allstate Insurance	2617 NW 9th St	Corvallis	OR	97330	524210	Insurance
R C Humphrey Construction Inc	6160 NW Fair Oaks Dr	Corvallis	OR	97330	236115	General Contractors
US Geological Survey	777 NW 9th St	Corvallis	OR	97330	924120	Federal Government-Land/Mineral/Wildlife/Forest Conservation
Goldberg-Hambl, Sara	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Herbst, Brianna, DPT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Vocational Rehabilitation Department	4170 SW Research Way	Corvallis	OR	97333	923130	State Government-Social/Human Resources
Hudson, Benjamin, Francis, DO	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Mecop Inc	435 NW 5th St	Corvallis	OR	97330	611710	Educational Consultants
Pink Laser & Spa	128 SW 3rd St	Corvallis	OR	97333	812112	Beauty Salons
Plaza Medi Spa	305 SW C Ave	Corvallis	OR	97333	713940	Health Spas
Catalyst Psychiatry, LLC	2222 NW Lincoln Ave	Corvallis	OR	97330	622210	Psychiatric Treatment Facilities
Augustine, Wella PT	3620 NW Samaritan Dr	Corvallis	OR	97330	621340	Physical Therapists
Clayton's Auto Repair & Service	797 NE Circle Blvd	Corvallis	OR	97330	811111	Automobile Repairing & Service
Chamberlain, Lee A MSN	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Registered RN
The Home Depot	1780 NW Four Acre Place	Corvallis	OR	97330	444110	Home Centers
David Lawrence	889 NW Grant Ave	Corvallis	OR	97330-4539	999990	Unclassified Establishments
Hart, Kari K	3509 NW Samaritan Dr	Corvallis	OR	97330	621330	Social Workers
Willamette Landing Owners Association	3501 SE Shoreline Dr	Corvallis	OR	97333	813910	Associations
Benton County Juvenile Department	4077 SW Research Way	Corvallis	OR	97333-1065	921120	Legislative assemblies
Smythe, Tracy M PA	996 NW Circle Blvd	Corvallis	OR	97330	621399	Physicians Assistants
Eye Care Associates	330 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Urgent Care Walk-In Clinic	5234 SW Philomath Blvd	Corvallis	OR	97333	621111	Physicians & Surgeons
Benton Community Health Center	530 NW 27th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Bi-Mart	1555 SW 53rd St	Corvallis	OR	97333	455110	Department Stores
The Shop	244 NW 2nd St	Corvallis	OR	97330-5459	713940	Gymnasium (gym)
Rite Aid GNC Live Well Store	2080 NW 9th St	Corvallis	OR	97330	456191	Vitamin & Food Supplements
Westminster House	101 NW 23rd St	Corvallis	OR	97330	813110	Church Organizations
Dental Health PC	869 NW 23rd St	Corvallis	OR	97330	621210	Dentists
Siuslaw National Forest	3200 SW Jefferson Way	Corvallis	OR	97331-8550	488390	Other Support Activities for Water Transportation
Kironde, Kristy Lynn	2001 NW Monroe Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Graves, Julie E	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Bunce, Shanna M MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Corvallis Cad Service	2535 NW Kings Blvd	Corvallis	OR	97330	541990	Services NEC
Nextgenis.com Computers Service & Repair	314 SW Monroe Ave	Corvallis	OR	97333	541890	Advertising-Computer
Travis Gapp Construction	755 SW 55th St	Corvallis	OR	97333	236115	Construction Companies
Traweek, Cody Angela	530 NW 27th St	Corvallis	OR	97330	621330	Pharmacists
Oregon State University College of Science	128 Kidder Hall	Corvallis	OR	97331-8553	611310	Schools offering baccalaureate or graduate degrees
White, Nicholas J DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
Jones, Lisa, Fougere, OD	1329 NW 9th St	Corvallis	OR	97330-5386	621320	Doctors of optometry clinics
Steyn, Jody-Leigh MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons

Spiritopia/Or Ryegrass Spirits	720 NE Granger Ave	Corvallis	OR	97330	445320	Liquors-Retail
Drakes, Marie, Louise, RN	4455 NE Highway 20	Corvallis	OR	97330-9695	621399	Offices of All Other Miscellaneous Health Practitioners
Brutsaert, Marijke L	744 NW 4th St	Corvallis	OR	97330	621330	Social Workers
Townsend, James A DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Avcr Electronics	582 SW Adams Ave	Corvallis	OR	97333	449210	Electronic Equipment & Supplies-Retail
Mistry Investments LLC	2244 NW Dixon St	Corvallis	OR	97330	523910	Investments
Dunn, Kristi	201 Gill Coliseum	Corvallis	OR	97331-8547	621340	Physical, occupational, speech therapists and audiogists' clinics
The Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Veto Home Care	1320 SW Hillview Ave	Corvallis	OR	97333	621610	Home Health Service
Lemon Grass Noodle House	1603 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Miller, Khali, D	3521 NW Samaritan Dr	Corvallis	OR	97330	621330	Pharmacists
Lawrence David DC	889 NW Grant Ave	Corvallis	OR	97330	621310	Chiropractors DC
RJH Enterprises	33270 SE White Oak Rd	Corvallis	OR	97333-2507	238910	Site Preparation Contractors
Blair, Tashina, Louise	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Nurses-Practitioners
Yetter, Brook, Barrett	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Agae Technologies LLC	33900 SE Eastgate Cir	Corvallis	OR	97333	339999	Manufacturers
Peoria Road Farm Market	33269 SE Peoria Rd	Corvallis	OR	97333-2546	445230	Produce Markets
Cruz, Erikjone	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
The Hanson Country Inn	795 SW Hanson St	Corvallis	OR	97333	721110	Hotels & Motels
Lerma, Keegan KM	335 NW 4th St	Corvallis	OR	97330	621340	Physical Therapists
Gardens at Holstein House	31707 Oconna	Corvallis	OR	97330	812990	Wedding Chapels
Quality Painting of Oregon	37609 Soap Creek Rd	Corvallis	OR	97330	238320	Painters
Benchmark Fab & Finish	33127 SE Peoria Rd	Corvallis	OR	97333	811121	Automobile Customizing
Brown, Beethoven MD	815 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Duong, Jeanine M OD	1597 SW 53rd St	Corvallis	OR	97333	621320	Optometrists OD
Janus House of Business	606 SW 5th St	Corvallis	OR	97333	623990	Group Homes
Electric Charging Station	2750 SW Campus Way	Corvallis	OR	97331	457120	Electric Charging Station
H&R Block	5280 SW Philomath Blvd	Corvallis	OR	97333-1042	541213	Tax services
Harvest Christian Center Corvallis	1601 NE Conifer Blvd	Corvallis	OR	97330	813110	Churches
Harrison Bar & Grill	550 NW Harrison Blvd	Corvallis	OR	97330	722511	Restaurants
8020 Property LLC	2065 NW Grant Ave	Corvallis	OR	97330	531210	Real Estate Management
Wood, Meghan E DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dirt Road Brewing	5770 NW Oak Creek Dr	Corvallis	OR	97330	312120	Brewers (Mfrs)
Kronewitter, Waverley A	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
American Dream Pizza	2525 NW Monroe Ave	Corvallis	OR	97330	722511	Pizza
The Park at Fifth Street	635 NW 5th St	Corvallis	OR	97330	531311	Apartment Finding & Rental Service
Lance Kaufman Consulting	2623 NW Bluebell Pl	Corvallis	OR	97330	541618	Consultants-Business NEC
Antoine, Sarah, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Internal Medicine	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Matsushita, Starr DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rex, LLC	777 NE 2nd St	Corvallis	OR	97330	541110	Attorneys
Cox, Dale	344 NW 6th St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Michelle's Personalized Skin Care	1128 NE 2nd St	Corvallis	OR	97330-6251	621999	Miscellaneous health care providers
Aron, Mark	216 NW 6th St	Corvallis	OR	97330	621399	Psychologists
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
OSU Small Animal Teaching HSP	172 Magruder Hall	Corvallis	OR	97331-8555	541940	Animal hospitals, clinics, and veterinarians
Marinescu, Luiza G	3509 NW Samaritan Dr	Corvallis	OR	97330-3893	621399	Offices of All Other Miscellaneous Health Practitioners
Samaritan Family Medicine Resident Clinic	3517 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Acey, Autumn, May	4185 SW Research Way	Corvallis	OR	97333	621330	Social Workers
Truax Corp CC27	1680 SW 3rd St	Corvallis	OR	97333	457120	Service Stations-Gasoline & Oil
Piercey Plaza LLC	305 SW C Ave	Corvallis	OR	97333-4400	812112	Beauty Shops
Art in the Valley	209 SW 2nd St	Corvallis	OR	97333	459920	Art Galleries & Dealers
Power Chevrolet GMC of Corvallis	705 NW Buchanan Ave	Corvallis	OR	97330-6216	441110	New Car Dealerships
Castor	458 SW Madison Ave	Corvallis	OR	97333	722511	Restaurants
Barrett, Shawn, A, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Wilson Motors Ford	1105 NW 5th St	Corvallis	OR	97330-6209	441110	New Car Dealerships

Doug Looney's Live Sound	541 SW Wake Robin Ave	Corvallis	OR	97333	449210	Sound Systems & Equipment-Renting
Samaritan Kidney Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Depot Suites	700 SW Washington Ave	Corvallis	OR	97333	721310	Corporate Lodging
Rains, Shalece	425 SW Madison Ave	Corvallis	OR	97333	812199	Massage Therapists
Stamper Industries	3367 SE Midvale Dr	Corvallis	OR	97333	339999	Manufacturers
Sportsman's Storage	4535 SE 3rd St	Corvallis	OR	97333	713930	Boat Storage
Samaritan Pediatrics Circle	1112 NW Circle Blvd	Corvallis	OR	97330	621210	Dentists
Oregon Wildlife Institute	37112 Moss Rock Dr	Corvallis	OR	97330	813910	Associations
TransPerfect	127 SW 4th St	Corvallis	OR	97333	541930	Translators & Interpreters
Enfield, Braden J	2080 NW 9th St	Corvallis	OR	97330	621330	Pharmacists
Neuhaus, Alicia, June	530 NW 27th St	Corvallis	OR	97330	621330	Pharmacists
Natural Grocers	1235 NW 10th St	Corvallis	OR	97330	445110	Grocers-Retail
Hill, Spencer, Larson, DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Jamie Hughes CPA LLC	883 NW Grant Ave	Corvallis	OR	97330	541211	Accountants
Bullfrog Music	310 SW 2nd St	Corvallis	OR	97333	459140	Musical Instruments-Dealers
Clark & Eldredge Dental	3485 NW Dimple Hill Rd	Corvallis	OR	97330	621210	Dentists
McConahay, Mary M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
La La 34 LLC	545 NW 34th St	Corvallis	OR	97330	999990	Nonclassified Establishments
Corvallis Life Community	4900 NW Highway 99	Corvallis	OR	97330-9487	813110	Religious societies
Takush, Donald, Raymond, MD	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
O'Brien, Nicolas, Eugene	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Watson Jr, Michael DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Majestic Theatre	115 SW 2nd St	Corvallis	OR	97333	711110	Theatres-Live
JKC Corvallis Automotive, Inc	900 NW 4th St	Corvallis	OR	97330	441110	Automobile Dealers-New Cars
Broadway Metal Recycling Inc	2165 NW Professional Dr	Corvallis	OR	97330-4683	332999	All Other Miscellaneous Fabricated Metal Product Manufacturing
Pizza Hut	700 NE Circle Blvd	Corvallis	OR	97330	722511	Pizza
Martin, Sarah, Lily	650 SW 3rd St	Corvallis	OR	97333	621399	Alternative Medicine
THE SHOW	1915 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Auto Tech	727 NW 4th St	Corvallis	OR	97330	811114	Brake Service
Sibling Revelry	145 NW 2nd St	Corvallis	OR	97330	458110	Women's Apparel-Retail
Woodworking Industries	33875 SE Peoria Rd	Corvallis	OR	97333	337110	Cabinets
Creative Framing	2615 NW 9th St	Corvallis	OR	97330	455219	Picture Frames-Dealers
Molecular Masses LLC	720 NE Granger Ave	Corvallis	OR	97330	311352	Candy & Confectionery-Manufacturers
La Vella, Erika D DO	3517 NW Samaritan Dr	Corvallis	OR	97330-3768	621111	Physicians' clinics
Internet Service Corvallis	134 SW 4th St	Corvallis	OR	97333	518210	Internet Service
Moen, Kristin, Elizabeth	2075 NW Grant Ave	Corvallis	OR	97330	621399	Nurses-Practitioners
Witham Hill Oaks Apartments	4275 NW Clubhouse Pl	Corvallis	OR	97330	531110	Apartments
Fred Meyer	777 NW Kings Blvd	Corvallis	OR	97330-5620	445110	Grocery Stores and Supermarkets
Schulz, Tyler R DO	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Clare Staton, Realtor Connected Real Estate Group	435 NW 5th St	Corvallis	OR	97330	531210	Real Estate
Camas Commons	5140 SW Meadow Flower Dr	Corvallis	OR	97333	531110	Apartments
Pierz, Jennifer M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Knife River-Corvallis	28602 Highway 34	Corvallis	OR	97333	423390	Construction Materials NEC (Whls)
Oregon Rubber Mills Co	1985 SW Airport Ave	Corvallis	OR	97333	326299	Rubber Products-Manufacturers
Hair By Christy	445 NW 3rd St	Corvallis	OR	97330	812112	Beauty Salons
Houston, Brittany, Simone, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jenkins, Daniel B DPT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Safeway	5270 SW Philomath Blvd	Corvallis	OR	97333	445110	Grocers-Retail
Filtered Solutions	1817 SW Brooklane Dr	Corvallis	OR	97333	999990	Nonclassified Establishments
Iszler, Kimberly M	777 NW 9th St	Corvallis	OR	97330	621399	Dietitians
Videx Inc	1105 NE Circle Blvd	Corvallis	OR	97330	334412	Printed & Etched Circuits-Mfrs
Peaceful Family Solutions	993 NW Circle Blvd	Corvallis	OR	97330	541110	Attorneys
Arnold, Kristilyn, Hilda	426 NW 4th St	Corvallis	OR	97330	624190	Counselors
Pepsi Beverages Co	2636 NE Belvue St	Corvallis	OR	97330	312111	Bottlers (Mfrs)
Rubicon Investments Ltd	NULL	Corvallis	OR	NULL	523910	Investments
Sprick, Brandy JC MSN	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Registered RN

Watershed Fly Shop	351 SW Madison Ave	Corvallis	OR	97333	459110	Fishing Tackle-Dealers
Simpson, Mark	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Day Surgery Center of Corvallis	444 NW Elks Dr	Corvallis	OR	97330-3745	621111	Physicians' clinics
Richard Gretz Goldsmiths	308 SW Madison Ave	Corvallis	OR	97333	458310	Jewelry Designers
Chestnut Village	2766 SW Pickford St	Corvallis	OR	97333	531110	Apartments
The Gift Shops	1800 SW 3rd St	Corvallis	OR	97333	459420	Gift Shops
Independent Merchant Brokers	6735 SW Country Club Dr	Corvallis	OR	97333-1987	561990	Miscellaneous support services
Annmarie O'Daniel	260 SW Madison Ave	Corvallis	OR	97333	624190	Counselors
Casa Latinos Unidos De Benton County	1555 SW 35th St	Corvallis	OR	97333	921120	Government Offices-County
Bedrooms LLC	250 NW 1st St	Corvallis	OR	97330-4836	531210	Real Estate Agencies and Brokerages
BUENA VISTA ARBOR CARE	5820 NW Highway 99	Corvallis	OR	97330	561730	Tree Service
Raw Hair Society	600 SW 3rd St	Corvallis	OR	97333	812112	Beauty Salons
Campus Limousine Service	NULL	Corvallis	OR	97330	485320	Limousine Service
Morgan Draperies	27678 Highway 99W	Corvallis	OR	97333-9464	449122	Window Treatment Retailers
Women Role Models Project	1105 Kelley Engineering	Corvallis	OR	97331-8600	624190	Miscellaneous Individual and Family Services
Dunning Wealth Management	2101 NW Professional Dr	Corvallis	OR	97330	523150	Stock & Bond Brokers
Martin, Jayd, Lynn	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
10D Tech	410 NW Walnut Blvd	Corvallis	OR	97330	423690	Telecommunication Equip/Syst-Whls/Mfrs
Corvallis Clinic Immediate CR	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Grantz, Erika	420 NW 2nd St	Corvallis	OR	97330	624190	Marriage & Family Counselors
HMK Consulting Inc	1340 NW 11th St	Corvallis	OR	97330	541511	Software/Application/Platform Developers & Programmers
Kontraband Retro Games	425 SW Madison Ave	Corvallis	OR	97333	459120	Games & Game Supplies
Western Union Agent Location	1467 NW Monroe Ave	Corvallis	OR	97330	522320	Money Order Service
Coffee Culture	363 SW Jefferson Ave	Corvallis	OR	97333	722515	Coffee Shops
McMahon Construction Solutions	3955 SW Brooklane Dr	Corvallis	OR	97333	236115	Construction Companies
Upper Hand Orthopedics	2773 NW 9th St	Corvallis	OR	97330-3857	621111	Physicians' clinics
Knife Edge Software	137 SW 3rd St	Corvallis	OR	97333	513210	Software/Application/Platform Publishing
Tran, Jenny MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Clinic-Orthopedics	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
AmeriGas Propane Exchange	1840 NW 9th St	Corvallis	OR	97330	457210	Propane Tank Kiosks
USPS Blue Collection Box	3615 NW Samaritan Dr	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Team Green Pest Solutions	3670 NW Highland Dr	Corvallis	OR	97330	561710	Pest Control
OSU Athletics	100 Gill Coliseum	Corvallis	OR	97331-8547	561599	Miscellaneous travel arrangement and reservation services
Earthfort	635 SW Western Blvd	Corvallis	OR	97333	541380	Soil Testing
Flannery, Gregory R DDS	833 NW 23rd St	Corvallis	OR	97330	621210	Dentists
Benny's Donuts	116 NW 3rd St	Corvallis	OR	97330-4701	722515	Snack & Nonalcoholic Beverage Bars
Reynolds Law Firm	225 SW 4th St	Corvallis	OR	97333-4872	541110	Attorney Offices/Private Practices
Mierau, Luke	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Starbucks	425 SW Madison Ave	Corvallis	OR	97333	722515	Coffee Shops
Honey Buzzin LLC	29216 Lakeside Dr	Corvallis	OR	97333	424490	Honey (Whls)
Red Diamond Inc	2645 SW 49th St	Corvallis	OR	97333	561990	Business Services NEC
SmileKeepers Corvallis	1769 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Pederson, Deborah, Stadfelt, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Campaign For OSU	4238 SW Research Way	Corvallis	OR	97333	813940	Political Organizations
Brenda Cochran Counseling	223 SW 8th St	Corvallis	OR	97333	624190	Marriage & Family Counselors
DPS & Associates, Inc	720 NW 4th St	Corvallis	OR	97330	541110	Attorneys
Refresh Your Memory Inc	1318 NW 9th St	Corvallis	OR	97330-4565	541512	Computer-aided design (CAD), engineering (CAE), manufacturing (CAM) systems integration design services
Jensen, April G DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Path of Life Counseling	685 NW 5th St	Corvallis	OR	97330	624110	Counseling Services
Bluesun, Inc	NULL	Corvallis	OR	NULL	561311	Employment Agencies & Opportunities
Patel, Karan, Arun, DMD	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Favorite Duplex LLC	913 NW Grant Ave	Corvallis	OR	97330	531210	Real Estate
Mel's Barber Shop	958 NW Circle Blvd	Corvallis	OR	97330	812111	Barbers
Heart of the Valley Birth Center	25737 SW Airport Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Gonzales, Beau Dion	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Oregon State University-Capital Planning & Development Dept	3015 SW Western Blvd	Corvallis	OR	97333	611310	University-College Dept/Facility/Office

Mincy, Piper	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Wood, Lynn PA	545 SW 2nd St	Corvallis	OR	97333	621399	Physicians Assistants
Dixon Creek Dental Center	1885 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Al Hutchinson's Auto Center	1800 NW 9th St	Corvallis	OR	97330-2143	441120	Used Car Dealerships
Balmeo, Kathleen M	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
The Arts Center	700 SW Madison Ave	Corvallis	OR	97333	459920	Art Galleries & Dealers
Caves Bier & Kitchen	308 SW 3rd St	Corvallis	OR	97333	722511	Restaurants
Maxs Food & More	2475 NW 9th St	Corvallis	OR	97330-1560	722410	Bars
Miller, Jacob R	777 NW 9th St	Corvallis	OR	97330	624190	Counselors
Veri at Timberhill	2380 NW Rolling Green Dr	Corvallis	OR	97330	531110	Apartments
Stedman, Morgynn, Skye	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Demaggio's New York Pizza	151 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
G & J Truck Pros	257 NW Van Buren Ave	Corvallis	OR	97330	423120	Truck Accessories (Whls)
Titus, Laurel	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
Naturalpoint Headquarters	3658 SW Deschutes St	Corvallis	OR	97333-9285	541330	Engineers' offices
Delmendo, Madison N	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Dietitians
Medical Information Management	938 NW Kings Blvd	Corvallis	OR	97330	541219	Billing Service
PetSmart	940 NW Circle Blvd	Corvallis	OR	97330	459910	Pet Supplies & Foods-Retail
Landberg, Brooke, H	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
City of Corvallis	501 SW Madison Ave	Corvallis	OR	97333	921110	City Government-Executive Offices
Northwest Habitat Institute	355 NW 7th St	Corvallis	OR	97330	813910	Associations
Corvallis Housing	501 SW Madison Ave	Corvallis	OR	97333	925110	City Government-Housing Programs
Inflexion Health LLC	3925 SW Country Club Dr	Corvallis	OR	97333	621999	Health Services
Iqbal, Aadil S DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Clinic Family Practice	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Blake Ecker: Allstate Insurance	310 NW 5th St	Corvallis	OR	97330	524210	Insurance
Corvallis High School	1400 NW Buchanan Ave	Corvallis	OR	97330	611110	Schools
Meadowlark Communications Inc	2807 NW Morning Glory Dr	Corvallis	OR	97330	517810	Communications
Munoz Soccer Coaching	3510 NW Veracruz Pl	Corvallis	OR	97330	713990	Amusement & Recreation NEC
Ravi Chikkalingaiah MD PC	NULL	Corvallis	OR	97330	621111	Physicians & Surgeons
Element Grow	33911 SE Eastgate Cir	Corvallis	OR	97333	541330	Engineering
Corvallis Family Medicine	2400 NW Kings Blvd	Corvallis	OR	97330-3900	621999	Miscellaneous health care providers
Anderson Blues	8793 NW Arboretum Rd	Corvallis	OR	97330	445230	Fruits & Vegetables & Produce-Retail
Andrew Beck-Ameriprise Financial Services, Inc	777 NE 2nd St	Corvallis	OR	97330	523940	Financial Advisory Services
Beerhaus Taphouse LLC	101 NW Jackson Ave	Corvallis	OR	97330	722410	Bars
Bank of America Mortgage	324 SW 3rd St	Corvallis	OR	97333	522292	Real Estate Loans
Sterling Management Group	200 SW 4th St	Corvallis	OR	97333-4649	531210	Real Estate Agencies and Brokerages
Robnett's Hardware	400 SW 2nd St	Corvallis	OR	97333	444140	Hardware-Retail
Wydra, Nicole D	1740 NW 9th St	Corvallis	OR	97330-2141	621399	Offices of All Other Miscellaneous Health Practitioners
Java II	121 The Valley Library	Corvallis	OR	97331-8552	722515	Snack & Nonalcoholic Beverage Bars
Robinson, Irina MD	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Conservation Biology Institute	136 SW Washington Ave	Corvallis	OR	97333	813312	Environmental Conservation/Ecologcl Org
FedEx Drop Box	201 SW Airport Ave	Corvallis	OR	97333	541860	Mailing & Shipping Kiosks
Shoestring Graphics	7160 NW Somerset Dr	Corvallis	OR	97330	541430	Graphic Designers
Insect Identification Services, LLC	1020 NW Lewisburg Ave	Corvallis	OR	97330	561710	Pest Control
Relevance	2435 NW Harrison Blvd	Corvallis	OR	97330-5403	531311	Residential Property Managers
Benton County Admin	205 NW 5th St	Corvallis	OR	97330-4808	921120	Legislative assemblies
Public Good PR, LLC	3349 NW Tanager Dr	Corvallis	OR	97330	541820	Public Relations Counselors
Western Union Agent Location	450 SW 3rd St	Corvallis	OR	97333	522320	Money Order Service
Bodycare By Ruby LLC	344 SW 2nd St	Corvallis	OR	97333	812199	Massage Therapists
Caster, John C	408 SW Monroe Ave	Corvallis	OR	97333	621330	Social Workers
Queen's Chopstick	2329 NW Kings Blvd	Corvallis	OR	97330	722511	Restaurants
Advantage Property Management	987 NW Circle Blvd	Corvallis	OR	97330-1408	531210	Real Estate Agencies and Brokerages
Aloha Is Foundation	3021 NE Glacier Way	Corvallis	OR	97330	999990	Federal Government Contractors
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Corvallis Cat Care	620 NW 4th St	Corvallis	OR	97330	541940	Veterinarians

Sykora, Gregory J DMD	1830 NW 9th St	Corvallis	OR	97330	621210	Dentists
The Little Gym of Corvallis, or	958 NW Circle Blvd	Corvallis	OR	97330	713940	Children's Fitness
Andrew William Beck	777 NE 2nd St	Corvallis	OR	97330	541110	Attorneys
Meristem Counseling Center	760 SW Madison Ave	Corvallis	OR	97333	624110	Counseling Services
Tacovore	2503 NW Kings Blvd	Corvallis	OR	97330	999990	Nonclassified Establishments
Ewanchyna, Kevin DJ MD	5234 SW Philomath Blvd	Corvallis	OR	97333-1042	621111	Physicians' clinics
Ilas, Sophia	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Curcuit Courthouse	120 NW 4th St	Corvallis	OR	97330	922110	County Government-Courts
Ronald D Wobig, MD, PC	1128 NE 2nd St	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Health Service	NULL	Corvallis	OR	NULL	621999	Health Services
Summerset Village	300 SE Goodnight Ave	Corvallis	OR	97333	531190	Mobile Homes-Parks & Communities
Marek & Lanker LLP	810 SW Madison Ave	Corvallis	OR	97333	541110	Attorneys
SOS NW Construction LLC	2240 SW 3rd St	Corvallis	OR	97333	236115	Construction Companies
Red Hill Soils	NULL	Corvallis	OR	NULL	541990	Auctioneers
K W Mid-Willamette	1121 NW 9th St	Corvallis	OR	97330-4505	531210	Real Estate Agencies and Brokerages
Safety & Service Electric Inc	24359 Neuman Rd	Corvallis	OR	97333	238210	Electric Contractors
Maiti, Somen	420 NW 2nd St	Corvallis	OR	97330	624190	Counselors
Creating Nutrition, LLC	120 SW 4th St	Corvallis	OR	97333	621399	Nutritionists
Gerding Builders	200 SW Airport Ave	Corvallis	OR	97333	236220	General Contractors-Nonresidential Buildings
Spross, Anna	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Spectrum Strategic Capital	1745 NW Kings Blvd	Corvallis	OR	97330-1905	999990	Unclassified Establishments
Electric Charging Station	925 NW Garfield Ave	Corvallis	OR	97330	457120	Electric Charging Station
Cleaning Genie LLC	1408 NW Meadowgreen Pl	Corvallis	OR	97330-1345	561720	Janitorial/Custodial services
7th Street Station	701 SW 7th St	Corvallis	OR	97333	721310	Student Housing
Horsepower Productions	340 SW 2nd St	Corvallis	OR	97333	512110	Video Production & Taping Service
Boyd, Kayla, Marie	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Organ Climate Change Research Institute	370 Strand Ag Hall	Corvallis	OR	97331-8594	611310	Schools offering baccalaureate or graduate degrees
The Conservation Planning Institute, Inc	8285 NW Wynoochee Dr	Corvallis	OR	97330	813312	Environmental Conservation/Ecologcl Org
Red Salon	559 NW Van Buren Ave	Corvallis	OR	97330	812112	Beauty Salons
OSU Department of Microbiology	226 Nash Hall	Corvallis	OR	97331-8542	611310	Schools offering baccalaureate or graduate degrees
United States Postal Service	311 SW 2nd St	Corvallis	OR	97333-4631	491110	Postal Service
Kettler, Erin	815 NW 9th St	Corvallis	OR	97330-6173	621340	Physical, occupational, speech therapists and audiogists' clinics
Corvallis Building Permits	501 SW Madison Ave	Corvallis	OR	97333-4601	926150	Regulation, Licensing, and Inspection of Miscellaneous Commercial Sectors
Lloyd, Jentry, B, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Brandis Broken Top LLC	6300 SW Reservoir Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Elite Property Management	351 NW Jackson Ave	Corvallis	OR	97330	531311	Apartment Finding & Rental Service
Limbwalker Co	2555 SW 53rd St	Corvallis	OR	97333	561730	Ornamental Shrub & Tree Services
Nelson, Whitley, Faye, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hanson Insurance Group	2211 NW Professional Dr	Corvallis	OR	97330	524210	Insurance
Roos, Marissa, J	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
McMaster Donna	254 SW Madison Ave	Corvallis	OR	97333	541512	Website Design Service
Cascade Pacific Resource	847 NW Monroe Ave	Corvallis	OR	97330	921120	Government Offices-Federal
Wheeler, Cara E	3680 NW Samaritan Dr	Corvallis	OR	97330-3737	621399	Offices of All Other Miscellaneous Health Practitioners
Cardiovascular Consultants	3600 NW Samaritan Dr	Corvallis	OR	97330-5472	621111	Physicians' clinics
Shepard, Carolyn	910 NW Kings Blvd	Corvallis	OR	97330	621330	Pharmacists
Hall, Erandhi N DO	3620 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Sunset Shopping Center, A Phillips Edison Property	1555 SW 53rd St	Corvallis	OR	97333	531120	Shopping Centers & Malls
Western Pulp Products Company	5025 SW Hout St	Corvallis	OR	97333	322130	Paper Converters (Mfrs)
Kevin Sliker	2851 NW 9th St	Corvallis	OR	97330-3897	524210	Insurance Agencies and Brokerages
Do it Better	260 SW Madison Ave	Corvallis	OR	97333	621340	Physical Therapists
Wood, Gregory, A, MD	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Andersen Construction Co Inc	940 NE Circle Blvd	Corvallis	OR	97330	236220	Building Contractors
Irepair Phone Shop	2065 NW Buchanan Ave	Corvallis	OR	97330	517112	Cellular Telephones (Services)
Faridi, Cyrus, Hakhamanish, DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Rogues Digital Imaging	1480 SW 3rd St	Corvallis	OR	97333	999990	Nonclassified Establishments
Harvison, Sara M	815 NW 9th St	Corvallis	OR	97330	621399	Nurses-Practitioners

High Quality Compassion	1435 NW 9th St	Corvallis	OR	97330	459991	Cannabis Dispensary
Parkinson, Randi, Shea	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Muddy Creek Charter School	1555 SW 35th St	Corvallis	OR	97333	611110	Schools
Brian Donne-COUNTRY Financial Rep	545 SW 2nd St	Corvallis	OR	97333	524210	Insurance
Corvallis Eye Care	2117 NW Fillmore Ave	Corvallis	OR	97330	524114	Hospitalization Plans-Medical & Surgical
Willamette Dental Group-Corvallis	2420 NW Professional Dr	Corvallis	OR	97330-3977	621210	Dentists' clinics
Small Wonders Preschool	847 NW Ermine Pl	Corvallis	OR	97330	624410	Schools-Pre-School/Kindergarten-Academic
Gregs Gardening LLC	2459 SE Micah Pl	Corvallis	OR	97333	561730	Lawn & Grounds Maintenance
Hideaway Apartments LLC	4468 NW Live Oak Dr	Corvallis	OR	97330	531110	Apartments
North West Dental of Corvallis	2342 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
Trillium Children's Farm Home	4455 NE Highway 20	Corvallis	OR	97330	621111	Physicians & Surgeons
Reinhart, Brandyn	3620 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Drift Away Massage	310 NW 5th St	Corvallis	OR	97330	812199	Massage Therapists
Cheldelin Middle School	987 NE Conifer Blvd	Corvallis	OR	97330	611110	Schools
Rice's Pharmacy Gifts & Wine Gifts	910 NW Kings Blvd	Corvallis	OR	97330	456110	Pharmacies
Naughton, Maura	1885 SE Crystal Cir	Corvallis	OR	97333	541690	Scientists-Consulting
Thrive Physical Therapy	6735 SW Country Club Dr	Corvallis	OR	97333-1987	621340	Physical, occupational, speech therapists and audiogists' clinics
College of Earth Ocean & Atmospheric Sciences	104 Coas Administration Bldg	Corvallis	OR	97331-8563	611310	Schools offering baccalaureate or graduate degrees
Mid-Valley Gastroenterology	3521 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Love in the Name of Christ	4900 SW Highway 99	Corvallis	OR	97330	541612	Human Resource Consultants
Corvallis Duplicate Bridge Club	1931 NW Circle Blvd	Corvallis	OR	97330	813410	Clubs
Corvalis Dutch Brothers	133 SW 2nd St	Corvallis	OR	97333-4715	999990	Unclassified Establishments
West Inc	456 SW Monroe Ave	Corvallis	OR	97333	541714	Environmental & Ecological Services
Positive Electric Inc	NULL	Corvallis	OR	97330	238210	Electric Contractors
Clarity LLC	NULL	Corvallis	OR	NULL	561990	Miscellaneous support services
Mangum, Sally Jane DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Oregon Pound Brazilian Jiu Jitsu	987 NE Conifer Blvd	Corvallis	OR	97330	611620	Martial Arts Instruction
Singh, Shabeg, MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Samaritan Pediatrics	777 NW 9th St	Corvallis	OR	97330	621111	Physicians & Surgeons
Next Generation Tanning	820 NW 9th St	Corvallis	OR	97330	812199	Tanning Salons
Pi Tau Sigma	204 Rogers Hall	Corvallis	OR	97331-8569	813410	Community clubs
OSU Veterinary Teaching Hospital	700 SW 30th St	Corvallis	OR	97331-8628	541940	Animal hospitals, clinics, and veterinarians
HomeSmart	257 SW Madison Ave	Corvallis	OR	97333	531210	Real Estate
Silvanus-Hershiser, Siena, Madelene	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Vanderpool, Charles, H, DDS	223 SW 8th St	Corvallis	OR	97333	621210	Dentists
Abraham Blessing Ministries	1241 SE Rivergreen Ave	Corvallis	OR	97333	813110	Religious Organizations
I Phasion Inc	1565 SW 53rd St	Corvallis	OR	97333	999990	Federal Government Contractors
Fresenius Kidney Care Corvallis	3580 NW Samaritan Dr	Corvallis	OR	97330-3766	621492	Kidney dialysis clinics
Corvallis Dental Group	2318 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Brooks, Karen M MD	4455 NE Highway 20	Corvallis	OR	97330	621111	Physicians & Surgeons
Comfort Suites	1730 NW 9th St	Corvallis	OR	97330	721110	Hotels & Motels
Cardiovascular Consultants	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Csintalan, Robert F DPT	2350 NW Century Dr	Corvallis	OR	97330	621340	Physical Therapists
NW Drivers Ed Corvallis	523 SW 4th St	Corvallis	OR	97333	611692	Driving Instruction
Grace Lutheran Church	435 NW 21st St	Corvallis	OR	97330	813110	Churches
Elmer's Breakfast-Lunch-Dinner	1115 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Old World Deli	341 SW 2nd St	Corvallis	OR	97333	722511	Restaurants
Samaritan Pediatrics	777 NW 9th St	Corvallis	OR	97330-6169	621111	Physicians' clinics
Cassidy, James	570 NW Merrie Dr	Corvallis	OR	97330	611430	Professional & Management Development Training
Middleton Heating & Sheet Metal	610 SW Washington Ave	Corvallis	OR	97333	238220	Sheet Metal Work Contractors
Swanson Agency Inc	310 NW 5th St	Corvallis	OR	97330	524210	Insurance
Corvallis Convention	113 SW 3rd St	Corvallis	OR	97333-4873	541820	Public relations (PR) consulting services
Iwan, Katarzyna B MD	545 SW 2nd St	Corvallis	OR	97333	621111	Physicians & Surgeons
Arco Station	245 NW 3rd St	Corvallis	OR	97330	457120	Service Stations-Gasoline & Oil
McMenamins on Monroe	2001 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Adams, Traci	1830 NW 9th St	Corvallis	OR	97330	621399	Dental Hygienists

Murry Co	NULL	Corvallis	OR	NULL	999990	Nonclassified Establishments
Oregon Rhododendrons	6613 NE Pettibone Dr	Corvallis	OR	97330	424930	Nurseries-Plants Trees & Etc-Wholesale
Samaritan Plastic Surgery	996 NW Circle Blvd	Corvallis	OR	97330-1485	621111	Physicians' clinics
McMenamins Corvallis Pub	420 NW 3rd St	Corvallis	OR	97330	722511	Restaurants
Kammerzelt, Bridget, Angelique	3640 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Kinetic Bagel Institute	250 NW 1st St	Corvallis	OR	97330	722515	Bagels
DISH Network	1935 NW 9th St	Corvallis	OR	97330	516120	Television-Cable & Catv
Beasley, Somphone S	2555 NE Belvue St	Corvallis	OR	97330	621399	Nurses-Practitioners
Kando Corp	5208 SW Philomath Blvd	Corvallis	OR	97333	999990	Nonclassified Establishments
Get Sum Aloha Kine Grinds Food Truck	520 SW 4th St	Corvallis	OR	97333	999990	Nonclassified Establishments
Carr, Margaret, A, MD	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Association For Resale Innovation	312 SW 3rd St	Corvallis	OR	97333	459510	Consignment Shops
Cadwell Realty Group	375 NW Harrison Blvd	Corvallis	OR	97330-4815	531210	Real Estate Agencies and Brokerages
Visual People	262 NW Polk Ave	Corvallis	OR	97330	541430	Graphic Designers
Burbank, Holly, Ann	530 NW 27th St	Corvallis	OR	97330	621399	Nurses-Registered RN
Caceres Ricca, Erika	815 NW 9th St	Corvallis	OR	97330	621340	Speech Pathologists
AmeriGas Propane Exchange	590 NE Circle Blvd	Corvallis	OR	97330	457210	Propane Tank Kiosks
Merrill, Rebecca	1300 NW Harrison Blvd	Corvallis	OR	97330	624190	Counselors
Towns Ciderhouse	1749 SW Airport Ave	Corvallis	OR	97333	424490	Beverages (Whls)
Edward Jones	410 NW Walnut Blvd	Corvallis	OR	97330	523940	Financial Advisory Services
First American Title-Corvallis	405 NW 5th St	Corvallis	OR	97330-6495	541191	Title Search Companies
Miller, Gregory	530 NW 27th St	Corvallis	OR	97330	621399	Physicians Assistants
Thomas David Murch	NULL	Corvallis	OR	NULL	236115	General Contractors
Roots Studio	260 SW Madison Ave	Corvallis	OR	97333	999990	Nonclassified Establishments
Home Care	2141 NW Fillmore Ave	Corvallis	OR	97330-5624	621610	Home nursing services
Eberhart, Curt DPT	2609 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Bojia Li MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
The Franklin Press	408 SW Monroe Ave	Corvallis	OR	97333	513120	Periodicals-Publishing & Printing (Mfrs)
Kellie Cleaver, Counselor	4185 SW Research Way	Corvallis	OR	97333-1783	622210	Rehabilitation hospitals
Fang, Tzann T MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Astro Data Service	974 NW Circle Blvd	Corvallis	OR	97330	541910	Research Service
Dutch Bros Coffee	1500 SW 53rd St	Corvallis	OR	97333-2626	722515	Snack & Nonalcoholic Beverage Bars
Ashbrook Independent School	4045 SW Research Way	Corvallis	OR	97333	611110	Schools
Bob Forrest Engine Rebuilders	1010 SW A Ave	Corvallis	OR	97333-4225	811111	Car repair shops
Lee, Anson M MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Layoun, Vanessa, Rose	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Miranda, Brooke Ot	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
Embedded Systems	730 SW 4th St	Corvallis	OR	97333	541715	Electronic Research & Development
nwgi/NW Graphic Imaging	5270 NW Highway 99	Corvallis	OR	97330	541430	Graphic Designers
Clem, Amy, Turner	929 NW Grant Ave	Corvallis	OR	97330	621340	Physical Therapists
Mid Valley Baptist Church	1750 SW 3rd St	Corvallis	OR	97333	813110	Churches
Ledford, Ian DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Seastone, Thomas, M, DPT	2635 NW Rolling Green Dr	Corvallis	OR	97330	621340	Physical Therapists
Samaritan Kidney Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Trillium Family Service	4455 NE Highway 20	Corvallis	OR	97330	624190	Marriage & Family Counselors
Samaritan Cardiology	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
ServiceMaster of Corvallis	720 NE Granger Ave	Corvallis	OR	97330	238990	Cleaning Services-Industrial
American Optometric Association	130 SW 3rd St	Corvallis	OR	97333	621320	Optometrists OD
Nirvana Indian Restaurant	2309 NW Kings Blvd	Corvallis	OR	97330	722511	Restaurants
Bale, Jonathan	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hollis, Karleen	3600 NW Samaritan Dr	Corvallis	OR	97330	621340	Physical Therapists
Hess, Deeanna	850 SW 26th St	Corvallis	OR	97331-8624	621111	Physicians' clinics
Garner, Quinn, M, PT	845 SW 30th St	Corvallis	OR	97331	621340	Physical Therapists
Miracle, Justin, Tyler	777 NW Kings Blvd	Corvallis	OR	97330	621330	Pharmacists
Earth Smart	250 NW 1st St	Corvallis	OR	97330	541714	Environmental & Ecological Services
Arviso, Kaylee	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Samaritan Choice Plans	815 NW 9th St	Corvallis	OR	97330-6173	524210	Insurance Agencies and Brokerages
Bourke Retail LLC	137 SW 3rd St	Corvallis	OR	97333	455219	Miscellaneous Retail Stores NEC
Coalition Graduate Employees	101 NW 23rd St	Corvallis	OR	97330	813930	Labor Organizations
Mum Mum LLC	2517 NW 9th St	Corvallis	OR	97330-1799	722511	Full-Service Restaurants
Oregon Trail Brewery	341 SW 2nd St	Corvallis	OR	97333	312120	Brewers (Mfrs)
Slinker, Jacob	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Samaritan Obstetrics & Gynecology Corvallis	3640 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
C & V Sauna LLC	NULL	Corvallis	OR	97333	812199	Bathhouses Spas & Saunas
Sim, Madison	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Linn Benton Food Share	545 SW 2nd St	Corvallis	OR	97333	813410	Organizations
Green Builder	NULL	Corvallis	OR	97330	541310	Building Construction-Consultants
Replay Childrens Wear	118 SW Avery Ave	Corvallis	OR	97333	459510	Used Merchandise Retailers
Guild Mortgage-Greg Norlander	435 NW 5th St	Corvallis	OR	97330	522292	Real Estate Loans
Farmers Insurance-Clifford Curr	1805 NW Circle Blvd	Corvallis	OR	97330-1310	524210	Insurance Agencies and Brokerages
Leozie Bookkeeping	29142 Tampico Rd	Corvallis	OR	97330	541219	Accounting & Bookkeeping General Svc
Avery House Nature Center	116 SW 4th St	Corvallis	OR	97333	712190	Nature Centers
Papa Murphy's Take 'n' Bake	5278 SW Philomath Blvd	Corvallis	OR	97333-1042	722511	Full-Service Restaurants
Lifestance Health	4185 SW Research Way	Corvallis	OR	97333-1783	621330	Psychoanalysts' clinics (except MDs and Dos)
Lifestance Health	4185 SW Research Way	Corvallis	OR	97333-1783	621330	Psychoanalysts' clinics (except MDs and Dos)
College Hill Alternative High School	510 NW 31st St	Corvallis	OR	97330	611110	Schools
North Pointe	2675 NE Lancaster St	Corvallis	OR	97330	531110	Apartments
Keith Frome DDS	1759 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
Sedlak's Boots & Shoes	225 SW 2nd St	Corvallis	OR	97333-4633	458210	Shoe Retailers
Navarro Company LLC	2140 SW 71st St	Corvallis	OR	97333	236115	General Contractors
Yamasaki, Margaret, Hull	636 SW 2nd St	Corvallis	OR	97333	621330	Social Workers
Samaritan Athletic Medicine & Physical Therapy Center	845 SW 30th St	Corvallis	OR	97331	621111	Physicians & Surgeons
Heindel, Stephanie W MD	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Hightower Construction Inc	5145 NE Highway 20	Corvallis	OR	97330	238990	Building Cleaning/Maintenance Svcs
Alba, Deborah W	2314 NW Kings Blvd	Corvallis	OR	97330	621399	Nurses-Practitioners
Benco	976 NW Sycamore Ave	Corvallis	OR	97330	624310	Developmentally Disabled Info/Svcs
Conrado, Fredmilg	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
G Christianson Construction	644 NW 4th St	Corvallis	OR	97330	236115	Home Builders
Bit By Bit	38578 OREGON-99W	Corvallis	OR	97330	813311	Charitable Institutions
Blanchard, Chad, Anthony	344 NW 6th St	Corvallis	OR	97330	624190	Counselors
Aquatic Biology Associates Inc	3490 NW Deer Run St	Corvallis	OR	97330	541380	Testing Laboratories & Services
Honey Software	27477 Writsman Creek Dr	Corvallis	OR	97330	513210	Prepackaged Software
Myers, Emma Lara	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Sunbow Farm Solutions	6910 SW Plymouth Dr	Corvallis	OR	97333-9310	311999	All Other Miscellaneous Food Manufacturing
CTS Bus Station-Downtown	5th Street & Monroe Ave	Corvallis	OR	97330	485119	Transit Station
Synergy Security Solutions	5995 NE Elliott Cir	Corvallis	OR	97330	423610	Security Control Equip & Systems-Whls
Michael Stattel Counseling LPC	4900 NW Shiloh Pl	Corvallis	OR	97330-9781	624190	Miscellaneous Individual and Family Services
Espinoza Lau, Silvana	530 NW 27th St	Corvallis	OR	97330	624190	Marriage & Family Counselors
Corvallis Clinic	3680 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Dryden, Isabel Rosa	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Carl's Jr	800 NW 9th St	Corvallis	OR	97330-6141	722511	Full-Service Restaurants
Corvallis Development Service	501 SW Madison Ave	Corvallis	OR	97333-4601	926150	Regulation, Licensing, and Inspection of Miscellaneous Commercial Sectors
Scott Fitzgerald	1460 SW Allen St	Corvallis	OR	97333	999990	Federal Government Contractors
Republic Services Coffin Butte Landfill	28972 Coffin Butte Rd	Corvallis	OR	97330	423930	Waste Rdctn Dspsl/Recycle Svc-Ind (Whls)
Tiana Holland Beauty	728 NW 4th St	Corvallis	OR	97330	812112	Beauty Salons
Karlin Consulting LLC	1581 NW Terracegreen Pl	Corvallis	OR	97330	541618	Consultants-Business NEC
Graham, Craig, D, MD	845 SW 30th St	Corvallis	OR	97331	621111	Physicians & Surgeons
McPeak, Kristy	139 SW 3rd St	Corvallis	OR	97333	624190	Counselors
Murphy, Luke	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Brohard, Justin N DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Electric Charging Station	987 NE Conifer Blvd	Corvallis	OR	97330	457120	Electric Charging Station
Shamy, Noah, Payton	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors

Osuu Couns Psychiatric Service	500 Snell Hall	Corvallis	OR	97331-8593	624110	Children services
The Darkside Cinema	215 SW 4th St	Corvallis	OR	97333	512131	Theatres-Movie
L & S Builders Inc	3350 NW Crest Dr	Corvallis	OR	97330	236118	Remodeling & Repairing Building Contractors
Salt & Light Property Group	1121 NW 9th St	Corvallis	OR	97330	531210	Real Estate
Mercury Free Mining	4070 SW Fairhaven Dr	Corvallis	OR	97333	212390	Mining Companies
Svboda, Jana	760 SW Madison Ave	Corvallis	OR	97333	624190	Marriage & Family Counselors
Chupp, Colson, Daniel	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Hart, Brendon M DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Equine Exchange	845 NE Circle Blvd	Corvallis	OR	97330	459110	Saddlery & Harness
Warner Paige PHD LLC	636 SW 2nd St	Corvallis	OR	97333	621399	Psychologists
Horizon Realty Advisors LLC	6300 SW Grand Oaks Dr	Corvallis	OR	97333	531210	Real Estate
USPS Blue Collection Box	950 NW Circle Blvd	Corvallis	OR	97330	541860	Mailing & Shipping Kiosks
Pacific Medical	2292 NW Kings Blvd	Corvallis	OR	97330-3923	621111	Physicians' clinics
Les Caves	308 SW 3rd St	Corvallis	OR	97333-4627	722511	Full-Service Restaurants
Tani & Co	833 NW Buchanan Ave	Corvallis	OR	97330	812112	Beauty Salons
The Robins Nest Child Care Center LLC	802 NW Buchanan Ave	Corvallis	OR	97330	624410	Child Care Service
Herrera Flores, Ranferi, Natalie	1205 NW Garfield Ave	Corvallis	OR	97330	621330	Social Workers
Johnson, Lawrence E Aty	566 NW Van Buren Ave	Corvallis	OR	97330	541110	Attorneys
Safeway Pharmacy	5270 SW Philomath Blvd	Corvallis	OR	97333	456110	Pharmacies
Samaritan Family Medicine Resident Clinic	3517 NW Samaritan Dr	Corvallis	OR	97330-3769	621111	Physicians' clinics
O'Brien, Catherine A MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Ghysels, Susan	3600 NW Samaritan Dr	Corvallis	OR	97330	621399	Physicians Assistants
Benton County Natural Areas, Parks & Events	110 SW 53rd St	Corvallis	OR	97333-2935	711190	Miscellaneous professional entertainers
Oregon State University College of Pharmacy	1601 SW Jefferson Ave	Corvallis	OR	97331	611310	Pharmaceutical Schools
Muth, William, E, MD	3640 NW Samaritan Dr	Corvallis	OR	97330-3787	621111	Physicians' clinics
Samaritan Urology	990 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Can Research Education & Consulting	922 NW Circle Blvd	Corvallis	OR	97330-1483	541614	Custom consulting services
Thompson's Painting	NULL	Corvallis	OR	97333	238320	Painting Contractors-Commercial & Ind
Pro Lam Inc	5010 SW Hollyhock Cir	Corvallis	OR	97333	321999	Wood Products NEC (Mfrs)
Samaritan Dialysis Services LLC Corvallis Site	3580 NW Samaritan Dr	Corvallis	OR	97330-3766	621492	Kidney dialysis clinics
Salcido Giles, Jaclyn L	306 SW 8th St	Corvallis	OR	97333	624190	Counselors
Corvallis Orthodontics	1857 NW Kings Blvd	Corvallis	OR	97330	621210	Dentists
HUB International	340 NW 5th St	Corvallis	OR	97330	524210	Insurance
Prestige Senior Living West Hills	5595 SW West Hills Rd	Corvallis	OR	97333	541690	Assisted Living Facility Consultants
Plastech Inc	5121 SW Hout St	Corvallis	OR	97333	326199	Plastics-Mold-Manufacturers
International Comic Book Archive	101 SW Western Blvd	Corvallis	OR	97333	459210	Comic Books
Shantz, Naomi E	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Burnett, Anna	636 SW 2nd St	Corvallis	OR	97333	621340	Physical Therapists
Jimenez, Anavice J	1601 SW Jefferson Ave	Corvallis	OR	97331	621330	Pharmacists
Beeton, Christine	1650 SW 45th Pl	Corvallis	OR	97333	624190	Counselors
Mindi Romer Physical Therapy	230 SW 3rd St	Corvallis	OR	97333	621340	Physical Therapists
Maids	NULL	Corvallis	OR	97330	238990	All Other Specialty Trade Contractors
Samaritan Urgent Care	5234 SW Philomath Blvd	Corvallis	OR	97333	621399	Physicians Assistants
Willamette Dental Group-Corvallis	2420 NW Professional Dr	Corvallis	OR	97330	621210	Dentists
College Hill Dental Group	1310 NW Harrison Blvd	Corvallis	OR	97330	621210	Dentists
The 707 Communities	707 SW 10th St	Corvallis	OR	97333	531110	Apartments
Cornerstone School of Ministry	2125 NW Lester Ave	Corvallis	OR	97330	813110	Religious Organizations
Subway	2479 NW Monroe Ave	Corvallis	OR	97330-5367	722511	Full-Service Restaurants
Glenwood Manor	1687 NW Division St	Corvallis	OR	97330	531110	Apartments
Tarn Tip Authentic Thai Cuisine	2535 NW Monroe Ave	Corvallis	OR	97330-5326	722511	Full-Service Restaurants
Konkler, Kerin, S, NP	3680 NW Samaritan Dr	Corvallis	OR	97330	621399	Nurses-Practitioners
Good Samaritan Regional Medical Center	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Woodlife Environmental Consultants LLC	8200 NW Chaparral Dr	Corvallis	OR	97330	541714	Environmental & Ecological Services
Stadium Grill	2500 SW Western Blvd	Corvallis	OR	97333	722511	Restaurants
Oregon State University Board of Trustees	638 Kerr Administration Bldg	Corvallis	OR	97331-8565	611310	Schools offering baccalaureate or graduate degrees
Willamette Gardens	3290 SW Willamette Ave	Corvallis	OR	97333-1509	444240	Nursery, Garden Center, and Farm Supply Retailers

Samaritan Mental Health	3509 NW Samaritan Dr	Corvallis	OR	97330-3893	621111	Physicians' clinics
Phillip Tedder Inc	251 NW Leprechaun Ln	Corvallis	OR	97330	541614	Business Management Consultants
Benton County It Service Department	209 NW 5th St	Corvallis	OR	97330	921120	Government Offices-County
Gonzalez, Jennifer, MD	1112 NW Circle Blvd	Corvallis	OR	97330	621111	Physicians & Surgeons
Toastmasters International	204 Rogers Hall	Corvallis	OR	97331-8569	611430	Professional and administration development training
Subway	5080 SW Philomath Blvd	Corvallis	OR	97333-1044	722511	Full-Service Restaurants
B & R Auto Body & Paint	3065 SE 3rd St	Corvallis	OR	97333	811121	Automobile Body-Repairing & Painting
State Farm Insurance	635 SW 4th St	Corvallis	OR	97333-4427	524298	Miscellaneous Insurance Agencies
Beelart Embroidery	24044 Decker Rd	Corvallis	OR	97333	323113	Screen Printing (Mfrs)
Adams Parent Teachers Organization	1615 SW 35th St	Corvallis	OR	97333	813410	Organizations
Lederer, Kathryn E NP	201 Plageman Bldg	Corvallis	OR	97331-8567	621399	Offices of All Other Miscellaneous Health Practitioners
Ortho Mechanical Inc	1110 NE Circle Blvd	Corvallis	OR	97330	238210	Mechanical Contractors
Wade L Haslam DMD PC	2657 NW Rolling Green Dr	Corvallis	OR	97330-3519	621210	Dentists' clinics
Duerksen & Associates Inc	913 NW Grant Ave	Corvallis	OR	97330	531390	Real Estate Support Services
KFC	1775 NW 9th St	Corvallis	OR	97330	722511	Restaurants
Cooley, Erin, Kelly	3620 NW Samaritan Dr	Corvallis	OR	97330-3785	621111	Physicians' clinics
Les Schwab	2119 NW 9th St	Corvallis	OR	97330-1598	441340	Tire Dealers
Husbands, Melissa C	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Benton County Records	120 NW 4th St	Corvallis	OR	97330-4734	921120	Legislative assemblies
Schwartz, Audrey L PHD	1300 NW Harrison Blvd	Corvallis	OR	97330	621399	Psychologists
Highway 20 Productions	230 SW 3rd St	Corvallis	OR	97333	541921	Photography
Josh Sizemore, PMHNP-BC	2075 NW Grant Ave	Corvallis	OR	97330	621112	Psychiatry-Adult Child & Adolescent
Hair By Karin	2747 NW 9th St	Corvallis	OR	97330	812112	Beauty Salons
Centurion Real Estate Management, LLC	2380 NW Kings Blvd	Corvallis	OR	97330	531210	Real Estate Management
Visit Corvallis	113 SW 3rd St	Corvallis	OR	97333	561510	Tourist Information
AmeriGas Propane Exchange	2641 NW 9th St	Corvallis	OR	97330	457210	Propane Tank Kiosks
Pear Tree Salon	559 SW 4th St	Corvallis	OR	97333	812112	Beauty Salons
Holland, Anika	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Dogs For Invisible DSBLTS	384 NW Conifer Blvd	Corvallis	OR	97330	812910	Animal care services
Cascade Design Group	505 NW Harrison Blvd	Corvallis	OR	97330	541330	Engineers-Consulting
Samaritan Health Service	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Lumina Hospice & Palliative Care	720 SW 4th St	Corvallis	OR	97333	623110	Hospices
David Evans & Associates	1600 SW Western Blvd	Corvallis	OR	97333	541330	Engineers-Consulting
The Barbers	820 NW 9th St	Corvallis	OR	97330	812111	Barbers
Krispy Krunchy Chicken	5500 SW Philomath Blvd	Corvallis	OR	97333	722511	Restaurants
Carlson College of Veterinary Medicine-Small Animal Services	700 SW 30th St	Corvallis	OR	97331-8628	541940	Animal hospitals, clinics, and veterinarians
Masonic Hall	306 SW Madison Ave	Corvallis	OR	97333	812220	Cemeteries
Scott Taylor Company	NULL	Corvallis	OR	97330	236118	Residential Remodeling Contractors
ABM	2100 SW May Way	Corvallis	OR	97331	561720	Janitor Service
Ham Hopson & Associates LLC	5470 NE Highway 20	Corvallis	OR	97330	561730	Landscape Contractors
Electrolysis Clinic of Corvallis	460 SW Madison Ave	Corvallis	OR	97333-4794	812199	Miscellaneous self grooming services (except hair, nail, facial, nonpermanent makeup, nonmedical diet services)
7-Eleven	1900 SW 3rd St	Corvallis	OR	97333	445131	Convenience Stores
American Water Works LLC	29201 Highway 34	Corvallis	OR	97333	444240	Garden Centers
Peacock Bar & Grill	125 SW 2nd St	Corvallis	OR	97333	722511	Restaurants
Evashevski Elliott PC	745 NW Van Buren Ave	Corvallis	OR	97330	541110	Attorneys
Suburban Christian Church	2760 SW 53rd St	Corvallis	OR	97333-1397	813110	Religious societies
Joshua Kittel at CrossCountry Mortgage, LLC	200 SW 4th St	Corvallis	OR	97333	522292	Real Estate Loans
Samaritan Surgical Specialists	3615 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Jimmy John's	1557 NW Monroe Ave	Corvallis	OR	97330	722511	Restaurants
Dixon Creek LLC	202 NW 6th St	Corvallis	OR	97330	541110	Attorneys
Boase, Kathleen, Elizabeth	257 SW Madison Ave	Corvallis	OR	97333-4757	624190	Miscellaneous Individual and Family Services
Defries, Kelsey	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Tyee Wine Cellars	26335 Greenberry Rd	Corvallis	OR	97333	312130	Wineries (Mfrs)
Luknic, Alice M MD	501 NW Elks Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Capital Mortgage Source	301 SW 4th St	Corvallis	OR	97333-4653	522292	Real Estate Credit Lending
JOANN	932 NW Circle Blvd	Corvallis	OR	97330	459130	Fabric Shops

Keane, Delaney Ann DO	3600 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Laura Brophy	2625 NW Mulkey Ave	Corvallis	OR	97330	541690	Scientists-Consulting
Solomon, Jeremy DPT	815 NW 9th St	Corvallis	OR	97330	621340	Physical Therapists
E & S Geographic & Information	2161 NW Fillmore Ave	Corvallis	OR	97330	519290	Information & Referral Svcs
Mid-Valley Bicycle Club	NULL	Corvallis	OR	NULL	459110	Bicycles-Dealers
Heath, Christian, MD	3600 NW Samaritan Dr	Corvallis	OR	97330-3737	621111	Physicians' clinics
Northwest Realty Consultants	360 NW Tyler Ave	Corvallis	OR	97330	531210	Real Estate
Edward Jones	2085 NW Grant Ave	Corvallis	OR	97330-4366	523940	Portfolio Management and Investment Advice
The Green Room	1665 SE 3rd St	Corvallis	OR	97333	459991	Cannabis Dispensary
La Rockita	922 NW Circle Blvd	Corvallis	OR	97330	722511	Restaurants
Rest & Repair LLC	650 SW 3rd St	Corvallis	OR	97333	811310	Repair Shops & Related Services NEC
Dixon Creek Software	2397 NW Kings Blvd	Corvallis	OR	97330	513210	Software/Application/Platform Publishing
Healing Motion Physical Therapy	1128 NE 2nd St	Corvallis	OR	97330	621340	Physical Therapists
Renaissance on the Riverfront	136 SW Washington Ave	Corvallis	OR	97333	531110	Condominiums
Cox, Joseph D	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Buena Vista Arbor	5820 NW Highway 99	Corvallis	OR	97330	561730	Tree Service
Benton County Disability Service	1121 NW 9th St	Corvallis	OR	97330-4505	921120	Legislative assemblies
Broadbent, Christopher	4455 NE Highway 20	Corvallis	OR	97330	624190	Counselors
Safeway Fuel Station	5270 SW Philomath Blvd	Corvallis	OR	97333	457120	Service Stations-Gasoline & Oil
Allstate Insurance	470 NW Buchanan Ave	Corvallis	OR	97330-6214	524210	Insurance Agencies and Brokerages
Sargent, Mara	530 NW 27th St	Corvallis	OR	97330	624190	Counselors
Morrow, Alexandra, Nicole, DO	3517 NW Samaritan Dr	Corvallis	OR	97330	621111	Physicians & Surgeons
Seed Research of Oregon	27630 Llewellyn Rd	Corvallis	OR	97333	424910	Seeds & Bulbs-Wholesale
Durnin Jr, James P DMD	142 SW 2nd St	Corvallis	OR	97333	621210	Dentists
Diamond Woods Golf Course	96040 Territorial Hwy	Monroe	OR	97456	713910	Golf Courses
Monroe Cemetery Association	NULL	Monroe	OR	NULL	813910	Associations
Farrier Supplies	26729 Highway 99 W	Monroe	OR	97456-9724	424990	Other Miscellaneous Nondurable Goods Merchant Wholesalers
The Inn at Diamond Woods	96096 Territorial Hwy	Monroe	OR	97456	721191	Inns
Bob's Welding	25425 Springhill Dr	Monroe	OR	97456	811490	Welding
Deerhaven Farms, Inc	25711 Fawver Ln	Monroe	OR	97456	111998	Field Crops-Except Cash Grains
Monroe Municipal Court	664 Commercial St	Monroe	OR	97456-8403	922110	Courts
Gemini Concrete Pumping Inc	NULL	Monroe	OR	NULL	238110	Concrete Contractors
Double H Tree Farms	24649 Park Rd	Monroe	OR	97456	111998	Farms
Earth's Rising Co-op Farm	25358 Cherry Creek Rd	Monroe	OR	97456-9490	111998	All Other Miscellaneous Crop Farming
South Benton Community Museum	140 S 5th St	Monroe	OR	97456	712110	Museums
Alpine Pump Inc	25526 Bellfountain Rd	Monroe	OR	97456	561499	Water Treatment Equip Svc & Supls
K4E	25017 Alpine Rd	Monroe	OR	97456	236220	Building Contractors
Van Beek Dairy Farm	26405 McFarland Rd	Monroe	OR	97456	112120	Dairies (Milk)
Renosa Corp	NULL	Monroe	OR	NULL	423690	Electronic Equipment & Supplies-Whls
Wildwood Seed & Specialties	24773 Highway 99 W	Monroe	OR	97456	424990	Pet Supplies-Wholesale
Jardines Christmas Tree Farm	26191 Bruce Rd	Monroe	OR	97456-9767	444240	Nursery, Garden Center, and Farm Supply Retailers
Ridge Runner Trucking	26641 Berg Dr	Monroe	OR	97456	484230	Trucking
Monroe Rural Fire Protection District-Station 3	680 Commercial St	Monroe	OR	97456-8403	922160	Fire Protection
Bellfountain Park	24849 Park Rd	Monroe	OR	97456	712190	Parks
Doug Hodgson Trucking Co	25663 Bellfountain Rd	Monroe	OR	97456	484230	Trucking
Monroe Barber Shop	225 N 5th St	Monroe	OR	97456	812111	Barbers
Long Timber Brewing Co	180 N 5th St	Monroe	OR	97456	312120	Brewers (Mfrs)
Allen PC	26444 Bennett Blvd	Monroe	OR	97456	541211	Accountants
Stampede Mountain Ranch	24704 Alpine Rd	Monroe	OR	97456	713990	Stables
Your Daily Goat LLC	26641 Bellfountain Rd	Monroe	OR	97456-9753	112410	Sheep Farming
Century Forest Management	24615 Williams Rd	Monroe	OR	97456-9437	113310	Logging
Paradise Springs Weddings & Events	25674 Cherry Creek Rd	Monroe	OR	97456	711310	Events-Special
Goracke Brothers	NULL	Monroe	OR	97456	999990	Nonclassified Establishments
Fairwood Construction	26595 Fairwood Dr	Monroe	OR	97456	236115	Construction-Building Contractors
Dawson & Douglas Inc	27065 Highway 99 W	Monroe	OR	97456	531210	Real Estate
Lucas Trucking	26177 Coon Rd	Monroe	OR	97456	484230	Trucking-Heavy Hauling

Roberts, Doninica N	610 Dragon Dr	Monroe	OR	97456	621399	Nurses-Registered RN
Terra Glass	24217 Williams Rd	Monroe	OR	97456	459420	Glass-Hand Blown Art
Monroe School District 1J	365 N 5th St	Monroe	OR	97456	611110	School Districts
Ed Parker Logging	27779 Hells Canyon Rd	Monroe	OR	97456	113310	Logging Companies (Mfrs)
Monroe City Hall	664 Commercial St	Monroe	OR	97456	921120	City Hall
Western Union Agent Location	236 N 5th St	Monroe	OR	97456	522320	Money Transfer Service
Bennys Pizza Joint	225 N 5th St	Monroe	OR	97456	722511	Pizza
Honey Tree Apiaries	24750 Cox Ln	Monroe	OR	97456-9776	112910	Apiculture
Alpine Tavern	25200 Alpine Rd	Monroe	OR	97456	722410	Bars
Broadley Vineyards	265 S 5th St	Monroe	OR	97456	312130	Wineries (Mfrs)
Bailey Excavating Inc	26454 Coon Rd	Monroe	OR	97456	238910	Excavating Contractors
Alpine Honey Bee Removal	NULL	Monroe	OR	97456	561710	Pest Control
Wall Excavating & Hauling	26695 Shady Oak Dr	Monroe	OR	97456	238910	Excavating Contractors
Monroe United Methodist Church	648 Orchard St	Monroe	OR	97456-9411	813110	Religious societies
AmeriGas Propane Exchange	236 N 5th St	Monroe	OR	97456	457210	Propane Tank Kiosks
Business & Quality Process	26925 Reiling Ave	Monroe	OR	97456	561990	Business Services NEC
Alpine Church of Jesus Crist Latter Day Saints	25314 Rainbow Creek Rd	Monroe	OR	97456	813110	Churches
Meeker, Katherine, M	610 Dragon Dr	Monroe	OR	97456	621399	Nurses-Practitioners
C & L Farms	26011 Old River Rd	Monroe	OR	97456	111998	Farms
Alpine Community Center	25184 Webster Ave	Monroe	OR	97456	624110	Community Centers
Bluebird Hill Farm & Cellars	25059 Larson Rd	Monroe	OR	97456	312130	Wineries (Mfrs)
Dave's Electric	NULL	Monroe	OR	NULL	238210	Electric Contractors
Robertson, Jeremy, Dean, RN	610 Dragon Dr	Monroe	OR	97456	621399	Nurses-Registered RN
Speece, Susan E NP	NULL	Monroe	OR	97456	621399	Nurses-Practitioners
Raining L Ranch	25270 Alpine Rd	Monroe	OR	97456	713990	Stables
Church of the First Born	27145 McFarland Rd	Monroe	OR	97456	813110	Religious societies
DC Excavation Inc	NULL	Monroe	OR	97456	238910	Site Preparation Contractors
Nusbaum Farms	26894 Bellfountain Rd	Monroe	OR	97456	111998	Farms
CFN Cardlock	575 Main St	Monroe	OR	97456	424720	Commercial Fueling Stations (Whls)
Monroe Telephone Company	575 Commercial St	Monroe	OR	97456	517121	Data Communication Service
Crowson Bus Co	125 N 6th St	Monroe	OR	97456	485510	Buses-Charter & Rental
Kevin Spence Water Techs	25169 Turner Rd	Monroe	OR	97456	423830	Pumps (Whls)
USPS Blue Collection Box	590 Main St	Monroe	OR	97456	541860	Mailing & Shipping Kiosks
L & M AG LLC	26527 Old River Rd	Monroe	OR	97456	115116	Farming Service
Long Branch Bar & Grill	270 S 5th St	Monroe	OR	97456	722511	Restaurants
Monroe Grade School	600 Dragon Dr	Monroe	OR	97456	611110	Schools
Hurtgen Vue Dairy	26792 McFarland Rd	Monroe	OR	97456-9765	112120	Dairy Cattle and Milk Production
Crooked Gate Ranch LLC	26293 Foster Rd	Monroe	OR	97456	112990	Ranches
Woodhall III Vineyards	25944 Green Peak Rd	Monroe	OR	97456	111332	Vineyards
Whybra Vineyards LLC	25060 Orchard Tract Rd	Monroe	OR	97456	111332	Vineyards
M G Land Improvement Co	25522 Coon Rd	Monroe	OR	97456	238910	Land Clearing & Leveling
Dollar General	236 N 5th St	Monroe	OR	97456	455219	Variety Stores
D & D Tree Farms	26386 Foster Rd	Monroe	OR	97456	561730	Tree Service
Long Branch Restaurant & Lnge	270 S 5th St	Monroe	OR	97456	722511	Restaurants
Monroe Health Center	610 Dragon Dr	Monroe	OR	97456-9604	621111	Physicians' clinics
Proper Construction Services, LLC	24822 Kyle Rd	Monroe	OR	97456	237310	Road Building Contractors
Island Acres LLC	28182 E Ingram Island Rd	Monroe	OR	97456	999990	Nonclassified Establishments
Hull-Oakes Lumber Co	23837 Dawson Rd	Monroe	OR	97456	423310	Lumber-Wholesale
Asmunderlion LLC	870 Commercial St	Monroe	OR	97456	999990	Nonclassified Establishments
Bateman Enterprises Inc	25745 Larkin Rd	Monroe	OR	97456	484230	Trucking
Justice Shepherds	26820 Reiling Ave	Monroe	OR	97456	115210	Dog Breeders
Earthly Essentials Consulting	NULL	Monroe	OR	97456	541618	Consultants-Business NEC
Benton County Health Services	610 Dragon Dr	Monroe	OR	97456	923120	County Government-Public Health Programs
Umpqua Bank	165 N 5th St	Monroe	OR	97456-4516	522110	Commercial banks
United States Postal Service	590 Main St	Monroe	OR	97456-9606	491110	Postal Service
Rolling Thunder Club Lambs	25509 Coon Rd	Monroe	OR	97456	813410	Clubs

Monroe Tree Farm	24134 Territorial Hwy	Monroe	OR	97456	531210	Real Estate Management
ERA Real Estate Naper Realty Inc	26585 Patterson Dr	Monroe	OR	97456	531210	Real Estate
MBL Timber Service Inc	26134 Foster Rd	Monroe	OR	97456	115310	Foresters-Consulting
Donrowe.com	26604 Shady Oak Dr	Monroe	OR	97456	423610	Converters-Electric (Whls)
Ambient Heating and Cooling LLC	798 Orchard St	Monroe	OR	97456	238220	Air Conditioning Contractors & Systems
Hareline Dubbin Inc	24712 Territorial Hwy	Monroe	OR	97456	339920	Fishing Tackle-Manufacturers
Frog Hollow Farms	25175 E Ingram Island Pl	Monroe	OR	97456	111998	Farms
West Coast Well Drilling	27401 Stow Pit Rd	Monroe	OR	97456	237110	Water Well Drilling & Service
Monroe RV Park	Highway 99 W & Orchard St	Monroe	OR	97456	721211	Recreational Vehicle Parks
Alpine Vineyards	25904 Green Peak Rd	Monroe	OR	97456	312130	Wineries (Mfrs)
Benton Lane Winery	23924 Territorial Hwy	Monroe	OR	97456	312130	Wineries (Mfrs)
New Hope Life Center	660 Pine St	Monroe	OR	97456	813110	Churches
South Benton Community Food Bank	648 Orchard St	Monroe	OR	97456	624210	Food Banks
Dari Mart	230 S 5th St	Monroe	OR	97456	445131	Convenience Stores
Monroe Church of Christ	180 S 6th St	Monroe	OR	97456	813110	Churches
Oregon Barrel Racing Association Inc	C/O 26315 Highway 99W	Monroe	OR	97456	813410	Clubs
Monroe South Benton Nutrition	605 Main St	Monroe	OR	97456	921120	Government Offices-City/Village & Twp
Vinwood Taphouse	1736 Main St	Philomath	OR	97370	722511	Restaurants
Coast Range Commercial Refrigeration	22815 Hoskins Rd	Philomath	OR	97370	425120	Refrigerating Equip-Commercial (Whls)
Corvallis City	NULL	Philomath	OR	97370	921120	Government Offices-City/Village & Twp
McDonald's	125 S 14th St	Philomath	OR	97370	722511	Restaurants
Peak Acupuncture	113 S 10th St	Philomath	OR	97370	621399	Acupuncture
Playtime Sports	610 S 19th St	Philomath	OR	97370	323113	Screen Printing (Mfrs)
Consumers Power Inc	6990 W Hills Rd	Philomath	OR	97370	221122	Electric Companies
Wren Sub Station	NULL	Philomath	OR	97370	999990	Nonclassified Establishments
Houston, Emily, Alice	732 Main St	Philomath	OR	97370	621340	Physical Therapists
Marys River Quilt Guild	NULL	Philomath	OR	NULL	449129	Blankets Retail
Inavale Farm	31786 Horse Farm Ln	Philomath	OR	97370	316990	Horse Equipment & Supplies-Whls & Mfrs
The Human Bean	1914 Main St	Philomath	OR	97370	722515	Coffee Shops
Peak Lumber Sales	201 Main St	Philomath	OR	97370	321113	Sawmills & Planing Mills-General (Mfrs)
Hoskins Berry Farm	39615 Luckiamute Rd	Philomath	OR	97370-9752	111334	Berry (except Strawberry) Farming
Bountiful Backyard	326 Vincent St	Philomath	OR	97370-9219	111422	Floriculture Production
Philomath Area Chamber-CMRC	1010 Applegate St	Philomath	OR	97370	813910	Chambers Of Commerce
Sewchic Patterns Co	595 Dampier Dr	Philomath	OR	97370	459130	Sewing Patterns
Willamette Valley Rentals	1322 Main St	Philomath	OR	97370	531210	Real Estate Management
Inavale Farm & Pet Groom Inc	31798 Horse Farm Ln	Philomath	OR	97370-8906	541940	Animal hospitals, clinics, and veterinarians
Nftca Inc	921 Applegate St	Philomath	OR	97370-9439	999990	Unclassified Establishments
Kyu Choi	1907 Main St	Philomath	OR	97370	999990	Nonclassified Establishments
Bicycle Stage One	1619 Main St	Philomath	OR	97370	459110	Bicycles-Dealers
Philomath Self Storage	421 Landmark Dr	Philomath	OR	97370-9486	531130	Landlords of Miniwarehouses and Self-Storage Units
Sirianni, Barbara, Curlee	126 S 11th St	Philomath	OR	97370	621330	Social Workers
AmeriGas Propane Exchange	658 Main St	Philomath	OR	97370	457210	Propane Tank Kiosks
Furniture Restoration Center of Oregon	1321 Main St	Philomath	OR	97370	459510	Used Merchandise Retailers
McComb, Brenda	24793 Hidden Valley Rd	Philomath	OR	97370	611710	Educational Consultants
Figaros Italian Kitchen Inc	14011 Main St	Philomath	OR	97370	722511	Restaurants
Marys Peak True Value	1740 Main St	Philomath	OR	97370	444140	Hardware-Retail
Oregon Soil Corporation	24577 Ervin Rd	Philomath	OR	97370	112990	Earthworms
Mid Valley Dental Arts	2811 Main St	Philomath	OR	97370	621210	Dentists
Holderread Waterfowl Farm	2679 West Hills Rd	Philomath	OR	97370-9407	111998	All Other Miscellaneous Crop Farming
Corvallis Clinic	1219 Applegate St	Philomath	OR	97370-2031	621111	Physicians' clinics
Severn Thomas-State Farm Insurance Agent	2372 Main St	Philomath	OR	97370-9361	524210	Insurance Agencies and Brokerages
The Farm Antiques	32897 Fern Rd	Philomath	OR	97370	459510	Antiques-Dealers
Roderick, Ashlee, Nicole	732 Main St	Philomath	OR	97370-9725	621340	Physical, occupational, speech therapists and audiogists' clinics
Mayer International Investment Co	NULL	Philomath	OR	NULL	523910	Miscellaneous Financial Intermediaries
Mark Rohlfs/Santa & Son	24469 Highway 20	Philomath	OR	97370	561730	Tree Service
Healing Motion Physical Therapy	732 Main St	Philomath	OR	97370	621340	Physical Therapists

Elkhorn Timber LLC	39761 Luckiamute Rd	Philomath	OR	97370	113110	Timber Tracts
Peace Lutheran Church	2540 Applegate St	Philomath	OR	97370	813110	Churches
Q B Accounting	23724 Knowlton Ln	Philomath	OR	97370	541211	Accountants
USPS Blue Collection Box	1140 Applegate St	Philomath	OR	97370	541860	Mailing & Shipping Kiosks
Canince Classroom LLC	NULL	Philomath	OR	97370	812910	Dog Training
Small World Wine Co	NULL	Philomath	OR	NULL	445320	Wines-Retail
Odot Highway Division	NULL	Philomath	OR	97370	999990	Nonclassified Establishments
Fibrevolution	NULL	Philomath	OR	NULL	314999	All Other Miscellaneous Textile Product Mills
Barnhart Farms LLC	14195 Wildwood Rd	Philomath	OR	97370	111998	Farms
Pioneer Telephone Co-op	NULL	Philomath	OR	NULL	517111	Telephone Companies
Lifewize Ministries	32895 Fircreek Ln	Philomath	OR	97370	813110	Christian Ministries
Gathering Together Farm	25159 Grange Hall Rd	Philomath	OR	97370	111998	Farms
Global Automotive Repair & Service LLC	3026 West Hills Rd	Philomath	OR	97370-9553	811111	Car repair shops
Philomath Utility Billing	980 Applegate St	Philomath	OR	97370	926130	City Government-Regulation & Administration-Communication/Utilities
Philomath Education Association	2054 Applegate St	Philomath	OR	97370	813930	Labor Organizations
Benton County Historical Society & Museum	1101 Main St	Philomath	OR	97370	712110	Museums
Petersen Investment Planning	35006 Hawk Hill Rd	Philomath	OR	97370	523910	Investments
Bauer Plumbing Inc	NULL	Philomath	OR	NULL	238220	Plumbing Contractors
THE DIZZY HEN	1247 Main St	Philomath	OR	97370	722511	Restaurants
Oaksping Apartments	1933 College St	Philomath	OR	97370	531110	Apartments
Bashful Bob's Inc	430 Sawtooth Ln	Philomath	OR	97370	236115	General Contractors
Citizens Bank	1224 Main St	Philomath	OR	97370	522110	Banks
Western Union Agent Location	658 Main St	Philomath	OR	97370	522320	Money Transfer Service
Philomath Planning & Development	980 Applegate St	Philomath	OR	97370	925110	City Government-Housing Programs
Philomath Fire & Rescue	1035 Main St	Philomath	OR	97370	922160	Fire Protection
Ark Animal Hospital	1100 Applegate St	Philomath	OR	97370	541940	Veterinarians
Axis	1203 Main St	Philomath	OR	97370	238210	Electric Contractors
Les Schwab	838 Main St	Philomath	OR	97370	441340	Tire-Dealers-Retail
DSL Philomath	1420 Main St	Philomath	OR	97370	518210	Internet Service
Tri S Con	24477 Maxfield Creek Rd	Philomath	OR	97370	236115	Home Builders
The Boulevard	3071 Main St	Philomath	OR	97370	531110	Apartments
Philomath Frolic & Rodeo Inc	502 S 13th St	Philomath	OR	97370	711190	Rodeos
Heritage Natural Finishes LLC	500 Main St	Philomath	OR	97370	337215	Furniture Frames (Mfrs)
Windy Hill Farm	938 N 9th St	Philomath	OR	97370	111998	Farms
Pioneer Long Distance	1304 Main St	Philomath	OR	97370	517111	Telephone Companies
Philomath Market	1405 Main St	Philomath	OR	97370	445131	Convenience Stores
Extreme Mobile Auto Detail	704 N 11th St	Philomath	OR	97370	811192	Automobile Detail & Clean-Up Service
Hunter Castle	24318 Price Creek Rd	Philomath	OR	97370	711510	Sculptors
Clemens Community Pool	2054 Applegate St	Philomath	OR	97370	713940	Swimming Pools-Public
Student Transportation-America	24515 Highway 20	Philomath	OR	97370	485410	Buses-School Transportation Service
Ruth Long Hair Design	23539 Forrests Pl	Philomath	OR	97370	812112	Beauty Salons
College United Methodist Church	1123 Main St	Philomath	OR	97370	611310	University-College Dept/Facility/Office
The Corvallis Clinic	1219 Applegate St	Philomath	OR	97370	621399	Physicians Assistants
Les & Bob's Sports & Apparel	2670 Chapel Dr	Philomath	OR	97370	458110	Women's Apparel-Retail
Halstead, Andrew	732 Main St	Philomath	OR	97370	621340	Physical Therapists
Willamette Valley Intellectual	24236 Alsea Hwy	Philomath	OR	97370	541110	Attorneys
Shea Nicole Brown	1215 Main St	Philomath	OR	97370	523940	Financing Consultants
Silverman Studios LLC	2711 Newton St	Philomath	OR	97370	541840	Advertising-Video Production Services
Eats & Treats	1644 Main St	Philomath	OR	97370	722511	Restaurants
Stymer Global Ventures LLC	22602 Wells Creek Rd	Philomath	OR	97370	999990	Nonclassified Establishments
D W Leer LLC	24856 Hidden Valley Rd	Philomath	OR	97370	115310	Foresters-Consulting
Good Earth Pest	921 N 19th St	Philomath	OR	97370	561710	Pest Control
Rainey, Rochelle	569 Coastal View Dr	Philomath	OR	97370	812990	Miscellaneous Personal Services NEC
Edward Jones-Financial Advisor: Helen K Bennett, Cfpaams	134 N 19th St	Philomath	OR	97370-9242	523940	Portfolio Management and Investment Advice
C G Hall Trucking Inc	1547 Applegate St	Philomath	OR	97370	484220	Log Hauling
Alamo Roofing LLC	NULL	Philomath	OR	97370	238160	Roofing Contractors

Main St Market	1830 Main St	Philomath	OR	97370	457120	Service Stations-Gasoline & Oil
Dollar General	658 Main St	Philomath	OR	97370	455219	Variety Stores
Arc Thrift Store	936 Main St	Philomath	OR	97370	459510	Thrift Shops
Siuslaw Welding & Repair	NULL	Philomath	OR	97370	811490	Welding
Flashback Productions	3206 West Hills Rd	Philomath	OR	97370-9553	999990	Unclassified Establishments
Western Oregon Rabbit Co	2495 Rosecrest Dr	Philomath	OR	97370	112930	Fur Farms
Stokes Construction Co	25342 Stokes Ln	Philomath	OR	97370	237310	Road Building Contractors
Forest Restoration, Inc	1431 College St	Philomath	OR	97370	115310	Foresters-Consulting
Blue Collar Accounting LLC	240 N 19th St	Philomath	OR	97370	541219	Accounting & Bookkeeping General Svc
Miner Malcolm R Certified	NULL	Philomath	OR	97370	531320	Real Estate Appraisers
Philomath Rental, LLC	432 Landmark Dr	Philomath	OR	97370	532310	Rental Service-Stores & Yards
Laughlin, Jill	732 Main St	Philomath	OR	97370	621340	Physical Therapists
Enthalpion Energy LLC	24616 Daisy Dr	Philomath	OR	97370	238220	Energy Management Systems & Products
Central Valley Construction	24210 Columbine Dr	Philomath	OR	97370	236115	Construction Companies
Fulcrum Associates	2298 Wooded Knolls Dr	Philomath	OR	97370	541614	Business Management Consultants
Bashful Bobs Manufacturing Construction & Supply	2651 Main St	Philomath	OR	97370-9292	236115	New Single-Family Housing Construction (except Operative Builders)
Oregon Eagle Foundation	24178 Cardwell Hill Dr	Philomath	OR	97370	813312	Environmental Conservation/Ecologcl Org
D5 Field Repair, LLC	337 N 7th St	Philomath	OR	97370	811111	Truck-Repairing & Service
Marc Adamus Photography LLC	1165 West Hills Rd	Philomath	OR	97370-9013	541921	Photographic services
Sunrise Tree Farm	24048 Maxfield Creek Rd	Philomath	OR	97370	561730	Tree Service
Ark Animal Hospital	1100 Applegate St	Philomath	OR	97370-9416	541940	Animal hospitals, clinics, and veterinarians
Philomath Scout Lodge Inc	660 Clemens Mill Rd	Philomath	OR	97370	722320	Caterers
Egger, Adrian	1219 Applegate St	Philomath	OR	97370	621399	Psychologists
Russell Watkins Inc	23740 Woods Creek Rd	Philomath	OR	97370	484220	Log Hauling
Emerald Valley Thinning	NULL	Philomath	OR	NULL	541110	Attorneys
Wonder Dogs-Philomath Studio	1379 N 9th St	Philomath	OR	97370	812910	Dog Training
Corvallis Clinic Philomath	1219 Applegate St	Philomath	OR	97370	621111	Physicians & Surgeons
Wendy's Cutting Corner	100 S 8th St	Philomath	OR	97370	812112	Beauty Salons
Tutt Lynette	1332 Main St	Philomath	OR	97370	621999	Health Services
Landmark Realty	405 Landmark Dr	Philomath	OR	97370-9486	531210	Real Estate Agencies and Brokerages
Integrated Resource Management	1431 College St	Philomath	OR	97370	115310	Foresters-Consulting
Scotco Trucking Inc	1070 N 19th St	Philomath	OR	97370	484230	Trucking
Philomath Counseling	1229 Main St	Philomath	OR	97370	624110	Counseling Services
Philomath Community Church	145 N 14th St	Philomath	OR	97370	813110	Churches
L & B Reforestation Inc	24745 Alsea Hwy	Philomath	OR	97370	115310	Foresters-Consulting
Sentinel Edge Inc	32845 Fircreek Ln	Philomath	OR	97370	423610	Security Control Equip & Systems-Whls
Philomath City Building Permits	980 Applegate St	Philomath	OR	97370	926150	City Government-Regulation/Licensing & Inspection-Commercial Sectors
Riddle Tree Service LLC	330 N 11th St	Philomath	OR	97370	561730	Tree Service
Philomath Youth Activities Club	421 S 19th St	Philomath	OR	97370	624110	Youth Organizations & Centers
Philomath Family	1640 Main St	Philomath	OR	97370-9237	456110	Pharmacies and Drug Retailers
Peaceful Pages	375 Benton View Dr	Philomath	OR	97370-3904	459210	Book Retailers and News Dealers
Philomath Elementary School	239 S 16th St	Philomath	OR	97370	611110	Schools
Corvallis Remodeling LLC	24462 Cardwell Hill Dr	Philomath	OR	97370	236118	Remodeling & Repairing Building Contractors
Greengable Garden	24689 Grange Hall Rd	Philomath	OR	97370	812990	Wedding Chapels
Marcotte Distilling Company	1732 Main St	Philomath	OR	97370	312140	Distillers (Mfrs)
JBLC Construction	921 Applegate St	Philomath	OR	97370	236115	Construction Companies
Cardwell Hill Vineyard	244 Cardwell Hill Dr	Philomath	OR	97370	312130	Wineries (Mfrs)
Applegate Door	1243 S Broad St	Philomath	OR	97370	444180	Doors-Garage
Beelart, Levi	201 Main St	Philomath	OR	97370	115310	Foresters-Consulting
Philomath Police Department	1010 Applegate St	Philomath	OR	97370-9484	922120	Police Protection
JTS Fence	138 N 18th St	Philomath	OR	97370	236115	General Contractors
RJS & Associates Insurance Service	2364 Main St	Philomath	OR	97370-9361	524210	Insurance Agencies and Brokerages
Westwood Community Church	23319 Greasy Creek Rd	Philomath	OR	97370	813110	Churches
Philomath Finance Department	980 Applegate St	Philomath	OR	97370	921130	City Government-Finance & Taxation
Gene Tools LLC	1001 Summerton Way	Philomath	OR	97370	325414	Biological Products (Mfrs)
Caliber Collision	2408 Main St	Philomath	OR	97370	811121	Automobile Body-Repairing & Painting

Ramco Logging Inc	NULL	Philomath	OR	NULL	113310	Logging Companies (Mfrs)
Harris Bridge Vineyard	22937 Harris Rd	Philomath	OR	97370	312130	Wineries (Mfrs)
Benton County School District 17	1620 Applegate St	Philomath	OR	97370	611110	School Districts
Mid Valley Tire	34930 Wren Rd	Philomath	OR	97370	441340	Tire-Dealers-Retail
Philomath City Recorder	980 Applegate St	Philomath	OR	97370	921190	City Government-General Offices
Healing Motion Physical Therapy	732 Main St	Philomath	OR	97370	621340	Physical Therapists
Siddiki, Awais A MD	2364 Main St	Philomath	OR	97370	621111	Physicians & Surgeons
Sanders Home Designs	704 Pioneer St	Philomath	OR	97370	541310	Home Design & Planning Service
R & T Logging Of Oregon Inc	1801 Egan Dr	Philomath	OR	97370	113310	Logging Companies (Mfrs)
Miss Matched	1620 Main St	Philomath	OR	97370	999990	Nonclassified Establishments
Valley West Realty	39363 Luckiamute Rd	Philomath	OR	97370	531210	Real Estate
Brian Michael Stokes	24477 Maxfield Creek Rd	Philomath	OR	97370	236115	General Contractors
TLSR LLC	1337 Main St	Philomath	OR	97370	999990	Nonclassified Establishments
Practical Business Service Inc	119 S 16th St	Philomath	OR	97370	541211	Accountants
Holiday Tree Farm Inc	NULL	Philomath	OR	97370	444240	Nurserymen
Headwaters Counseling	1988 Chapel Dr	Philomath	OR	97370	624110	Counseling Services
Oregon State Forestry Department	24533 Alsea Hwy	Philomath	OR	97370	921120	Government Offices-State
Bashful Bobs Manufacturing, Construction & Supply	430 Sawtooth Ln	Philomath	OR	97370	236115	Construction Companies
Philomath Towne Pump	1841 Main St	Philomath	OR	97370	445131	Convenience Stores
Freshops	36180 Kings Valley Hwy	Philomath	OR	97370	424820	Brewers Equipment & Supplies (Whls)
Applegate Door Company	720 Applegate St	Philomath	OR	97370	444180	Door & Gate Operating Devices
J D McGee Inc	1215 Main St	Philomath	OR	97370	541330	Engineers' offices
Franklin Pump Systems	815 Applegate St	Philomath	OR	97370	423720	Water Conditioners (Whls)
RJS & Associates Insurance Service	1215 Main St	Philomath	OR	97370	524210	Insurance
Active911 Inc	518 N 19th St	Philomath	OR	97370	513210	Software/Application/Platform Publishing
Benton County Schools Credit Union	1710 Main St	Philomath	OR	97370	522130	Credit Unions
Philomath Middle School	2021 Chapel Dr	Philomath	OR	97370	611110	Schools
Timber Supply Co Inc	2354 Main St	Philomath	OR	97370	423810	Log Splitting Equipment (Whls)
Mainline Pump & Irrigation	815 Applegate St	Philomath	OR	97370	449210	Pumps-Retail
Community Cow	25159 Grange Hall Rd	Philomath	OR	97370	999990	Nonclassified Establishments
Healing Motion Physical Therapy	732 Main St	Philomath	OR	97370-9725	621340	Physical, occupational, speech therapists and audiogists' clinics
Healing Motion Physical Therapy	732 Main St	Philomath	OR	97370-9725	621340	Physical, occupational, speech therapists and audiogists' clinics
Wetlabs Inc	620 Applegate St	Philomath	OR	97370	541714	Laboratories-Research & Development
Compton Family Wines	810 Applegate St	Philomath	OR	97370	312130	Wineries (Mfrs)
Shelterworks Limited	427 N 15th St	Philomath	OR	97370	444110	Building Materials
Irmrts Joint Venture	1431 College St	Philomath	OR	97370-9290	115310	Support Activities for Forestry
Branch Engineering Inc	1215 Main St	Philomath	OR	97370	541330	Engineers-Civil
Sea-Bird Scientific (Wet Labs)	620 Applegate St	Philomath	OR	97370	541715	Oceanographic Research & Development
Hair It Is	1130 Main St	Philomath	OR	97370	812112	Beauty Salons
El Cruzero	1830 Main St	Philomath	OR	97370	722511	Restaurants
Philomath Public Works Department	1515 Willow Ln	Philomath	OR	97370-9274	921120	Legislative assemblies
Benton Co Cultural Coalition	NULL	Philomath	OR	NULL	999990	Nonclassified Establishments
Eco Express Laundry	104 N 14th St	Philomath	OR	97370	812320	Laundries
Peak Hearing Systems	1215 Main St	Philomath	OR	97370	456199	Hearing Aids
Les & Bobs Sports & Apparel	1204 Main St	Philomath	OR	97370	541490	Embroidery
Figaro's Pizza	1411 Main St	Philomath	OR	97370	722511	Full-Service Restaurants
First Baptist Church	335 S 26th St	Philomath	OR	97370	813110	Churches
Timber Town Coffee	1427 Main St	Philomath	OR	97370	722515	Coffee Shops
Tri S Construction, Inc	24477 Maxfield Creek Rd	Philomath	OR	97370	238910	Site Development Contractors
Wilsons Auto Parts	936 Main St	Philomath	OR	97370	441330	Automobile Parts & Supplies-Retail-New
American Dream Trucking LLC	1101 Pioneer St	Philomath	OR	97370	484230	Trucking
Phan, Seth	1640 Main St	Philomath	OR	97370	621330	Pharmacists
Kings Valley Charter School	38840 Kings Valley Hwy	Philomath	OR	97370	611110	Schools
Ixtapa Mexican Restaurant	1702 Main St	Philomath	OR	97370-9296	722511	Full-Service Restaurants
Philomath City Hall	980 Applegate St	Philomath	OR	97370	921120	City Hall
Corvallis Clinic Philomath Family Medicine	1219 Applegate St	Philomath	OR	97370	621111	Physicians & Surgeons

The Corvallis Clinic	1219 Applegate St	Philomath	OR	97370	621111	Physicians & Surgeons
Clemens Foundation	401 S 19th St	Philomath	OR	97370	541720	Foundation-Educ Philanthropic Research
AmeriGas Propane Exchange	432 Landmark Dr	Philomath	OR	97370	457210	Propane Tank Kiosks
North Star Oregon	1229 Main St	Philomath	OR	97370	624310	Vocational rehab agencies
Beggs Tire	838 Main St	Philomath	OR	97370	441340	Tire-Dealers-Retail
Clip Joint	100 S 8th St	Philomath	OR	97370	812111	Barbers
Peak Acupuncture	113 S 10th St	Philomath	OR	97370	621399	Acupuncture
Hendrix Outdoors Inc	NULL	Philomath	OR	NULL	459110	Sporting Goods-Retail
Finn Construction Inc	32238 Gerding Ln	Philomath	OR	97370	236115	Construction Companies
Heart of the Valley Astronomers	323 S 15th St	Philomath	OR	97370	813319	Non-Profit Organizations
Philomath Municipal Court	980 Applegate St	Philomath	OR	97370	922110	City Government-Courts
Galaxie Motel	104 S 20th St	Philomath	OR	97370	721110	Hotels & Motels
Motedb	517 N 19th St	Philomath	OR	97370-9297	541519	Computer disaster recovery and software installation services
Cardwell Hill Cellars	24241 Cardwell Hill Dr	Philomath	OR	97370	312130	Wineries (Mfrs)
Philomath Barber Shop	1331 Main St	Philomath	OR	97370	812111	Barbers
Turner Contract Cutting	NULL	Philomath	OR	NULL	113310	Logging Companies (Mfrs)
Hit Factory Productions	NULL	Philomath	OR	97370	512240	Recording Studios
Pathways Northwest	2364 Main St	Philomath	OR	97370	813311	Addiction Treatment Centers
Philomath Liquor Store	1805 Main St	Philomath	OR	97370	445320	Liquors-Retail
Sage Studios	25218 Oak Ln	Philomath	OR	97370	541430	Artists-Commercial
Aywn Publications	359 N 11th St	Philomath	OR	97370	513199	Publishers (Mfrs)
Camp Whispering Winds	NULL	Philomath	OR	97370	721214	Camps
Hoskins-Kings Valley Rural Fire Protection District	38101 Kings Valley Hwy	Philomath	OR	97370-9646	922160	Fire Protection
Mt Union Cemetery Association	NULL	Philomath	OR	NULL	812220	Cemeteries
State Farm	2372 Main St	Philomath	OR	97370-9361	524210	Insurance Agencies and Brokerages
Pioneer Telephone Co-op	23740 Woods Creek Rd	Philomath	OR	97370-9732	517111	Wired Telecommunications Carriers
Maginnis, Bardon CPA	1215 Main St	Philomath	OR	97370	541211	Accountants
Farmers Insurance	125 S 17th St	Philomath	OR	97370-9329	524210	Insurance Agencies and Brokerages
Wild Rose Quarry	35775 Kings Valley Hwy	Philomath	OR	97370	423320	Sand & Gravel (Whls)
Lynette Tutt	1332 Main St	Philomath	OR	97370	812199	Massage Therapists
Chorak Mowing	NULL	Philomath	OR	97370	561730	Lawn & Grounds Maintenance
Dance Me	132 S 17th St	Philomath	OR	97370	611610	Dancing Instruction
Edward Jones	134 N 19th St	Philomath	OR	97370-9242	523940	Portfolio Management and Investment Advice
Matthews Innovations	115 S 11th St	Philomath	OR	97370	333120	Machinery-Manufacturers
CTC	3178 West Hills Rd	Philomath	OR	97370-9553	332312	Fabricated Structural Metal Manufacturing
Philomath, City	980 Applegate St	Philomath	OR	97370-9439	999990	Unclassified Establishments
Schmidj	318 N 12th St	Philomath	OR	97370	999990	Nonclassified Establishments
Bob Davis LLC	24480 Alsea Hwy	Philomath	OR	97370	541110	Attorneys
Charles F Baker PC	1244 Applegate St	Philomath	OR	97370	621210	Dentists
Dan's Pump Service LLC	23085 Hoskins Rd	Philomath	OR	97370	811310	Pumps-Repairing
Zanda LLC	403 N 13th St	Philomath	OR	97370	999990	Nonclassified Establishments
Fiber Marketing Inc	351 S 15th St	Philomath	OR	97370	113310	Logging Companies (Mfrs)
The Corvallis Clinic	1219 Applegate St	Philomath	OR	97370	621111	Physicians & Surgeons
Marion Trading LLC	236 S 16th St	Philomath	OR	97370	999990	Nonclassified Establishments
Peak Resources	300 N 15th St	Philomath	OR	97370	541612	Energy Conservation & Mgmt Consultants
Philomath Community Service	360 S 9th St	Philomath	OR	97370	624190	Social Service & Welfare Organizations
Burner, Lisa	1622 Main St	Philomath	OR	97370-9237	624190	Miscellaneous Individual and Family Services
Out West Farm & Ranch	2606 Main St	Philomath	OR	97370	316990	Horse Equipment & Supplies-Whls & Mfrs
B & G Logging LLC	201 Main St	Philomath	OR	97370	113310	Logging Companies (Mfrs)
Jam & Associates	NULL	Philomath	OR	NULL	518210	Data Processing Service
Foursquare Church	1412 Applegate St	Philomath	OR	97370	813110	Churches
Greater Las Vegas Association	405 Landmark Dr	Philomath	OR	97370	813910	Associations
Strengthening Rural Families	535 S 19th St	Philomath	OR	97370	624190	Social Service & Welfare Organizations
17th St Self Storage	401 N 17th St	Philomath	OR	97370	531130	Storage-Household & Commercial
Heritage Natural Finishes LLC	126 S 11th St	Philomath	OR	97370	999990	Nonclassified Establishments
Oregon State Credit Union	1446 Main St	Philomath	OR	97370	522130	Credit Unions

Independent Motorcycle Repair	1623 Main St	Philomath	OR	97370	811310	Motorcycles & Motor Scooters-Rpr & Svc
Griz Services, LLC	30621 Slow Ln	Philomath	OR	97370	113210	Forest Nurseries & Gathering Forest Prod
Philomath School District 17J	1620 Applegate St	Philomath	OR	97370	611110	School Districts
Clemens Primary School	535 S 19th St	Philomath	OR	97370	611110	Schools
Phillips, Kaleigh A	2054 Applegate St	Philomath	OR	97370	621340	Physical Therapists
Steve Bush Logging	23251 Hoskins Rd	Philomath	OR	97370	113310	Logging (Mfrs)
American Home & Stone Inc	2707 Main St	Philomath	OR	97370-9244	327991	Cut Stone and Stone Product Manufacturing
Covid-19 Cure Project LLC	1001 Summerton Way	Philomath	OR	97370	999990	Nonclassified Establishments
Subway	115 S 19th St	Philomath	OR	97370-9221	722511	Full-Service Restaurants
Zirconium Research Corp	NULL	Philomath	OR	NULL	541910	Research Service
Nathan Gracey Standridge	22815 Hoskins Rd	Philomath	OR	97370	236220	Building Contractors
Pioneer Telephone Cooperative	1304 Main St	Philomath	OR	97370	517111	Telephone Companies
RJS & Associates	2364 Main St	Philomath	OR	97370	524210	Insurance
Brown, Cassandra, Anne	1219 Applegate St	Philomath	OR	97370	621399	Nurses-Registered RN
Electric Charging Station	914 Main St	Philomath	OR	97370	457120	Electric Charging Station
Oregon State Lock & Key	1503 Timothy St	Philomath	OR	97370-9663	561622	Lock picking services
Hammond, Paul C	2435 Applegate St	Philomath	OR	97370	115310	Foresters-Consulting
DGG Fishing LLC	821 Main St	Philomath	OR	97370	713990	Guide Service
Beaver Creek Seed Orchard	NULL	Philomath	OR	97370	921120	Government Offices-Federal
UPS Access Point Location	1740 Main St	Philomath	OR	97370-9296	541860	Mail advertising services
Oregon Education Association	146 S 12th St	Philomath	OR	97370	813930	Labor Organizations
Westwood Creek Farms	23195 Rexford Ln	Philomath	OR	97370	111998	Farms
Crozier, Erin Fuller PHD	NULL	Philomath	OR	97370	621399	Psychologists
Foley, Shawn, J, MD	1219 Applegate St	Philomath	OR	97370	621111	Physicians & Surgeons
Torley's Precision Machining	740 Applegate St	Philomath	OR	97370	332710	Machine Shops (Mfrs)
Lumos Wine Co	24000 Cardwell Hill Dr	Philomath	OR	97370	312130	Wineries (Mfrs)
Alamo Roofing LLC	24586 Old Peak Rd	Philomath	OR	97370-8916	238160	Roofing Contractors
James Summerton LP	1001 Summerton Way	Philomath	OR	97370	541714	Laboratories-Research & Development
Dairy Queen Grill & Chill	1907 Main St	Philomath	OR	97370	722511	Full-Service Restaurants
Farmers Insurance-Gary White	125 S 17th St	Philomath	OR	97370-9329	524210	Insurance Agencies and Brokerages
DTL Logging Co Inc	NULL	Philomath	OR	NULL	113310	Logging Companies (Mfrs)
The Church of Jesus Christ of Latter-Day Saints	150 James St	Philomath	OR	97370-9216	813110	Religious societies
Kristen George K Berry J Groot N Medill & R Adamson PTRS	Route 2 Box 138A	Philomath	OR	97370	813110	Religious Organizations
Rain Drop Farms	23093 Alsea Hwy	Philomath	OR	97370	111998	Farms
Dynamic Sewing	NULL	Philomath	OR	97370	314999	Sewing Contractors (Mfrs)
Healing Motion Physical Therapy	732 Main St	Philomath	OR	97370	621340	Physical Therapists
M & D Logging Inc	32647 Bevens Park Ln	Philomath	OR	97370	113310	Logging Companies (Mfrs)
John Grimm Afc	640 S 15th St	Philomath	OR	97370	999990	Nonclassified Establishments
Lantern Contracting LLC	31782 McLoughlin Dr	Philomath	OR	97370	238990	Contractors
Mid Valley Dental Arts	2811 Main St	Philomath	OR	97370	621210	Dentists
Color Wheel Co	3266 W Hills Rd	Philomath	OR	97370	325130	Color Cards (Mfrs)
Blue Rhino	1740 Main St	Philomath	OR	97370	457210	Propane Tank Kiosks
Landis, Gretchen	NULL	Philomath	OR	NULL	621399	Acupuncture
Knudson Logging Inc	23547 Woods Creek Rd	Philomath	OR	97370-9775	113310	Logging
Stymer Enterprises	1615 Pioneer St	Philomath	OR	97370	238210	Electric Contractors
Softstar Shoes	914 Main St	Philomath	OR	97370-2103	458210	Shoe Retailers
Inavale Pet Kennels	31798 Horse Farm Ln	Philomath	OR	97370	812910	Pet Boarding Sitting & Kennels
Corvallis Tool Co	3178 W Hills Rd	Philomath	OR	97370	541330	Machinery-Designing
CFN Cardlock	141 S 7th St	Philomath	OR	97370	424720	Commercial Fueling Stations (Whls)
Dunn & Co Tree Service	NULL	Philomath	OR	97370	561730	Tree Service
Emerald Valley Thinning Inc	23701 Pearson Pl	Philomath	OR	97370	113310	Logging Companies (Mfrs)
Fender's Blue LLC	24000 Cardwell Hill Dr	Philomath	OR	97370	999990	Nonclassified Establishments
Perkett, Paige	732 Main St	Philomath	OR	97370	621340	Physical Therapists
AmeriGas Cylinder Propane Refill	432 Landmark Dr	Philomath	OR	97370	457210	Gas-Propane-Refilling Stations
Pioneer Manor	1304 Main St	Philomath	OR	97370	921120	Government Offices-City/Village & Twp
Liz Dooley Volleyball Club	31695 Fern Rd	Philomath	OR	97370	713990	Volleyball Clubs

Denise McCoy, LMT	1332 Main St	Philomath	OR	97370	812199	Massage Therapists
United States Postal Service	1140 Applegate St	Philomath	OR	97370	491110	Post Offices
Living Faith Community Church	990 Pippa Ln	Philomath	OR	97370-8100	813110	Religious societies
Forest Restoration Inc	NULL	Philomath	OR	NULL	236118	Residential Remodeling Contractors
Calvert Kennels	3206 West Hills Rd	Philomath	OR	97370-9553	812910	Animal care services
Shoulder to Shoulder Farms	24542 Echo Hills Rd	Philomath	OR	97370	111998	Farms
Evenflo Plumbing	106 S 11th St	Philomath	OR	97370-9083	238220	Plumbing, Heating, and Air-Conditioning Contractors
New Idea Consultants	NULL	Philomath	OR	NULL	541614	Business Management Consultants
Hansen, Ronnie L	1229 Main St	Philomath	OR	97370	621330	Social Workers
Oregon State Grange Patrons of Husbandry	NULL	Philomath	OR	NULL	813410	Fraternal Organizations
Santa & Sons Christmas Trees	24469 Highway 20	Philomath	OR	97370-9792	111998	All Other Miscellaneous Crop Farming
D & S Trucking	25211 Evergreen Rd	Philomath	OR	97370	484220	Log Hauling
Irm Forestry	1431 College St	Philomath	OR	97370	115310	Foresters-Consulting
North Ridge Automotive	720 Main St	Philomath	OR	97370	811114	Brake Service
Diamond Clean Professional Service Inc	24620 Stovall Ln	Philomath	OR	97370-9551	561720	Janitorial/Custodial services
Philomath Preschool Headstart	1123 Main St	Philomath	OR	97370	624410	Schools-Pre-School/Kindergarten-Academic
Creative Graphic	1714 Main St	Philomath	OR	97370	339950	Signs (Mfrs)
Forestry Dept	24533 Alsea Hwy	Philomath	OR	97370	924120	State Government-Land/Mineral/Wildlife/Forest Conservation
AmeriGas Cylinder Propane Refill	2606 Main St	Philomath	OR	97370	457210	Gas-Propane-Refilling Stations
Healing Motion Physical Therapy	732 Main St	Philomath	OR	97370	621340	Physical Therapists
Philomath High School	2054 Applegate St	Philomath	OR	97370	611110	Schools
Absolutely Clear Windows	NULL	Philomath	OR	97370	238990	All Other Specialty Trade Contractors
Sunrise Sourdough Bakery	128 S 13th St	Philomath	OR	97370-8901	424490	Other Grocery and Related Products Merchant Wholesalers
Dirt Road Brewing	1301 Main St	Philomath	OR	97370	312120	Brewers (Mfrs)
M G Tax Service	2438 Applegate St	Philomath	OR	97370	541213	Tax Return Preparation & Filing
Bridge Builders International Inc	205 S 23rd St	Philomath	OR	97370	813110	Church Organizations
Chase Plumbing LLC	NULL	Philomath	OR	97370	238220	Plumbing Contractors
Chevron	1414 Main St	Philomath	OR	97370	457120	Service Stations-Gasoline & Oil
Goodfoot Farm	38001 Alexander Rd	Philomath	OR	97370-9785	111998	All Other Miscellaneous Crop Farming
Chiseled Spirit CrossFit	1243 Main St	Philomath	OR	97370	713940	Gymnasium (gym)
Philomath City Manager	980 Applegate St	Philomath	OR	97370-9439	921110	County supervisors' and executives' offices
Oregon Ignition Supply	30874 Botkin Rd	Philomath	OR	97370	423990	Durable Goods NEC (Whls)
RJS & Associates	1215 Main St	Philomath	OR	97370	524210	Insurance
Callis Cupcakery LLC	1821 Bullevard	Philomath	OR	97370-9538	311811	Retail Bakeries
The Corvallis Clinic	1219 Applegate St	Philomath	OR	97370	621111	Physicians & Surgeons
E E Timber Co	NULL	Philomath	OR	97370	423310	Timber & Timberland Companies (Whls)
La Rockita	1413 Main St	Philomath	OR	97370	722511	Restaurants
Betty's Salon of Beauty	223 S 19th St	Philomath	OR	97370	812112	Beauty Salons
Ryan P Cheeke	25617 Wonderly Ln	Philomath	OR	97370-9507	541110	Attorney Offices/Private Practices
Woodsman	529 Main St	Philomath	OR	97370	722511	Restaurants
Finn Construction Inc	201 Main St	Philomath	OR	97370	236118	Remodeling & Repairing Building Contractors
Slater Excavation	NULL	Philomath	OR	97370	238910	Excavating Contractors
Rick Robinson Trucking	30899 Peterson Rd	Philomath	OR	97370	562119	Trucking-Dump
Western Environmental Technology Laboratories, Inc	620 Applegate St	Philomath	OR	97370	334516	Laboratory Analytical Instruments (Mfrs)
Spaeth Lumber	137 N 13th St	Philomath	OR	97370	444180	Lumber-Retail
Philomath Frolic & Rodeo Inc	NULL	Philomath	OR	NULL	813410	Civic Organizations
Pediatric Therapy Pro	111 N 20th St	Philomath	OR	97370	621340	Speech Pathologists
Kings Valley Community Trust	23803 Maxfield Creek Rd	Philomath	OR	97370	813211	Education Religious & Charitable Trusts
Philomath Park Reservations	980 Applegate St	Philomath	OR	97370	712190	Parks
Alyrica Networks Inc	521 N 19th St	Philomath	OR	97370	517122	Agents for Wireless Telecommunications Services
David Paul Bayles Photography	24662 Ervin Rd	Philomath	OR	97370	541921	Photography
Dennis Gibson Construction	NULL	Philomath	OR	97370	238910	Excavating Contractors
Gap Medical Transport	391 N 7th St	Philomath	OR	97370	485999	Patient Transfer Svc
Inavale Farm & Stables	31786 Horse Farm Ln	Philomath	OR	97370-8906	115210	Support Activities for Animal Production
Philomath Community Public Library	1050 Applegate St	Philomath	OR	97370	519210	Libraries-Public
E D Hughes Excavating Inc	310 S 9th St	Philomath	OR	97370	238220	Sewer & Drain Cleaning-Service/Repair

Mid-Valley Gravel Company	705 Clemens Mill Rd	Philomath	OR	97370	444230	Lawn & Garden Equip & Supplies-Retail
Penske Truck Rental	421 Landmark Dr	Philomath	OR	97370	532120	Truck Renting & Leasing
Miller Timber Services Inc	24745 Alsea Hwy	Philomath	OR	97370	115310	Foresters-Consulting
Rotary International	NULL	Philomath	OR	NULL	624190	Social Service & Welfare Organizations
Willamette Hose & Fittings Inc	1214 Main St	Philomath	OR	97370	441330	Automotive Parts and Accessories Retailers
One on One Realty	1010 Main St	Philomath	OR	97370	531210	Real Estate
Gracewinds	1233 Main St	Philomath	OR	97370	999990	Nonclassified Establishments
Valley Electric Co LLC	NULL	Philomath	OR	97370	238210	Electric Contractors
Seto-Herr, Marie, Kylee Manon, DPT	732 Main St	Philomath	OR	97370-9725	621340	Physical, occupational, speech therapists and audiogists' clinics
New Life Fellowship	1412 Applegate St	Philomath	OR	97370	813110	Churches
Hendryx, Abby Joy	732 Main St	Philomath	OR	97370	621340	Physical Therapists
Anytime Fitness	1313 Main St	Philomath	OR	97370	713940	Health Clubs Studios & Gymnasiums
Green Street Foster Home	NULL	Philomath	OR	97370	623990	Foster Care
Stouder Construction Inc	25052 Evergreen Rd	Philomath	OR	97370	113310	Logging (Mfrs)
Giesy Farms	37574 Kings Valley Hwy	Philomath	OR	97370	111998	Farms
Mary's River Acupuncture Center	1332 Main St	Philomath	OR	97370	621399	Acupuncture
Richters Auto Repair LLC	120 S 10th St	Philomath	OR	97370	811111	Automobile Repairing & Service
Forest Meadows	1284 N 19th St	Philomath	OR	97370-9043	531190	Landlords of Other Real Estate Property
Rickard Rock Quarry	24253 Garrett Ln	Philomath	OR	97370	423320	Rock (Whls)
Muller George & Joyce	24186 Alsea Hwy	Philomath	OR	97370	111998	Farms
Dunlevy, Katharine	1219 Applegate St	Philomath	OR	97370	621399	Physicians Assistants
Evans Precision Tooling Inc	24178 Columbine Dr	Philomath	OR	97370-9001	811490	Miscellaneous personal and household goods restoration and support
Quality Timber Removal Inc	23781 Harris Rd	Philomath	OR	97370	113310	Logging Companies (Mfrs)
Logco Industries LLC	24114 Old Peak Rd	Philomath	OR	97370	999990	Nonclassified Establishments
Backwoods Home Magazine	2364 Main St	Philomath	OR	97370	513120	Publishers-Magazine (Mfrs)
John W Best Construction	23968 Ervin Rd	Philomath	OR	97370	236115	Construction Companies
TTT Timber	301 N 15th St	Philomath	OR	97370	484220	Log Hauling

Memorandum

To: Benton County Planning Commission

From: Jeffrey G. Condit

Subject: Response to May 5, 2025, Memorandum from Jeffrey L. Kleinman
File No. LU-24-027

Date: June 6, 2025

As you know, we represent Valley Landfills, Inc. ("VLI"), the applicant for the above-noted conditional use permit application (CUP). This memorandum responds to the above-noted memorandum prepared by Jeff Kleinman, attorney for Valley Neighbors for Environmental Quality and Safety.

I. Response to Mr. Kleinman's Sections I and II (Introduction and General Comments)

A. New Landfill. Mr. Kleinman argues that this CUP for expansion of the landfill should be treated as an application for a new landfill. That is not a plausible interpretation. The proposed expansion is on land specifically designated for landfill use, for which zoning was adopted with the intention of providing for future expansion of the landfill. A landfill has been operating in this area for 70 years, and the expansion area will be part of the landfill operation that includes areas north of Coffin Butte Road.

B. Conditions of Approval. VLI respectfully disagrees with the representation that it has a track record of noncompliance with conditions of approval or that Benton County (the "County") will not enforce conditions. The decisional record from 1973 through 1990 is not complete and is prior to Republic's ownership, so VLI also has limited records from this period. In the proposed conditions of approval, there are conditions that must be completed to the County's satisfaction during development before VLI can move onto the next phase. There are also operating conditions that continue to apply to the landfill after operations begin, such as maintenance of the vegetative screen and odor and noise monitoring and mitigation. If VLI fails to comply with these conditions, the County can bring an enforcement action against VLI up to and including revocation of the CUP. The proposed conditions are consistent with the County's

modern practice and provide plenty of teeth to ensure that VLI will continue to comply with any conditions of approval imposed by the County.

C. Benton County Talks Trash (BCTT). VLI agrees that the BCTT final report is not a binding legal document; it is, however, a highly persuasive resource. Multiple stakeholders spent months going over the history and legal framework of the landfill and produced a BCTT final report with significant (if not total) consensus. Mr. Kleiman argued at the May 6 hearing that the Planning Commission should ignore the analyses by the BCTT legal subcommittee because it included the County counsel and two attorneys for VLI. We note that Mr. Kleinman was invited to participate by Sam Imperati, the Oregon Solutions moderator, and Mr. Kleinman declined. As a result, Mr. Imperati retained former LUBA member and long-time land use lawyer Virginia Lucker to serve as the Committee's member on the legal subcommittee to ensure that the final report represented views coming from multiple perspectives. The consensus work product of the legal subcommittee included Ms. Lucker's substantive input and conclusions.

D. Past Representations About the Landfill. Mr. Kleinman and several persons testifying at the hearings argued that "promises were made" 50 years ago that the landfill would be temporary or would close after a certain period. We reiterate that the only applicable criteria are those in the current County land use regulations. *See, e.g.*, *M & T Partners, Inc. v. City of Salem*, ___ Or LUBA ___ (LUBA No. 2018-143) (Aug. 14, 2019) (oral and written representations by the applicant that the commercial shopping center uses allowed under a comprehensive plan and zone change would not include a Costco store did not support denial of a subsequent application including a Costco, where that restriction was not incorporated into the zone change and the Costco otherwise complied with the adopted requirements of the zone).

II. Response to Mr. Kleinman's Section III (Conditional Use Approval Standards)

A. Meaning of "Seriously Interfere" under BCC 53.215(1). Mr. Kleinman appears to argue that any interference that is more than insignificant is serious. That is not consistent with the express language of the Benton County Development Code. The interpretation that VLI proposed in its Burden of Proof, and with which staff concurred in the Staff Report, was based upon the BCTT analysis. That analysis was based not just on the input from the lawyers, but primarily on research by County planning staff about how the County has historically interpreted the conditional use criteria in past land use decisions. The Planning Commission should bear in mind that the conditional use criteria in BCC 53.215 apply to all conditional uses

under the Benton Development Code. If the County adopts a much more restrictive definition with regard to this application, then the County will have to apply that interpretation in any future CUP application for any conditional use in the Code. If the County adopts a more restrictive interpretation for this application than its historic interpretation, that affects the plausibility of the interpretation. If the County adopts a more restrictive interpretation for the application and then reverts to its historic interpretation in future applications, that is a due process issue. As an applicant, VLI expects to be judged based upon the text of Code and consistent the County's past practice.

Mr. Kleinman's construction of the term "significant" is not relevant because that term is not used in BCC 53.215(1).

B. Interference with Uses on Adjacent Property. BCC 53.215(1) requires an analysis of the impacts on adjacent property and on the character of the area. VLI identified the adjacent properties based upon the definition of "adjacent" in Webster's Third New International Dictionary, which, as Mr. Kleinman notes, is the dictionary preferred by LUBA and the appellate courts when construing terms of common usage. *See* BOP at 19-20. VLI identified adjacent properties, not just adjacent to the expansion area, but adjacent to the existing landfill plus the expansion area; VLI also included in its analysis properties abutting the adjacent properties. While VLI does not necessarily agree that this expansive view of "adjacent" is required by the Benton County Code, the Staff Report concurs that this captures all of the "adjacent properties."

1. Noise. As part of its post-hearing submittal, VLI has submitted an revised Odor Modeling Study dated June 2025 ("June 2025 Noise Analysis") to address the concerns in the Staff Report that led to staff's recommendations for denial and to recommend additional mitigation measures.

a. DEQ Noise Rule. Mr. Kleinman implies the DEQ Noise Control Regulations for Industry and Commerce (OAR 340-035-0035) (the "Noise Rule") are unenforceable and out of date. DEQ does not enforce its noise control regulations because the legislature withdrew DEQ's funding to do so. *See* OAR 340-035-0110. The Noise Rule has been updated since 1991, however, and is applied by cities, counties, and other state agencies in other contexts. *See, e.g.*, *Mingo v. Morrow Cnty.*, ____ Or LUBA ____ (LUBA Nos. 2011-014, 2011-016, and 2011-017) (June 1, 2011) ("*Mingo I*") (wind energy facility noise). The

Noise Rule is an accepted benchmark for determining noise impacts on surrounding properties, particularly in the absence of any County noise rules.

b. Back-Up Beepers. Mr. Kleinman argues that the proximity alarms that will be installed on VLI's vehicles instead of back-up beepers are even noisier. Mr. Kleinman cites no evidence in support of this allegation. VLI is actually proposing to install ambient-sensing broadband back-up alarms that use white noise that adjusts based upon ambient sound levels. These are much quieter than tonal alarms. June 2025 Noise Analysis.

2. Odor. As part of its post-hearing submittal, VLI has submitted an updated Odor Analysis to address the concerns in the Staff Report that led to staff's recommendations for denial.

3. Methane. Methane emissions are regulated by the EPA. VLI is fully cooperating with the EPA's Section 114 Information Request.

4. Visual Impacts. VLI relies on its analysis in the BOP and the staff analysis. The closed landfill cells will be reclaimed and revegetated over time. VLI has submitted additional testimony addressing the alleged "patchwork of decaying tarps" as part of its June 6, 2025, response to the hearing testimony. VLI has also submitted additional information about the height of the proposed expansion area. It will be below the height of Tampico Ridge at all points and will not be visible from the south side of the ridge

C. The Character of the Area. VLI relies on the arguments in its BOP.

D. 2021 Decision Findings. Mr. Kleinman cites to several findings from the Planning Commission's 2021 decision in support of denying this application. As Mr. Kleinman himself notes, the 2021 application was a substantially different application with a substantially different evidentiary record. Those findings are not relevant to this application.[1]

[1] Mr. Kleinman posits that this application is a "Trojan Horse" for the eventual closure of Coffin Butte Road and the filling in of the valley: "it is not inconceivable that the county would apply (to itself) to vacate Coffin Butte Road so that Republic would own and could fill over the right-of-way." In point of fact, any future expansion of the landfill would require a CUP process subject to the same criteria, public notice, and process as the existing application, and any concomitant vacation requires an official action of the County Board of Commissioners, even under the expedited process when all of the abutting property owners consent. *See* ORS 368.351, 368.356. Approval of this application would not affect the required process applicable to any future application or make it any easier.

E. The Purpose of the Forest Conservation (FC) Zone. Mr. Kleinman's argument that the purpose of the FC zone prohibits landfill use on FC-zoned lands ignores two express provisions in Chapter 60. Section 60.005 (Purpose of the Zone) describes forest-related uses and then goes on to say:

> Except for activities permitted or allowed as a conditional use, non-forest uses shall be prohibited in order to minimize conflicts with forest uses, reduce potential for wildfire, and protect this area as the primary timber producing area of the County.

BCC 60.215(11) expressly allows as a conditional use in the FC Zone:

> Disposal site for solid waste approved by the Benton County Board of Commissioners and the Oregon Department of Environmental Quality together with equipment, facilities, or buildings necessary for its operation.

Mr. Kleinman's argument is directly contrary to the express language of the Code.

III. Response to Mr. Kleinman's Section IV (Conditions Related to Traffic, Drainage, Leachate Management)

A. Traffic. VLI's traffic consultant has responded to testimony at the hearing regarding transportation in a report dated May 23, 2025, and included in its June 6 response to testimony at the hearing. The proposed improvements to Coffin Butte Road are more than sufficient to address the changes in truck and traffic patterns and will not impede through traffic on Coffin Butte Road.

B. Drainage and Leachate Management. Mr. Kleiman does not explain why he believes VLI's responses to drainage and leachate management are not compliant. VLI has submitted additional evidence into the record in response to testimony at the hearing about drainage/groundwater, leachate, and proposed construction. Typically, construction activity to site a proposed use is not considered part of the impact for conditional use review.[2]

IV. Response to Mr. Kleiman's Section V (Conditional Use Criteria Under BCC 60.220)

Staff correctly concluded that VLI has demonstrated compliance with these criteria. If the application is approved, the working face of landfill will move from the north side of Coffin Butte Road to the expansion area, but the overall off-site impacts will not be materially

[2] For example, OAR 340-035-0035(5)(g) exempts construction site noise from compliance with the Noise Rule.

different. As noted in VLI's BOP, farm and forest uses have thrived on adjacent properties, including the farm uses on VLI's properties directly adjacent to the landfill.

V. Response to Mr. Kleinman's Section VI (Development Activities in Wetlands)

Nothing in BCC 99.225 requires an applicant to obtain wetland permits prior to approval of a land use application or require an agency response before approval. None of the wetlands identified on site are a designated Goal 5 wetland under the County Comprehensive Plan or land use regulations, and so the County does not have any independent regulatory authority over any of the wetlands on site. The Draft Conditions of Approval (PA-1) require VLI to obtain an approved wetlands delineation and any necessary removal/fill permits prior to any ground-disturbing activities, as required by state and federal law.

VI. Conclusion

VLI has met its burden for proof to demonstrate compliance with the applicable criteria and respectfully requests that the Planning Commission approve the above-noted application.

Coffin Butte Landfill
2024 Expansion Application
Odor Dispersion Modeling Study

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

SCS ENGINEERS

Project No. 04225008.00 | February 2025
Revised June 2025

15940 SW 72nd Avenue
Portland, OR 97224
503-639-9201

Table of Contents

Section Page

1.0 INTRODUCTION 1
2.0 FACILITY DESCRIPTION 2
2.1 Location 2
2.2 Local Land Use / Zoning 3
2.3 Terrain / Topography 4
2.4 Climate and Meteorology 4
2.5 Potential Odor Activities 4
2.6 Odor Monitoring and Control Measures 5
2.7 Odor Complaint History 5
2.8 Proposed Project 7
2.9 Other Potential Sources of Odor in the Region 7
3.0 METHODOLOGY 9
3.1 Model Selection 9
3.2 Scenarios Modeled 9
3.3 Source Parameters 10
3.3.1 Fugitive Surface Grids 12
3.4 Building Downwash 13
3.5 Receptors 13
3.6 Meteorological Data 14
3.7 Terrain Data 16
3.8 Nuisance Odor Threshold 16
3.9 Scenario Emission Rates 17
4.0 RESULTS 19
5.0 CONCLUSIONS and Uncertainty Analysis 21
5.1 Modeling Conclusions 21
5.2 Odor Complaint Conclusions 21
5.3 Uncertainty Analysis 22
6.0 REFEFENCES 22

Appendices

Appendix A Odor Complaint Review
Appendix B Odor Pollutant Screening
Appendix C Scenario #1 Emission Rates
Appendix D Scenario #2 Emission Rates
Appendix E Odor Thresholds

Figures

Figure 1. Facility Location 2
Figure 2. Local Zoning Map 3
Figure 3. Elevation Contour Map 4
Figure 4. Proposed Expansion Area (Taxlot 104180001107) 7
Figure 5. Modeled Area Source Locations 12
Figure 6. Fugitive Source Grids 13
Figure 7. Nested Receptor Grid 14
Figure 8. Wind Rose of Modeled Meteorological Data 15
Figure 9. Peak 1-Hour Off-site Odor Impact Locations 20

Tables

Table 1. Point Source Release Parameters 11
Table 2. Flare Source Release Parameters 11
Table 3. Area Source Parameters 11
Table 4. Scenario #1: 2023 Emissions By Source (g/s) 17
Table 5. Scenario #2: 2052 Emissions By Source (g/s) 18
Table 6. Scenario #1: 2023 Model Results 19
Table 7. Scenario #2: 2052 Model Results 19

1.0 INTRODUCTION

The Coffin Butte Landfill (CBLF) is proposing to expand the waste disposal area of the landfill by using an existing property just south of Coffin Butte Road. The goal of this study was to conduct an odor dispersion modeling analysis that compares the existing and proposed operating scenarios for potential nuisance odor impacts. Since odor is a subjective human response, odor dispersion modeling was used to provide an objective approach towards understanding how on-site emissions of odor potentially impact off-site locations.

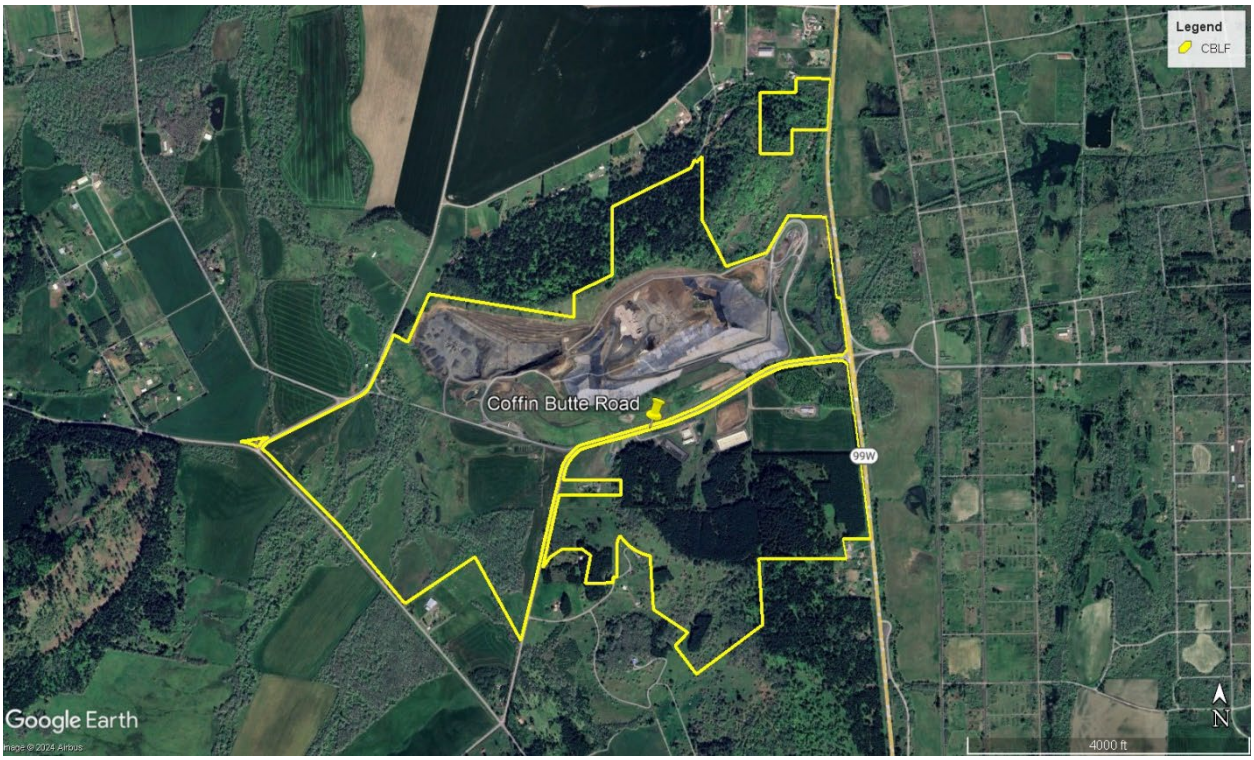
Following this Introduction, Section 2 provides a description of the facility. Section 3 describes the methodology used in this study while Section 4 summarizes the results. Section 5 then presents the conclusions. Finally, the appendices provide supporting documentation.

2.0 FACILITY DESCRIPTION

2.1 LOCATION

The CBLF is located at 28972 Coffin Butte Road in Corvallis, Oregon (Benton County). The facility is located just west of Highway 99W, approximately nine miles north of downtown Corvallis. Coffin Butte Road runs through the facility. See Figure 1 for the CBLF property boundary [1].

Figure 1. Facility Location

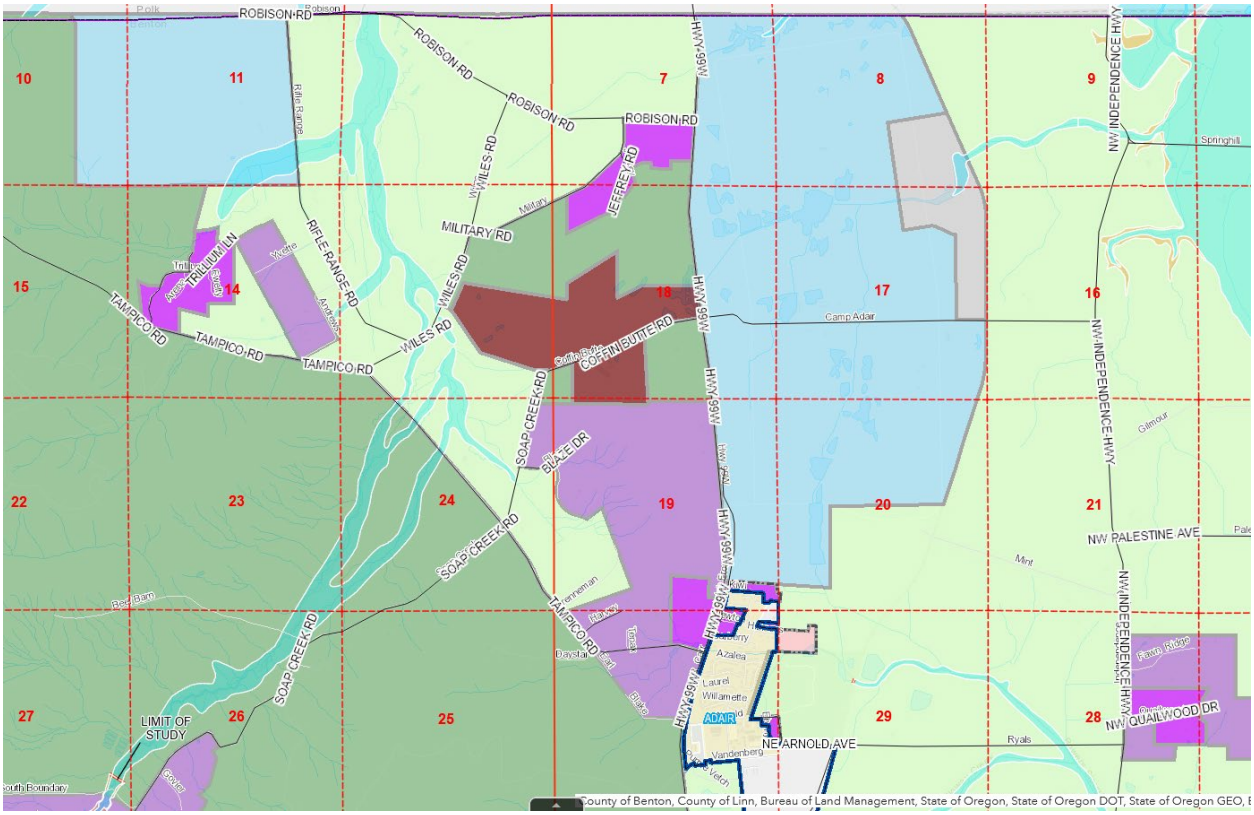


Note: Google Earth imagery from April 18, 2024.

2.2 LOCAL LAND USE / ZONING

Local land usage impacts air dispersion as surface characteristics differ for rural and urban conditions. Local land use near the CBLF is rural based upon the zoning map in Figure 2 [2].

Figure 2. Local Zoning Map



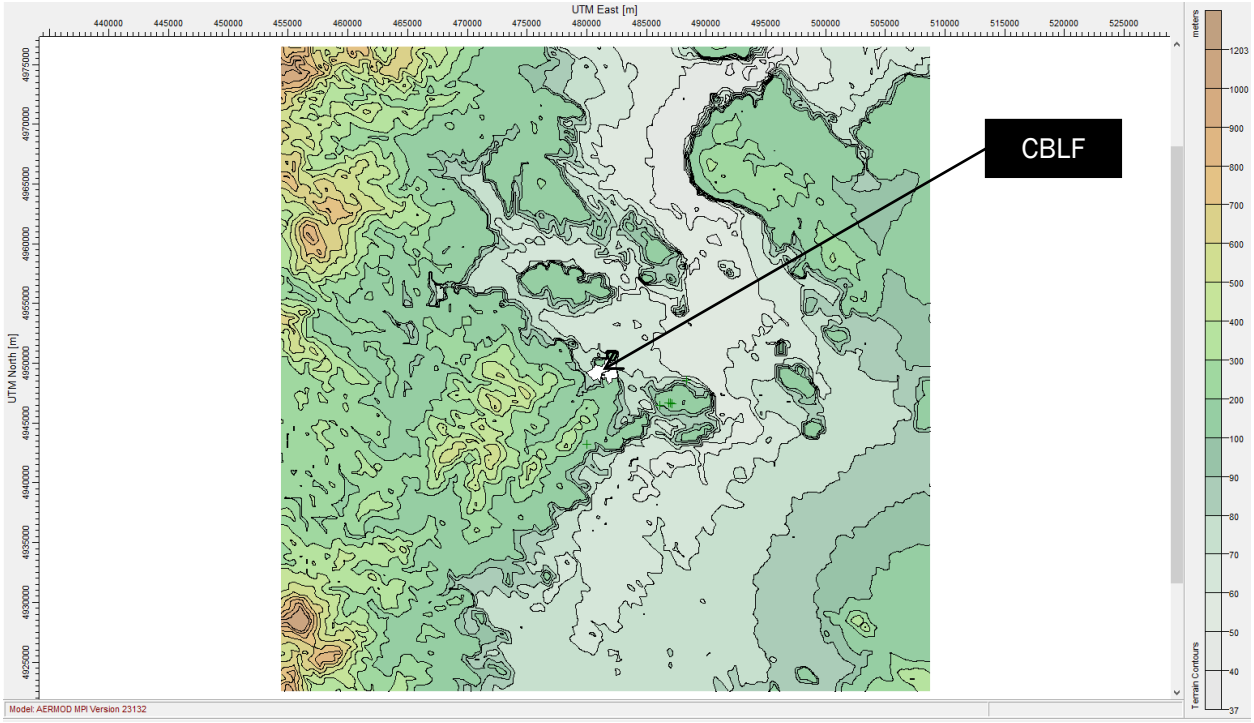
Zoning Color Code Legend:

- Exclusive farm use (light green);
- Forest conservation (green);
- Landfill (brown);
- Open space (light blue);
- Rural residential – 5 acre minimum parcel or lot size (magenta); and
- Rural residential – 10 acre minimum parcel or lot size (light magenta).

2.3 TERRAIN / TOPOGRAPHY

Local terrain also impacts air dispersion as winds can be channeled when flowing through canyons and valleys. In this case, the CBLF is located along the western edge of the Willamette Valley. See Figure 3 for the elevation contours surrounding the landfill [3].

Figure 3. Elevation Contour Map



2.4 CLIMATE AND METEOROLOGY

Local air quality is also impacted by the regional climate and meteorology as weather conditions control the transport and diffusion of emitted pollutants downwind from the release point into the surrounding area. Climate deals with long-term weather patterns while meteorology deals with short-term daily and hourly weather conditions. Nuisance odors are more likely to occur under poor meteorological conditions (e.g., low wind speed and stable wind conditions) that are common in the late night and early morning hours.

2.5 POTENTIAL ODOR ACTIVITIES

CBLF accepts commercial and public solid waste. The waste is placed in layers at the working face, compacted by heavy equipment, and then covered daily. Once an area of the CBLF has reached capacity, it is eventually capped with final cover to minimize infiltration of precipitation and release of gases not captured by the landfill gas collection and control system (GCCS). Odor is potentially emitted from sources such as:

- working face;
- tippers;
- leachate (i.e., water that has passed through the landfill's layers);
- landfill gas (LFG) which is a natural byproduct of decomposing organic material; and
- flares which burn any excess LFG collected by the CBLF.

Flares conservatively combust 98% of LFG sent to them. The 2% of un-combusted odor constituents in LFG is modeled for odors.

2.6 ODOR MONITORING AND CONTROL MEASURES

CBLF has developed and implemented a site-specific odor management plan that includes:

- application of daily cover;
- operating a LFG collection and control system;
- conducting surface emissions monitoring (SEM);
- monitoring local weather conditions (temperature, wind direction, etc.);
- conducting routine odor patrol inspections;
- responding to odor complaints received from the public and/or the Oregon Department of Environmental Quality (DEQ);
- taking action when odors are detected/reported;
- observing the area of concern for smell and conditions;
- inspecting landfill operations for any unusual activities or conditions;
- identifying possible sources of odor; and
- confirming implementation of applicable odor minimization measures.

2.7 ODOR COMPLAINT HISTORY

CBLF maintains a log of odor complaints received from the public and the DEQ. For this study, SCS Engineers (SCS) reviewed the odor complaints from 2022 through 2024 for potential patterns (e.g., time of day, day of week, season of year) as well as potential correlation to concurrent wind conditions measured on-site. For review purposes, each odor complaint log entry (event) was assigned a unique ID (1 through 84) as well as an estimated distance and wind direction from CBLF (e.g., if a complaint location was southeast (SE) of CBLF, then the concurrent wind direction at CBLF would need to be northwest (NW) for correlation). Note, odor event #1 (25 odor complaints between 11/18/21 and 2/7/22) could not be categorized since specific complaint dates/times were not provided.

Based upon the review, the following observations were made:

- Location
    - Complaint locations ranged from the adjacent surrounding area to approximately seven miles from CBLF.
    - Complaint locations varied from not provided to general areas to specific addresses.
    - The most common complaint locations specified were southwest (35%) and south (29%) of CBLF.
    - Complaint locations southwest of CBLF were within a valley whose terrain may be channeling odor from CBLF under certain wind conditions.
    - Populated areas south of CBLF include Adair Village, Lewisburg, and Corvallis.
- Time of Day

    - Odor complaints were reported in 16 different hours of the day.
    - Odor complaints peaked in the morning between 8:00 am and 11:00 am:
        - 7:00 am to 7:59 am (11%);
        - 8:00 am to 8:59 am (12%);
        - 9:00 am to 9:59 am (12%); and
        - 10:00 am to 10:59 am (7%).
- Complaints in a Single Day
    - Two days each had five odor events (1/18/2024 and 2/3/2024).
    - Two days each had four odor events (5/23/2024 and 12/1/2024).
    - Four days each had three odor events (2/10/2024, 2/20/2024, 4/1/2024, and 12/29/2024).
    - Seven days each had two odor events.
    - Thirty nine days each had one odor event.
- Day of Week
    - Odor events were reported on each day of the week and peaked on Thursday:
        - Thursday (20%);
        - Saturday (19%);
        - Friday (17%);
        - Tuesday (14%);
        - Sunday (11%);
        - Wednesday (10%); and
        - Monday (8%).
- Month and Season of the Year
    - The odor events peaked in December with the top four months being:
        - December (24%);
        - February (23%);
        - August (11%); and
        - January (10%).
    - The odor events peaked in the winter:
        - Winter (46%);
        - Fall (24%);
        - Summer (18%); and
        - Spring (12%).
    - Thermal inversions could be a contributing factor to the odor complaints. Radiation from the sun can heat the ground which in turn can warm the air near the Earth's surface. When warm air expands and cools as it rises, air temperature decreases with altitude. However, a thermal inversion occurs when air temperature increases with altitude. There are two kinds of thermal inversions: surface and aloft. Surface inversions can result in poor air quality (e.g., odors) as pollutants are trapped near ground level, dispersing only horizontally within the inversion. Surface inversions are stronger and more common during the winter months when winds are calm, skies are clear, and nights are long. [4, 5] Thermal inversions were not considered when evaluating each individual odor event. Air temperature needs to be measured at different heights to determine if a thermal inversion exists. The on-site meteorological station only collected air temperature data at one height. Any odors trapped within an inversion would still disperse horizontally based upon wind direction..
- Correlation of Odor Complaint to On-Site Wind Data
    - Correlation of odor complaints to on-site wind data took into account several factors including complaint location (distance and direction relative to CBLF), complaint time, and the wind speed/direction at and before the complaint time.

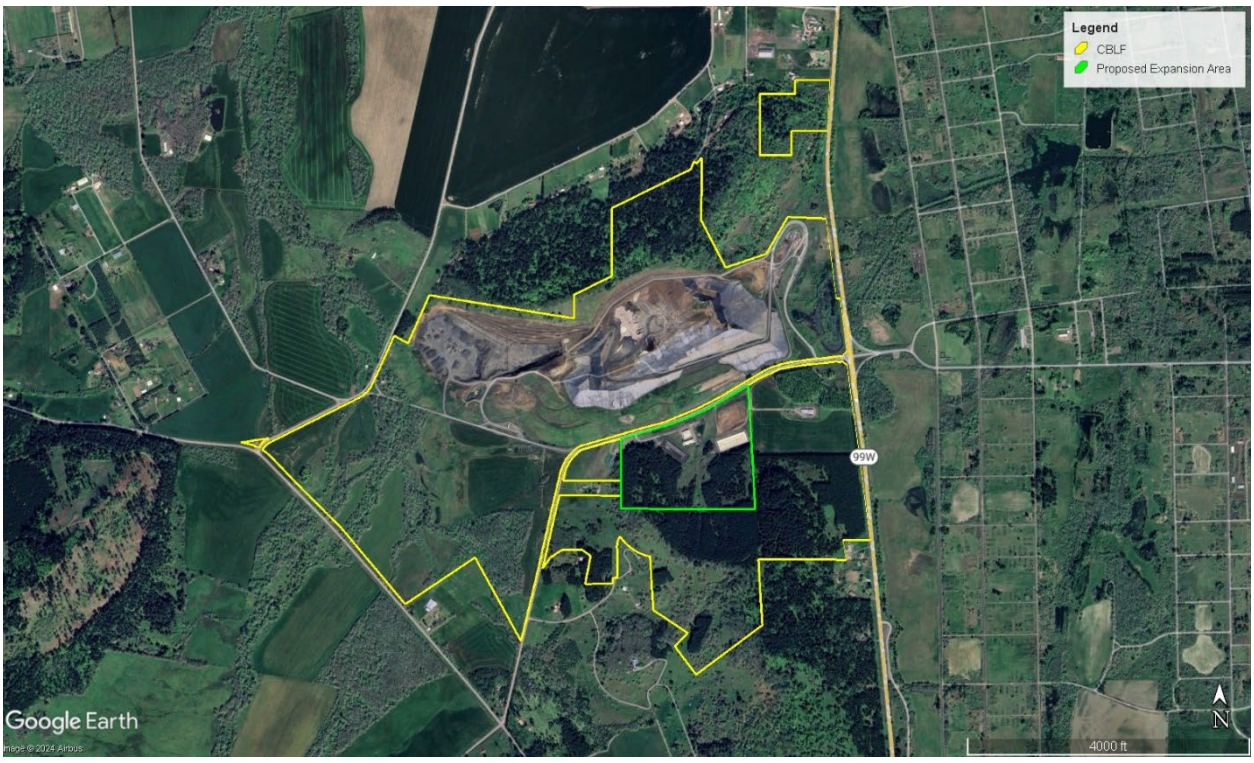
- Odor events were then categorized as follows for correlation:
  - "Likely" based on complaint location and wind conditions (1%);
  - "Not likely" based on complaint location and wind conditions (29%);
  - "Possible" due to ambiguity or lack of data (58%); and
  - "Unknown" due to complaint time not specified (12%).

See Appendix A for the odor complaint review details.

2.8 PROPOSED PROJECT

CBLF is requesting approval of a conditional use permit (CUP) application to expand the area on which landfill activities will be conducted to the south side of Coffin Butte Road (the "Development Site"). In addition to using the Development Site for the landfill, the proposed changes include an 1,800-square-foot employee building and parking on land to the west of the landfill, access road modifications on lands to the north, and the relocation of leachate ponds, leachate loadout, leachate sump, an outbound scale, portions of the perimeter landfill road, the shop/maintenance area, cut activities for landfill, and leachate ponds to support the landfill onto the property to the east (collectively, the "Project") [6]. Figure 4 displays the location of the expansion area in relation to existing operations.

Figure 4. Proposed Expansion Area (Taxlot 104180001107)



2.9 OTHER POTENTIAL SOURCES OF ODOR IN THE REGION

Although this study only addresses potential odor impacts from the CBLF, it is important to note that other potential sources of odor exist in the region including (but not limited to):

- Agriculture.
- Biosolids land application fields (used only in summer months, but not every).
- Compost / organics recycling facility.
- Wastewater treatment plant.

3.0 METHODOLOGY

Since odor is a subjective human response, odor dispersion modeling provides an objective approach towards understanding how on-site emissions of odor potentially impact off-site locations. The following summarizes the methodology used in this study.

3.1 MODEL SELECTION

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (Version 24142 incorporated into the Lakes Environmental AERMOD View 13.0 software suite) [7] was used to model estimated emissions of odorous pollutants from the landfill and predict maximum, off-site, 1-hour concentrations for each pollutant using the rural dispersion mode and elevated terrain.

AERMOD was selected for this study since:

- AERMOD is preferred/recommended by the EPA for near-field dispersion of emissions for distances less than 50 kilometers in both simple and complex terrain.
- AERMOD is acceptable to the DEQ for dispersion modeling studies [8].
- AERMOD has undergone numerous validation studies.
- AERMOD is in the public domain and is readily available.
- AERMOD can model multiple sources and multiple receptors.
- AERMOD can use representative meteorological data to simulate atmospheric conditions that affect the transport and dispersion of air pollution from sources.
- AERMOD can use local terrain data to model receptors in complex terrain.
- AERMOD can be used to model impacts of odor causing pollutants.

Input data for AERMOD included the following which are described below:

- source parameters (locations, dimensions, emission rates, etc.);
- receptor locations;
- meteorological data;
- terrain data; and
- model options.

See below for details regarding the AERMOD model input.

3.2 SCENARIOS MODELED

In order to estimate odors from the landfill at its current state as well as with the proposed expansion, modeling was performed in two scenarios. The first scenario (Scenario #1) modeled actual operations in 2023 using estimated emission rates from the following resources:

- Revised 2023 Annual Title V Report (October 11, 2024) for criteria pollutants using process throughputs and emission factors that have already been approved by DEQ;
- Revised 2023 Air Toxics Emission Inventory (ATEI) (August 2024) for speciated air toxics and Volatile Organic Compounds (VOCs) using process throughputs and emission factors that have already been approved by DEQ; and

- U.S. EPA LandGEM model (LandGEM) ran for the 2023 ATEI for additional non-toxic pollutants not included above assuming an EPA default 75% collection efficiency and 98% destruction efficiency by the flares[1].

The second scenario (Scenario #2) looked at year 2052, which is the estimated closure year if current tonnages of waste acceptance from 2023 continue. 2052 would also see the highest landfill gas generation rate based on the model. A 75 collection efficiency was used in this scenario as well. The estimated waste design capacity will be 41,110,068 tons including the expansion area.

A third scenario was considered to show a middle point in landfill expansion, but is dependent on the odor results of the first two scenarios to see if needed.

3.3 SOURCE PARAMETERS

Source parameters were used to model the release of odorous pollutants from the fugitive landfill surface, landfill gas flares, the tipper engines, and the aggregate insignificant (AI) source. The AI source is incorporated by DEQ into each criteria pollutant emission total for the facility, taking into consideration sources that are too small to be permitted. This includes: cell development, operation and closing; tipping and dump truck drops; leachate collection and wastewater treatment; as well as light plants and trash pumps.

In Scenario #1, the fugitive landfill source was located in the currently permitted waste area North of Coffin Butte Road. In 2023, two open (candlestick) flares were present at the landfill, as well as two tipper engines and the AI source.

Scenario #2 is proposed to include a fugitive landfill source in the current permitted area, as well as an expansion area South of Coffin Butte Road. Since 2023, the two open flares have been replaced with one enclosed flare with a landfill gas capacity of 3,390 standard cubic feet per minute (scfm). For a conservative approach, it is assumed that all landfill gas collected is going through this flare even though a landfill gas to energy (LFGTE) plant is on-site and expected to control a significant amount of the gas. The proposed landfill gas generation rate from LandGEM in 2052 would exceed this flare's capacity, but for simplicity all emissions were still modeled from this flare source, as a second flare with similar exhaust parameters would be installed close by if needed. The tipper engines and AI source parameters were not changed in Scenario #2; however, these sources were moved to the expansion area as the final buildout's active face would likely be in this region. The size of the AI source needed to be shrunk in order to fit in the smaller expansion area.

Tables 1 through 3 summarize the source parameters modeled while Figure 5 displays the modeled source locations. Most model parameters were taken from the November 2024 Modeling Report submitted to DEQ for CBLF. A revised extent of waste was used for the fugitive landfill surface source, with sources in the expansion area estimated based on engineering drawings. The fugitive landfill surface was split into squares as explained in Section 3.3.1.

[1] EPA, 2008a. Background Information Document for Updating AP42 Section 2.4 for Estimating Emissions from Municipal Solid Waste Landfills. National Risk Management Research Laboratory, Air Pollution Prevention and Control Division, U.S. EPA. September 2008.
http://www.epa.gov/ttn/chief/ap42/ch02/draft/db02s04.pdf

Table 1. Point Source Release Parameters

Model ID	Description	Elevation above mean sea level (ft)	Stack Height (ft)	Temperature (F)	Exit Velocity (ft/s)	Stack Diameter (ft)
EFLARE	Enclosed Flare	245.8	40	1,600	39.5	11.68
TIP2	Tipper Engine #2	301.1	9	1,016.6	57.7	0.66
TIP3	Tipper Engine #3	301.3	7.5	927.1	24.3	0.66

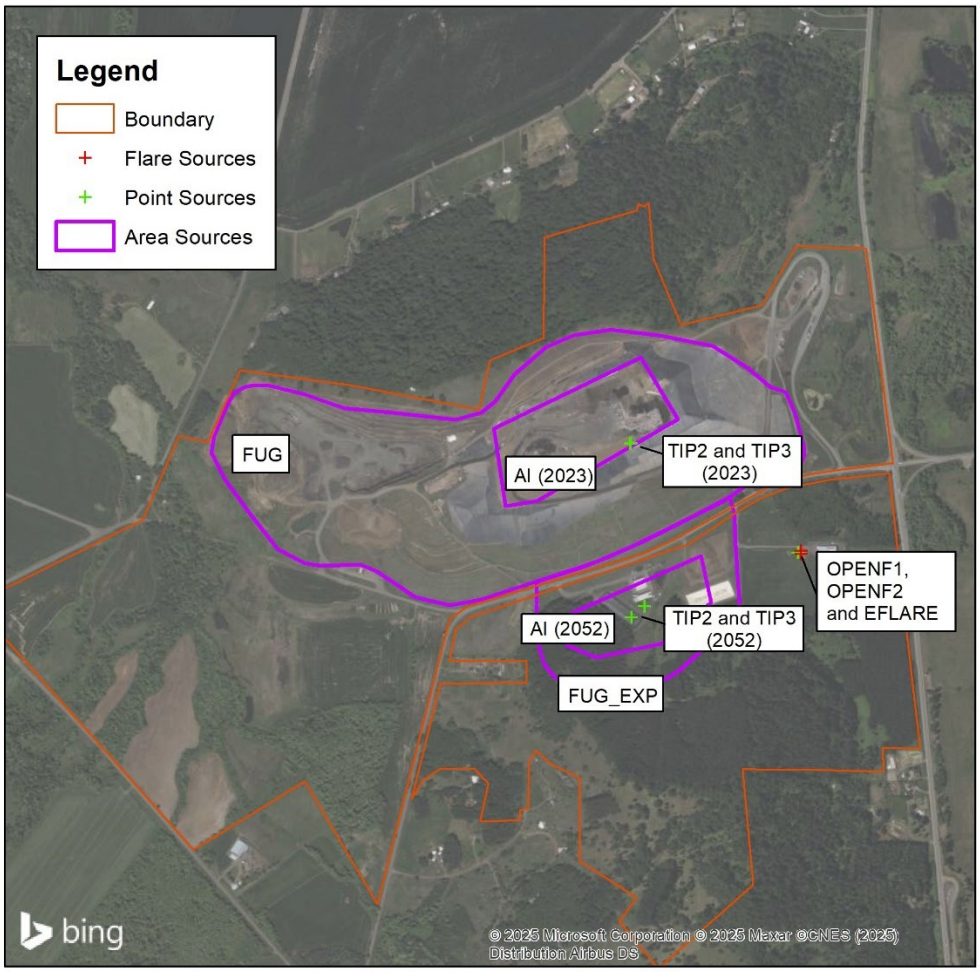
Table 2. Flare Source Release Parameters

Model ID	Description	Elevation above mean sea level (ft)	Effective Release Height (ft)	Temperature (F)	Exit Velocity (ft/s)	Stack Diameter (ft)
OPENF1	Open Flare #1	242.6	42.26	900	60	0.67
OPENF2	Open Flare #2	242.6	42.26	900	60	0.67

Table 3. Area Source Parameters

Model ID	Description	Elevation above mean sea level (ft)	Area (ft^2)	Release Height (ft)	Initial Vertical Dimension (ft)
FUG (See Section 3.3.1)	Current Fugitive Surface	246	215,278 (roughly)	Various	0
FUG_EXP (See Section 3.3.1)	Expanded Fugitive Surface (2052 only)	246	215,278 (roughly)	Various	0
AI (2023)	Aggregate Insignificant	281.6	1,132,482	0	0
AI (2052)	Aggregate Insignificant	281.6	668,917	0	0

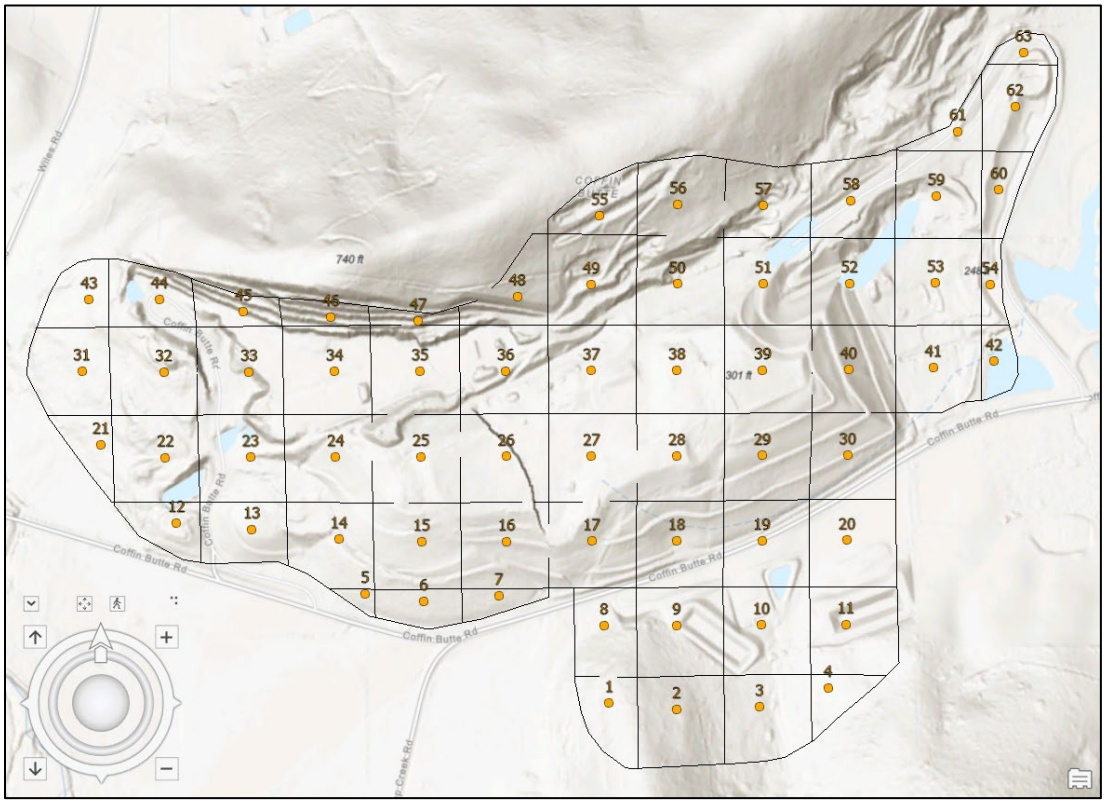
Figure 5. Modeled Area Source Locations



3.3.1 Fugitive Surface Grids

To properly represent the topography of the landfill as flat area sources, the landfill was split up into 20,000 square meter grids. The average elevation of each grid, based on the 2023 and 2052 terrain files discussed in Section 3.7, will be used as the release height of each area source. A base elevation of 246 feet was used, which is the landfill mound's base elevation. See Figure 7 below for a layout of each grid source's location.

Figure 6. Fugitive Source Grids



Grid squares 1 through 4, 8 through 11, 19 and 20 are only added in Scenario #2 as they are in the proposed expansion area, denounced FUG_EXP. Grids 5 through 7, 12 through 18, and 21 through 58 are in both scenarios and denounced FUG. The emission rates for each grid are calculated by taking the total emissions for the area (FUG or FUG_EXP) and dividing by the total number of grids (48 for FUG and 10 for FUG_EXP). Grids 59 through 63 do not contain waste and were removed from modeling.

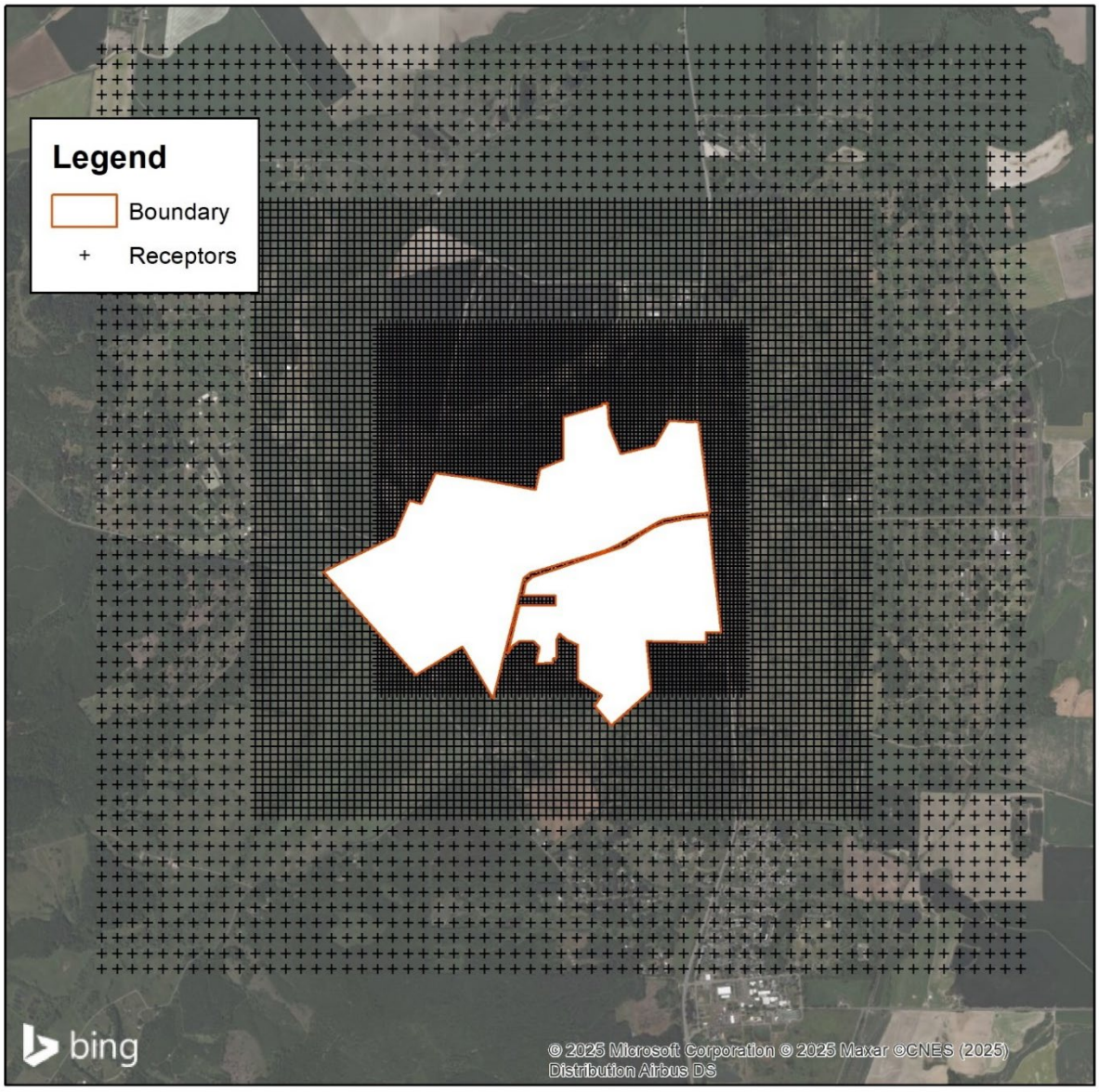
3.4 BUILDING DOWNWASH

Building downwash occurs when wind flowing over/around buildings impacts the dispersion of pollution from nearby stacks (point sources). One building exists 140 feet East of the flares where the LFGTE plant is located. This building is 175 feet by 60 feet wide and 25 feet tall.

3.5 RECEPTORS

AERMOD was used to generate nested 25-meter, 50-meter, and 100-meter spaced receptor grids over the landfill and surrounding area. Receptor flag pole heights were set to zero meters (ground level). On-site receptors within the landfill's property boundary were removed from the analysis. See Figure 6 for the layout of the nested grids.

Figure 7. Nested Receptor Grid



3.6 METEOROLOGICAL DATA

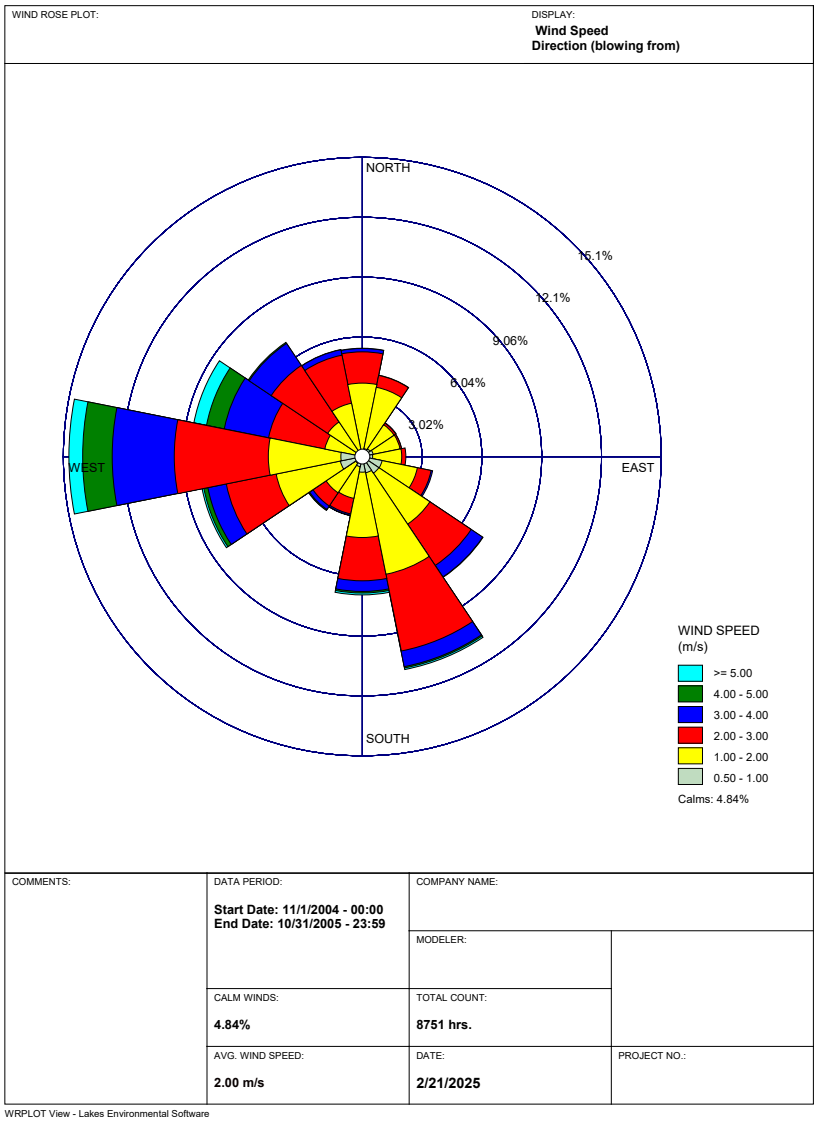
On-site data was collected between November 1, 2004 and October 30, 2005 by CH2M HILL to support permitting for the LFGTE facility (operated by Pacific Northwest Generating Cooperative) expansion which added two additional engines to the facility in 2006. At the time of collection, the meteorological station was located on-site, at a location recommended by DEQ, approximately 100 feet southeast of the LFGTE facility. The data collected from the onsite station included wind speed, wind direction, standard deviation of horizontal wind direction, temperature, delta temperature, and solar radiation. Data for this period is available for 8,727 hours for the year, resulting in a data availability of 99.9%, with greater than 90% availability for any single parameter. Additional details regarding the collected on-site data are available in the 2006 Air Modeling Report prepared by CH2M HILL.

This data set is characterized by strong west-southeast wind pattern. The meteorological data summary was included in the Modeling Protocol approved by DEQ.

The Salem McNary Field was used as the upper air data set. AERSURFACE was used to calculate site specific values for albedo, Bowen ratio, and surface roughness on an annual basis for 12 surface sectors.

A wind rose displays wind speed and wind direction graphically for a designated historical time period. Figure 7 displays the lower altitude (surface) wind rose for the meteorological data modeled in this study for all or model runs. Dominant surface wind patterns occur from the south-southeast and west in this meteorological set. Note, wind data in Figure 7 was measured during a different time period and at a different location than the on-site wind data used for the odor complaint analysis. Therefore, the wind data in Figure 7 was not used in the odor complaint analysis.

Figure 8. Wind Rose of Modeled Meteorological Data



3.7 TERRAIN DATA

Two different sets of terrain data were required to do this analysis: A dataset of current elevations for Scenario #1, and one using estimated final buildout elevations. Current terrain data was downloaded from the United States Geological Survey (USGS) 1 arc-second National Elevation Dataset (NED). Future elevations were determined using engineering renderings at final buildout from AutoCAD. Elevations were then processed and imported into AERMOD for the sources and receptors modeled in each scenario.

3.8 NUISANCE ODOR THRESHOLD

Oregon state laws prohibit businesses from emitting odors which cause a nuisance. These nuisance laws are implemented by the DEQ which has developed a strategy for responding to odor complaints reported through an online tool. The strategy emphasizes early odor detection, voluntary cooperation, and the rapid resolution of nuisance conditions related to odors [9]. Since the DEQ has not specified a protocol for odor evaluations, this study modeled pollutants individually so that predicted off-site concentrations could be directly evaluated against the individual pollutant's published odor detection threshold to determine whether the individual pollutant may be detectable in residential or commercial land use areas. Pollutant-specific odor thresholds were obtained from the following resources [10, 11, 12]:

- American Industrial Hygiene Association (AIHA), "Odor Thresholds for Chemicals with Established Occupational Health Standards, 3rd edition".
- National Oceanic and Atmospheric Administration (NOAA), "Computer-Aided Management of Emergency (CAMEO)".
- United States Environmental Protection Agency (EPA), "Health Effects Notebook for Hazardous Air Pollutants".

Note, many pollutants have a range of published odor thresholds. For this study, the lowest odor threshold published by AIHA was used for most pollutants. For pollutants with wide ranges in odor thresholds (e.g., sulfur based compounds such as hydrogen sulfide), the published odor threshold from CAMEO was used. CAMEO was also used for one pollutant that did not have a published odor threshold from AIHA. Finally, EPA odor thresholds were used for two pollutants that either did not have a published odor threshold from AIHA or had an EPA odor threshold lower than the published odor threshold from AIHA. See Appendix E for the odor thresholds modeled in this study.

Scenario #1 (2023 actual operations) had 49 pollutants with published odor thresholds. Since emission rates and odor thresholds vary by pollutant, the 2023 emissions (taken from the 2023 ATEI as well as non-toxics from LandGEM) were screened for pollutants with the highest potential for causing off-site odors. This was accomplished by ranking each pollutant based on the ratio of facility level emissions (in units of grams per second) to odor threshold (in units of grams per meter cubed). Based upon this screening process, this study focused upon evaluating the following top eight pollutants (approximately 95% of the 2023 odor emissions):

- Dimethyl sulfide (methyl sulfide);
- Ethyl benzene;
- Ethyl mercaptan (ethanethiol);
- Hydrogen sulfide;
- Methyl mercaptan;
- Nitrogen oxides (NOx as NO_2);

- Toluene; and
- Xylenes.

See Appendix B for the odor pollutant screening results.

3.9 SCENARIO EMISSION RATES

Emissions of the eight pollutants with the highest odor potential as mentioned in Section 3.8 were calculated for both Scenario #1 and #2. As mentioned, the estimated actual emissions from 2023 were used for Scenario #1. Hydrogen Sulfide, Xylene, Toluene, and ethyl benzene from this ATEI were directly brought into the model. The only change to sources from the ATEI was the landfill surface, noted as F-LFG1 and F-LFG2, which were combined and modeled as FUG. Dimethyl sulfide, methyl mercaptan, and ethyl mercaptan were taken from LandGEM for the 2023 year, which determined 591.58 MMscf of landfill gas was emitted fugitively and 607.56 MMsf of landfill gas was combusted by the open flares. These three pollutants are only present in the landfill gas sources. Nitrogen oxides (NOx) emissions were taken from the 2023 annual Title V emission calculations reported to DEQ. See Appendix C for Scenario #1 emission rates.

Scenario #2 requires LandGEM to estimate future yearly tonnages until the design capacity is reached. The design capacity is 41,110,068 tons including the expansion area, which will be reached in year 2052 assuming the 2023 waste acceptance of 930,373 tons continues annually. This would generate 1,132 MMscf of fugitive landfill gas and 3,399 MMscf of collected gas in year 2052. The same methodology from Scenario #1 was used to calculate fugitive and flare emissions using the permitted emission factor for NOx of 27.35 lb/MMscf. The total landfill fugitive surface area is 1,011,815 square meters, with 81% of this being in the current area, and 19% in the southern proposed expansion. Total fugitive emissions were split between FUG and FUG_EXP based on this area percentage. See Appendix D for Scenario #2 emission rates for the eight targeted odorous pollutants.

Emissions by source for each scenario are shown in Tables 4 and 5 below.

Table 4. Scenario #1: 2023 Emissions By Source (g/s)

Pollutant	FUG	OPENF1	OPENF2	TIP2	TIP3	AI
Ethyl Benzene	1.06E-02	1.04E-04	1.14E-04			
Hydrogen Sulfide	2.63E-02	2.57E-04	2.82E-04			
Toluene	7.86E-02	7.70E-04	8.45E-04	8.12E-05	6.26E-05	
Xylene	2.79E-02	2.73E-04	3.00E-04	5.66E-05	4.36E-05	
Dimethyl Sulfide	9.67E-03	2.90E-04	2.90E-04			
Ethyl Mercaptan	2.85E-03	8.56E-05	8.56E-05			
Methyl Mercaptan	2.40E-03	7.20E-05	7.20E-05			
Nitrogen Oxides		9.15E-02	1.71E-01	8.79E-01	6.77E-01	2.88E-02

Table 5. Scenario #2: 2052 Emissions By Source (g/s)

Pollutant	FUG	FUG_EXP	EFLARE	TIP2	TIP3	AI
Ethyl Benzene	1.65E-02	3.88E-03	1.22E-03			
Hydrogen Sulfide	4.07E-02	9.60E-03	3.02E-03			
Toluene	1.22E-01	2.87E-02	9.03E-03	8.12E-05	6.26E-05	
Xylene	4.32E-02	1.02E-02	3.21E-03	5.66E-05	4.36E-05	
Dimethyl Sulfide	1.66E-02	3.91E-03	1.23E-03			
Ethyl Mercaptan	4.89E-03	1.15E-03	3.63E-04			
Methyl Mercaptan	4.12E-03	9.71E-04	3.05E-04			
Nitrogen Oxides			1.34E+00	8.79E-01	6.77E-01	2.88E-02

4.0 RESULTS

Tables 6 and 7 summarize the peak, off-site, 1-hour pollutant concentrations for each modeling scenario in units of micrograms per meter cubed (ug/m3). Each pollutant impact was then compared to its odor threshold via a ratio called dilution to threshold or D/T (i.e., maximum impact divided by odor threshold). A D/T ratio of one indicates that roughly half of people can detect an odor at a given location for a given hour. A D/T of 7 is expected to result in a odor "nuisance" in most states, though this number is variable and not quantified in Oregon. See Figure 8 for the peak, off-site impact locations. Figures 9 through Figure 12 show the odor concentration contours from the two pollutants in each scenario with the highest D/T values. For each scenario, NOx had the highest D/T with the tipper engines as driving sources, and dimethyl sulfide had the highest D/T with the fugitive landfill surface as the driving source. All six of the remaining pollutants would show similar contours to dimethyl sulfide as they have the same driving source.

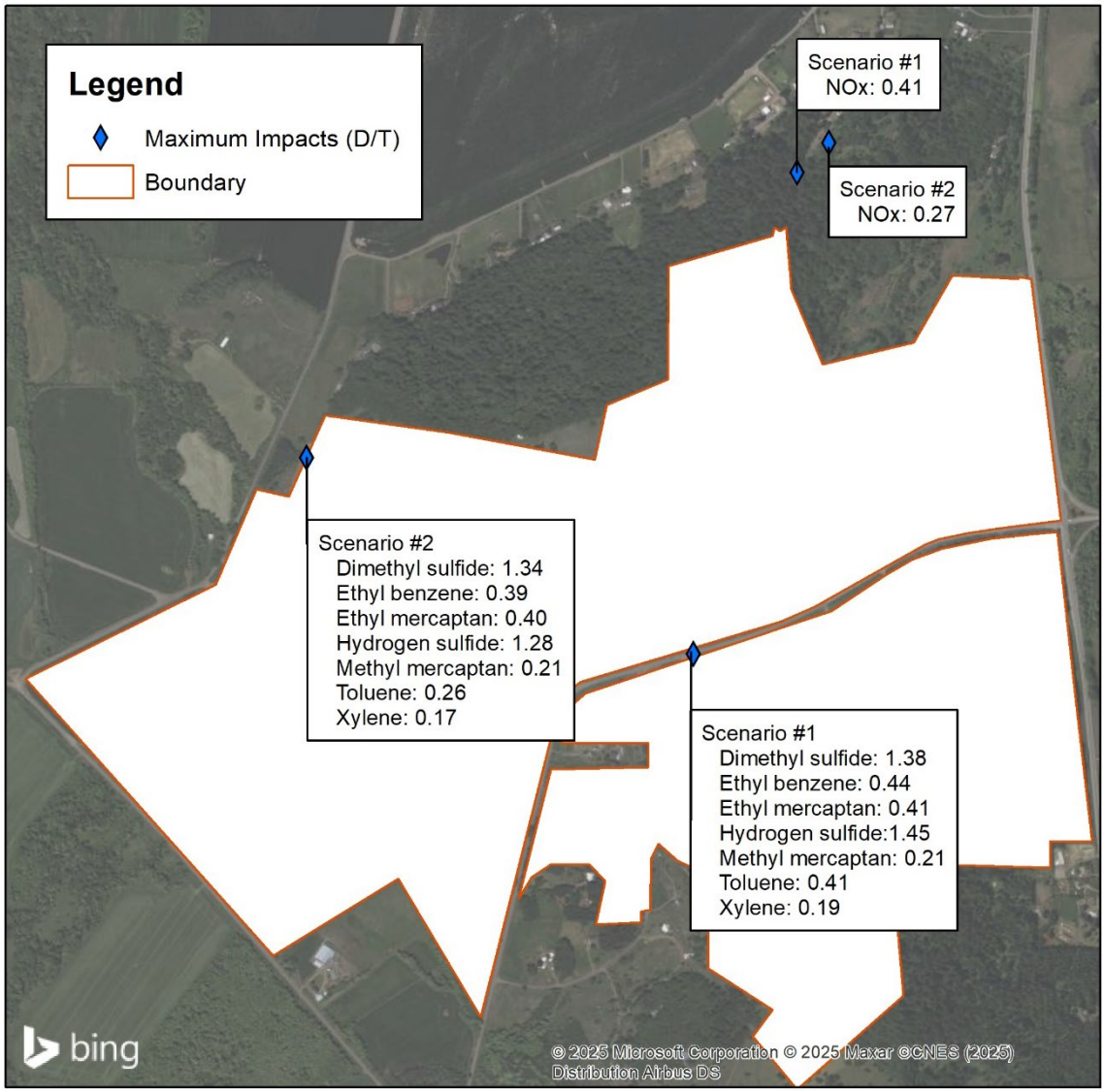
Table 6. Scenario #1: 2023 Model Results

Odor Pollutant	Max Impact (ug/m3)	Odor Threshold (ug/m3)	Max D/T	Driving Source	Max Impact Easting UTM Zone 10 (m)	Max Impact Northing UTM Zone 10 (m)
Dimethyl sulfide (methyl sulfide)	**3.51**	**2.54**	**1.38**	**FUG**	**481,595**	**4,949,280**
Ethyl benzene	3.85	8.68	0.44	FUG	481,595	4,949,280
Ethyl mercaptan (ethanethiol)	1.03	2.54	0.41	FUG	481,595	4,949,280
Hydrogen sulfide	**9.52**	**6.55**	**1.45**	**FUG**	**481,595**	**4,949,280**
Methyl mercaptan	0.87	4.13	0.21	FUG	481,595	4,949,280
NOx (as NO2)	769.18	1,881.62	0.41	TIP2 and TIP3	481,845	4,950,455
Toluene	28.54	97.99	0.29	FUG	481,595	4,949,280
Xylene (mixture)	10.11	52.10	0.19	FUG	481,595	4,949,280

Table 7. Scenario #2: 2052 Model Results

Odor Pollutant	Max Impact (ug/m3)	Odor Threshold (ug/m3)	Max D/T	Driving Source	Max Impact Easting UTM Zone 10 (m)	Max Impact Northing UTM Zone 10 (m)
Dimethyl sulfide (methyl sulfide)	**3.41**	**2.54**	**1.34**	**FUG**	**480,620**	**4,949,730**
Ethyl benzene	3.39	8.68	0.39	FUG	480,620	4,949,730
Ethyl mercaptan (ethanethiol)	1.01	2.54	0.40	FUG	480,620	4,949,730
Hydrogen sulfide	**8.36**	**6.55**	**1.28**	**FUG**	**480,620**	**4,949,730**
Methyl mercaptan	0.85	4.13	0.21	FUG	480,620	4,949,730
NOx (as NO2)	511.58	1,881.62	0.27	TIP2 and TIP3	481,920	4,950,530
Toluene	25.03	97.99	0.26	FUG	480,620	4,949,730
Xylene (mixture)	8.84	52.10	0.17	FUG	480,620	4,949,730

Figure 9. Peak 1-Hour Off-site Odor Impact Locations



Odor pollutants individually exceeded a D/T value of 1 for both hydrogen sulfide and dimethyl sulfide in this analysis. This is potentially detectable, but far below nuisance levels. However, there appears to be no significant change in odor impact from Scenario #1 to Scenario #2. Landfill gas generation from the landfill is expected to significantly increase from 2023 to 2052, increasing odor pollutants, however the landfill will be higher in elevation at that time which helps with dispersion. Scenario #1 shows the higher impacts from Nox as relocating the tipper engines and AI source to the southern expansion area is much better for modeling, having a larger buffer to the North and being at a lower elevation.

Based on the odor results in Scenario #1 and #2, a third scenario in the middle of expansion does not seem necessary. This middle scenario would show results in between Scenario #1 and #2 with slight differences based on landfill mound height in the expansion area and would certainly show D/T values less than 1 for all pollutants.

5.0 CONCLUSIONS AND UNCERTAINTY ANALYSIS

Conclusions for both odor modeling and complaint analyses are described below. In addition, a discussion on uncertainty in this report is detailed in Section 5.3

5.1 MODELING CONCLUSIONS

Since DEQ has not specified a protocol for odor evaluations, this study modeled pollutants individually so that predicted off-site concentrations could be directly evaluated against the individual pollutant's published odor detection threshold to determine whether the individual pollutant may be detectable in residential or commercial land use areas. This evaluation was accomplished using a D/T ratio for each pollutant modeled (i.e., maximum 1-hour pollutant concentration modeled divided by its odor threshold).

Based upon the modeling results of the two scenarios, the following conclusions are presented:

- Peak, off-site, 1-hour pollutant concentrations for Scenario #1 (2023 actual operations) showed hydrogen sulfide and dimethyl sulfide slightly over the detection threshold, but not nearly at nuisance levels.
- Peak, off-site, 1-hour pollutant concentrations for Scenario #2 (2052 proposed operations) also showed hydrogen sulfide and dimethyl sulfide slightly over the detection threshold, but not nearly at nuisance levels.
- Peak, off-site, 1-hour pollutant concentrations for Scenario #2 (2052 proposed operations) showed no significant change in odor impacts compared to Scenario #1 (2023 actual operation) for all pollutants except NOx. The decrease in NOx impact was due to the change in tipper and AI location, with an increase in all other pollutants based on increased landfill gas generation.
- Peak impact locations were all north of the landfill boundary for NOx in Scenario #1 and Scenario #2. Landfill gas odor constituents were highest on Coffin Butte Road in Scenario #1 and on the Northwest property boundary in Scenario #2.
- Moving operations to the proposed expansion area will move the predicted peak, off-site 1-hour impact locations, but impacts would remain below the nuisance levels for all pollutants.

Typically, odors become a nuisance at or above 7 D/T [13, 14]. Therefore, this study concludes that the proposed expansion Project will not cause detectable off-site nuisance odor impacts at nearby residential or commercial areas.

5.2 ODOR COMPLAINT CONCLUSIONS

The odor complaint analysis for complaints logged in 2022 through 2024 indicated the following conclusions:

- Complaint locations ranged from adjacent to CBLF to as far as seven miles away.
- Most complaints were located Southwest and South of CBLF, requiring wind from the North or Northeast to be coming from the landfill.
- Dominant wind patterns come from the South-Southeast and West based on the meteorological dataset.
- Complaints peaked in the morning from 8:00 AM to 11:00 AM.
- Complaints specifically peaked in winter months, possibly due to thermal inversions. Colder temperatures have less thermal mixing which leads to higher air quality and odor impacts.

- Correlating the complaint location to wind data during the complaint time showed only 1% of complaints "likely" to come from the landfill and 58% to be "possible" from the landfill.

5.3 UNCERTAINTY ANALYSIS

Odor modeling is inherently complex and subjective, leading to significant uncertainty. The model performed to average emission rates and ran them over hour averages of on-site meteorological data for a whole year from November 1st 2004 through October 31st 2005. The maximum hourly impact at each off-site receptor was presented, but does not take into account shorter term (less than 1 hour) timeframes when odor concentrations could be higher with the right meteorological conditions. In addition, AERMOD has limitations at low wind speeds and is not able to model thermal inversions which could be present around CBLF.

In addition, the odor detection thresholds for each pollutant are highly varied depending on the person. In general, these odor thresholds are based on a concentration where half of the general public is able to detect the smell at a specific time and location. Certain odorous chemicals can also have an additive effect, where their smells are similar enough that the concentrations of each constituent can be added to compare to a detection threshold. During a February 2025 meeting with SCS and the County's consultants, it was agreed to model pollutants individually so that predicted off-site concentrations could be directly evaluated against the individual pollutant's published odor detection threshold to determine whether the individual pollutant may be detectable in residential or commercial land use areas. However, even when considering an additive effect, the D/T remains below 7 for the top five pollutants summed together.

These limitations have the potential to underpredict odor concentrations. It is possible for odors to be detectible by people that are sensitive to particular odors, especially in low wind or thermal inversion conditions.

Uncertainty is also present in the odor complaint review. The time recorded for the complaint does not necessarily line up with the timeframe an odor was detected by the complainant. Thus it is hard to determine the actual wind direction/speed when the odor was detected. Another issue with analyzing complaints is that significant amounts of information are missing from each complaint. To get a full understanding of CBLF's contribution to the odor, each complaint would ideally include exact time and location the odor was detected, and a description of the odor at that time frame for comparison.

6.0 REFEFENCES

1. Benton County, "Taxlots", https://gis.co.benton.or.us/gisdata/Assessment/.

2. Benton County, "Benton County Zoning Map Online", https://cd.bentoncountyor.gov/maps/.

3. United States Geological Survey, "National Elevation Dataset (NED)", https://www.usgs.gov/publications/national-elevation-dataset.

4. Arizona Department of Environmental Quality, "Temperature Inversions Impact Air Quality", https://legacy.azdeq.gov/environ/air/ozone/Inversion%20Info.pdf.

5. National Weather Service, "What Is An Inversion?", https://www.weather.gov/media/lzk/inversion101.pdf.

6. Valley Landfills, Inc., “Burden of Proof 2024 Conditional Use Application”, https://coffinbuttelandfill.com/2024-cup/.

7. Lakes Environmental, “AERMOD View 13.0”, AERMOD Version 24142, https://www.weblakes.com/, January 2025.

8. Oregon Department of Environmental Quality, “Recommended Procedures for Air Quality Dispersion Modeling”, https://www.oregon.gov/deq/aq/Pages/default.aspx, March 2022.

9. Oregon Department of Environmental Quality, “Nuisance Odor Strategy”, https://www.oregon.gov/deq/aq/pages/nuisance-odor.aspx.

10. American Industrial Hygiene Association (AIHA), “Odor Thresholds for Chemicals with Established Occupational Health Standards, 3rd edition”, https://www.aiha.org.

11. National Oceanic and Atmospheric Administration (NOAA), “Computer-Aided Management of Emergency (CAMEO), https://cameochemicals.noaa.gov/search/simple.

12. United States Environmental Protection Agency (EPA), “Health Effects Notebook for Hazardous Air Pollutants”, https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants.

Appendix A

Odor Complaint Review

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
1	2/22/2022	(N/A)	DEQ informed us of 25 odor complaints they had received between 11/18/21 and 2/7/22. No additional details provided	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	Complaint times not specified. Wind speeds and wind directions varied throughout the period.	Unknown
2	7/1/2022	10:00 AM	via DEQ	(N/A)	"The usual stench from the landfill. Once again occuring at my location as the marine clouds lift and the day warms.	(N/A)	(N/A)	Calm	Southwest wind (0 mph). Winds were from the southwest (0-3 mph) between 0030 and 1030 hours.	Possible
3	7/26/2022	8:00 AM	via DEQ	(N/A)	"odors from the Coffin Butte Landfill. Quite noticeable this morning while we had a high pressure system and no wind", complex toxic chemical slew	(N/A)	(N/A)	SW	Southwest wind (1 mph). Winds were calm (0 mph) between 0230 and 0730 hours.	Possible
4	7/30/2022	8:00 AM	via DEQ	(N/A)	Coffin Butte Landfill by Republic. Sulfur, dump odor	(N/A)	(N/A)	Calm	South-southeast wind (0 mph). Winds were from the east-northeast (4 mph) at 0700 hours, then calm (0 mph) at 0730 and 0800 hours.	Possible
5	8/15/2022	9:13 AM	via DEQ	(N/A)	"the Coffin Butte Dump smell is noticeable on occasion. Today it is really bad. To the point of making me sick to my stomach when I walk around outside", methane	(N/A)	(N/A)	S / SW	South to southwest winds (1-5 mph). Winds were calm (0 mph) between 0430 and 0830 hours.	Possible
6	8/17/2022	(N/A)	DEQ	assorted via DEQ	(N/A)	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
7	12/13/2022	(N/A)	complaint forwarded to Ian Macnab from Hugh Gao of DEQ. No specific details of timing of event.	"neighborhood surrounding landfill"	"emissions gas, unsafe air quality"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
8	9/28/2023	(N/A)	N/A (forwarded from DEQ) 2/7/24	(N/A)	"overpowering and pervasive to my nostrils and eyes"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
9	11/21/2023	(N/A)	Becky LeBlanc	Writsman Creek Dr	"dump smell"	~ 3. 8 miles	NE	(N/A)	Complaint time not specified. Winds were briefly from north-northeast at 1000, 1130, and 1230 hours. Winds were from the north-northeast (0-5 mph) between 1400 and 2330 hours. Possible due to channeling effects of terrain.	Unknown
10	11/29/2023	12:40 PM	Larry Leblanc	Writsman Creek Dr	(N/A)	~ 3. 8 miles	NE	Calm	North-northeast wind (0 mph). Winds were from the north-northeast (0-4 mph) between 0700 to 1300 hours. Possible due to channeling effects of terrain.	Possible
11	12/1/2023	3:36 PM	Becky LeBlanc	Writsman Creek Dr	(N/A)	~ 3. 8 miles	NE	S	South wind (6 mph). Winds had a southerly component prior to event.	Not likely
12	12/12/2023	1:35 PM	Larry LeBlanc	Writsman Creek Dr	(N/A)	~ 3. 8 miles	NE	WNW	West-northwest wind (2 mph). Wind was briefly from the northeast (2 mph) at 1230 hours.	Possible
13	12/14/2023	(N/A)	N/A (forwarded from DEQ) 2/7/24	(N/A)	"particularly nasty"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
14	12/15/2023	12:00 PM	N/A (forwarded from DEQ) 2/7/24	highway 20 at independence highway	"absolutely overpowering"	~ 5.1 miles	NNW	WNW	West-northwest wind (1 mph). Winds were from the west-northwest (0-3 mph) between 0000 and 1230 hours.	Not likely
15	12/16/2023	2:00 PM	Larry LeBlanc	Writsman Creek Dr	"overwelming stench this morning"	~ 3. 8 miles	NE	NNE	North-northeast wind (4 mph). Winds were from the north-northeast (3-4 mph) between 1230 and 1400 hours. Possible due to channeling effects of terrain.	Possible
16	12/25/2023	(N/A)	N/A (forwarded from DEQ) 2/7/24	(N/A)	"like rotten garbage, some sort of gas"	(N/A)	(N/A)	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
17	1/12/2024	12:15 PM	N/A (forwarded from DEQ)	"apx 3 miles from Coffin Butte landfill"	"horrible smell of the landfill"	~ 3 miles	(N/A)	N / NNE	North-northeast wind (6 mph) at 1200 hours. North wind (4 mph) at 1230 hours.	Possible
18	1/18/2024	12:00 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	(N/A)	(N/A)	(N/A)	Calm	Northeast wind (0 mph). Winds were from the northeast (0-3 mph) between 0800 and 1200 hours.	Possible
19	1/18/2024	12:00 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"odor was very obvious"	(N/A)	(N/A)	Calm	Northeast wind (0 mph). Winds were from the northeast (0-3 mph) between 0800 and 1200 hours.	Possible
20	1/18/2024	1:30 PM	N/A (forwarded from DEQ) 2/7/24	"several miles south of Coffin Butte landfill"	"incredibly intense"	~ 2+ miles	N	NNW	North-northwest wind (2 mph). Winds had a northerly component between 0530 and 1330 hours.	Possible
21	1/18/2024	3:30 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"really bad"	(N/A)	(N/A)	SW	Southwest wind (3 mph). Winds had just shifted from northwest / west-northwest to southwest.	Possible
22	1/18/2024	4:00 PM	N/A (forwarded from DEQ) 2/7/24	"town of Corvallis"	"hits you like a wet blanket and permeates into the home as well"	~ 6.7 miles	N	NW	Northwest wind (6 mph).	Not likely
23	1/19/2024	8:00 AM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"very apparent"	(N/A)	(N/A)	SW	Southwest wind (2 mph). Winds were calm (0 mph) between 0500 and 0730 hours.	Possible
24	2/3/2024	9:00 AM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"foul chemical odor"	(N/A)	(N/A)	S	South wind (2 mph). Winds were calm (0 mph) between 0530 and 0830 hours.	Possible
25	2/3/2024	10:00 AM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"Strong smell of methane"	(N/A)	(N/A)	Calm	South wind (0 mph). Winds were calm (0 mph) between 0530 and 1000 hours except for south wind (2 mph) at 0900 hours.	Possible
26	2/3/2024	1:00 PM	N/A (forwarded from DEQ) 2/7/24	"apx 3 miles from the landfill"	"nasty, horrible and probably not good for anyone to breathe"	~ 3 miles	(N/A)	NNE	North-northeast wind (2 mph). Winds were calm (0 mph) between 0930 and 1230 hours.	Possible
27	2/3/2024	3:00 PM	N/A (forwarded from DEQ) 2/7/24	(N/A)	"Chemical type smell, Horrible"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds from the north-northeast (1-4 mph) between 1400 and 1430 hours.	Possible
28	2/3/2024	(N/A)	N/A (forwarded from DEQ) 2/16/24	"south end Tampico Rd"	"so strong"	~ 1.7 miles	NNW	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
29	2/8/2024	12:46 PM	N/A (forwarded from DEQ) 2/16/24	(N/A)	"strong"	(N/A)	(N/A)	NNE	North-northeast wind (1-5 mph). Winds were calm (0 mph) between 0000 and 1130 hours.	Possible
30	2/10/2024	7:30 AM	N/A (forwarded from DEQ) 2/16/24	"soap creek rd"	"awful stench"	~ 0 to 5.4 miles	Various	Calm	South wind (0 mph). Winds were calm (0 mph) between 0000 and 0730 hours.	Possible
31	2/10/2024	8:30 AM	N/A (forwarded from DEQ) 2/16/24	"soap creek valley"	"stinky air" "especially bad"	~ 3.3 miles	NE	Calm	South wind (0 mph). Winds were calm (0 mph) between 0000 and 0830 hours.	Not likely

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
32	2/10/2024	9:29 AM	N/A (forwarded from DEQ) 2/16/24	"by the landfill"	(N/A)	(N/A)	(N/A)	Calm	South wind (0 mph). Winds were calm (0 mph) between 0000 and 1030 hours.	Possible
33	2/13/2024	(N/A)	N/A (forwarded from DEQ) 2/16/24	"above 800ft elevation, along Vineyard Mountain Ridge"	"the usual Coffin Butte stench"	~ 4.7 miles	NNE	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
34	2/14/2024	8:30 AM	N/A (forwarded from DEQ) 2/16/24	(N/A)	"very bad"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were calm (0 mph) between 0700 and 0830 hours.	Possible
35	2/14/2024	11:00 AM	N/A (forwarded from DEQ) 2/23/24	"my home, Soap creek rd, Tampico rd, Adair Village"	"usual rotting garbage odor"	~ 0 to 1.8 miles	Various	Calm	North-northeast wind (0 mph). Winds were calm (0 mph) between 0700 and 1100 hours.	Possible
36	2/15/2024	10:51 PM	N/A (forwarded from DEQ) 2/23/24	(N/A)	"extremely strong"	(N/A)	(N/A)	WSW	West-southwest wind (3 mph) at 2300 hours. Winds had a northerly component between 2030 and 2230 hours.	Possible
37	2/20/2024	9:00 AM	N/A (forwarded from DEQ) 2/23/24	(N/A)	"rotting garbage"	(N/A)	(N/A)	S	South wind (3 mph). Winds were from the east-northeast (0-3 mph) between 0700 and 0830 hours.	Possible
38	2/20/2024	3:00 PM	N/A (forwarded from DEQ) 2/23/24	700-800 ft elevation	"usual landfill stench"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were calm (0 mph) between 1330 and 1500 hours except for north-northeast (4 mph) at 1430 hours.	Possible
39	2/20/2024	3:37 PM	N/A (forwarded from DEQ) 2/23/24	(N/A)	"malodorous chemical smell"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph) at 1530. Winds were calm (0 mph) between 1330 and 1600 hours except for north-northeast (4 mph) at 1430 hours.	Possible
40	2/22/2024	10:48 AM	N/A (forwarded from DEQ) 3/1/24	7 miles south of the landfill	(N/A)	~ 7 miles	N	W	West wind (3 mph). Winds were calm or from the south (0-3 mph) between 0400 and 1030 hours.	Not likely
41	2/24/2024	1:00 PM	N/A (forwarded from DEQ) 3/1/24	(N/A)	"Rotting stench"	(N/A)	(N/A)	NNE	North-northeast wind (3 mph).	Possible
42	2/24/2024	(N/A)	N/A (forwarded from DEQ) 3/1/24	3 miles south of landfill	"sour, reeking stench"	~ 3 miles	N	(N/A)	Complaint time not specified. Wind speeds and wind directions varied throughout the day.	Unknown
43	3/6/2024	7:30 AM	forwarded from DEQ	"South of Landfill"	"Reeking Stench"	~ 0 miles	N	Calm	South-southeast wind (0 mph). Winds were calm (0 mph) between 0000 and 0930 hours.	Possible
44	3/8/2024	8:30 AM	Faye Yoshihara	37461 Soap Creek Rd.	"rotting garbage plus acrid chemical smell", level 8	~ 3.7 miles	NE	Calm	South-southeast wind (0 mph). Winds were calm (0 mph) between 0000 and 0830 hours.	Not likely
45	3/8/2024	1:00 PM	Ken Kupperman	12425 Sauerkraut Rd	"5"	~ 5 miles	SE	NNE	North-northeast (1 mph). Wind was from the north-northeast (0-2 mph) between 1030 and 1300 hours.	Not likely
46	3/12/2024	2:30 PM	forwarded from DEQ	E.E. Wilson State Wildlife Area	"landfill odor with a noxious chemical component"	~ 1 mile	W	SSW	South-southwest wind (9 mph). Strong winds (6-9 mph) between 1330 and 1430 hours are not typically associated with odor complaints.	Not likely
47	3/23/2024	8:00 AM	Kate Schoenhals	White Fir and Trillium Lane, also Robison road	"foul/gassy, for two hours"	~ 1.1 to 1.8 miles	Various	Calm	Northeast wind (0 mph). Winds were from the northeast (0-2 mph) between 0500 and 0800 hours.	Not likely
48	4/1/2024	8:00 AM	Elizabeth Patte	37655 Zeolite Hills Rd	10	~ 3.6 miles	NE	Calm	South-southwest wind (0 mph). Winds were calm (0 mph) between 0000 and 0800 hours except for south-southwest (1 mph) at 0400 hours.	Not likely

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
49	4/1/2024	9:00 AM	Vicki Druliner	27673 Writsman Creek Drive	"incredibly bad", 10	~ 3.7 miles	NE	Calm	South-southwest wind (0 mph). Winds were calm (0 mph) between 0000 and 0900 hours except for south-southwest (1 mph) at 0400 hours.	Not likely
50	4/1/2024	11:30 PM	Nathalie Sutherland	2281 Paddington Dr NW	10, "smells like rotten eggs. But worse. More chemically."	~ 5.2 miles	WNW	Calm	Southeast wind (0 mph). Winds were mostly calm (0 mph) between 1830 and 2330 hours except for east-southeast (1 mph) at 2300 hours.	Not likely
51	4/12/2024	7:00 AM	forwarded from DEQ	"my house"	"overpowering landfill stench"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were from the north-northeast (0-1 mph) between 0600 and 0700 hours.	Possible
52	5/2/2024	7:00 PM	forwarded from DEQ	(N/A)	"Strong odors"	(N/A)	(N/A)	Calm	East-northeast wind (0 mph). Winds were calm (0 mph) between 1500 and 1900 hours.	Possible
53	5/23/2024	7:30 AM	forwarded from DEQ	(N/A)	"smell of Garbage" overwhelming	(N/A)	(N/A)	NNE	North-northeast wind (4 mph). Winds were calm (0 mph) between 0300 and 0700 hours.	Possible
54	5/23/2024	7:50 AM	forwarded from DEQ	5 miles from the dump	smell the dump	~ 5 miles	(N/A)	NNE	North-northeast wind (3-4 mph). Winds were calm (0 mph) between 0300 and 0700 hours.	Possible
55	5/23/2024	9:30 AM	forwarded from DEQ	5 miles south, adair	"coffin Butte's effluence"	~ 5 miles	N	NNE	North-northeast wind (3 mph). Winds were from the north-northeast (0-4 mph) between 0730 and 0930 hours.	Possible
56	5/23/2024	6:00 PM	forwarded from DEQ	"near coffin Butte"	"trash and rotten egg"	~ 0 miles	Various	NE	Northeast wind (10 mph). Strong winds are not typically associated with odor complaints.	Not likely
57	7/12/2024	12:06 AM	forwarded from DEQ	"south of the landfill"	"landfill smell"	~ 0 miles	N	WSW	West-southwest wind (3 mph). Winds were from the northwest (1-2 mph) between 2300 and 2330.	Not likely
58	7/24/2024	1:00 PM	forwarded from DEQ	near SE corner of Landfill buffer property	Noticeable unpleasant methane odor	~ 0 miles	NW	S	South wind (6 mph). Winds were from the northwest (4 mph) at 1230 hours.	Possible
59	7/30/2024	5:30 PM	forwarded from DEQ	4 miles SE of landfill	"landfill dump smell"	~ 4 miles	NW	SW	Southwest wind (6 mph).	Not likely
60	8/4/2024	8:30 AM	forwarded from DEQ (8/26)	SW of Landfill or driving by	dump stench	~ 0 miles	NE	Calm	South wind (0 mph). Wind was calm (0 mph) between 0600 and 0830 hours.	Possible
61	8/8/2024	7:40 AM	Ryan Griffin	Oak Grove Drive & Powers	"dump smell, like driving by", "10"	~ 4 miles	WNW	Calm	West-southwest wind (0 mph). Winds were from the west-southwest (0-3 mph) between 0330 and 0800 hours.	Not likely
62	8/8/2024	7:45 AM	Lauren Griffin	Palestine & Oak Grove	"9"	~ 3.8 miles	WNW	Calm	West-southwest wind (0 mph). Winds were from the west-southwest (0-3 mph) between 0330 and 0800 hours.	Not likely
63	8/9/2024	3:15 PM	forwarded from DEQ	(N/A)	Piercing garbage smell	(N/A)	(N/A)	WNW / NE	West-northwest wind (2 mph) at 1500 hours. Northeast wind (2 mph) at 1530 hours.	Possible
64	8/9/2024	5:53 PM	forwarded from DEQ	"miles away"	"terrible smell"	~ 2+ miles	(N/A)	SW	Southwest wind (10 mph). Strong winds are not typically associated with odor complaints.	Not likely
65	8/18/2024	7:30 AM	Ryan Griffin	Oak Grove Drive & Powers	"smells like driving by the dump", 8	~ 4 miles	WNW	Calm	South wind (0 mph). Winds were calm (0 mph) between 0500 and 0730 hours except from the south (2 mph) at 0630 hours.	Not likely
66	8/23/2024	6:30 PM	forwarded from DEQ	South of Landfill	"landfill chemical stink"	~ 0 miles	N	NW	Northwest wind (1 mph).	Possible
67	11/26/2024	11:30 AM	forwarded from DEQ	(N/A)	"Coffin Butte dump stench"	(N/A)	(N/A)	SE	Southeast wind (2 mph).	Possible

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
68	11/27/2024	7:15 AM	forwarded from DEQ	(N/A)	"went outside with my cup of coffee. Hit with the smell of the landfill"	(N/A)	(N/A)	S / Calm	South wind (0-1 mph). Winds were calm (0 mph) between 0400 and 0630 hours.	Possible
69	11/30/2024	10:00 AM	forwarded from DEQ	7 miles S of landfill	"sitting at my dest, when I stared to smell it. It lasted for a about 3 hours"	~ 7 miles	N	NNE	North-northeast wind (1 mph). Winds were from the north to northeast between 0000 and 1000 hours.	Possible
70	11/30/2024	12:00 PM	forwarded from DEQ	"passing by the… landfill"	"a terrible odor that we could smell from our car for about a mile north	~ 0 miles	Various	ENE	East-northeast wind (1 mph).	Possible
71	12/1/2024	8:30 AM	forwarded from DEQ	Soap Creek/Writsman Brook	"some sort of chemical", "rotten garbage"	~ 3.7 miles	NE	Calm	South-southwest wind (0 mph). Wind was calm (0 mph) between 0200 and 0830 hours.	Not likely
72	12/1/2024	10:00 AM	forwarded from DEQ	"near Coffin Butte"	"odor is so bad"	~ 0 miles	Various	SSW	South-southwest wind (1 mph). Wind was calm (0 mph) between 0200 and 0930 hours.	Possible
73	12/1/2024	10:00 AM	forwarded from DEQ	(N/A)	"sometimes unbearable"	(N/A)	(N/A)	SSW	South-southwest wind (1 mph). Wind was calm (0 mph) between 0200 and 0930 hours.	Possible
74	12/1/2024	11:52 AM	forwarded from DEQ	"soap creek valley"	"toxic landfill gases"	~ 3.3 miles	NE	N	North wind (3 mph). Winds were from the south-southwest (0-2 mph) between 1000 and 1130 hours. Possible due to channeling effects of terrain.	Possible
75	12/6/2024	9:45 AM	forwarded from DEQ	(N/A)	"landfill stench"	(N/A)	(N/A)	Calm	North-northeast wind (0 mph). Winds were mainly from the north-northeast (0-4 mph) between 0530 and 1000 hours.	Possible
76	12/14/2024	1:30 PM	forwarded from DEQ	Coffin Butte Road	“like a cross between a putrid low tide and an auto repair garage”.	~ 0 miles	Various	SSW	South-southwest wind (3 mph). Winds were from the south-southwest (0-3 mph) between 1030 and 1330 hours.	Not likely
77	12/20/2024	3:00 PM	forwarded from DEQ	4 miles SSE of the Landfill	"odor" "far worse than usual"	~ 4 miles	NNW	Calm	West wind (0 mph). Winds were from the west (0-4 mph) between 1330 and 1500 hours.	Not likely
78	12/23/2024	09:30 AM-12:30 PM	forwarded from DEQ	(N/A)	“Coffin Butte Landfill is belching landfill gas permeating the air. I was 6.3 miles from the landfill and the stench was very noticeable.”	~ 6.3 miles	(N/A)	Calm / NE	Northeast wind (0-4 mph) during this time period. Winds were calm (0 mph) between 0330 and 1030 hours.	Possible
79	12/23/2024	2:00 PM	Maggie Livesay	7580 NW Mountain View Drive	landfill smell, 5	~ 4.2 miles	N	Calm	Northeast wind (0 mph). Winds were from the northeast (4 mph) at 1200 hours. Winds were calm (0 mph) between 1230 and 1400 hours.	Not likely
80	12/29/2024	9:29 AM	Virginia Scott	"driving past dump"	"stench", "not one type of aroma"	~ 0 miles	Various	SSE	South-southeast wind (2 mph). Winds were calm (0 mph) between 0700 and 0900 hours.	Not likely
81	12/29/2024	9:29 AM & 6:30 PM	forwarded from DEQ	(N/A)	“As I was driving past the Coffin Butte dump on Coffin Butte Road in Benton County, OR on Sunday morning the stench was so strong that I has to put the car's air on recirculate until I was well north of the dump. It was equally as terrible on my return trip past the dump at about 6:30 PM on 12/29/24 and was smelly even on recirculate well past the Tampico/Soap Creek intersection. This is an issue because on moist days, like Sunday, when the car air is on recirculate, the car windows fog up which makes it dangerous to turn onto Hwy 99.”	Various	Various	SSE / S	South-southeast wind (2 mph) at 0930 hours. South wind (2 mph) at 1830 hours.	Likely

Comparison of CBLF Odor Complaints to On-site Wind Data

Odor Event ID	Odor Event Date	Odor Event Time	Complainant	Location of Odor	Description/Rating	Distance from Complaint Location to CBLF *	Direction from Complaint Location to CBLF **	On-site Wind Direction	Comments	Correlation Category
82	12/29/2024	4:45 PM	forwarded from DEQ	(N/A)	"Almost every evening to early morning there is a strong methane odor originating from the Coffin Butte Landfill located north of Corvallis in Benton County Oregon. This year the odor has become strong enough to smell indoors if an air filter isn't in use. There is also a tremendous amount of litter and garbage along Camp Adair Road, Hwy 99 and other tributary roads leading to the landfill. The garbage is on the roads, in the ditches soaking in water and leaching into the ground. The air and material pollution is a hazard to humans, wildlife and plant life in the local area. There is no telling what chemicals and hazardous materials are contaminating the local biosphere."	(N/A)	(N/A)	S	South wind (2 mph).	Possible
83	12/31/2024	3:45 PM	forwarded from DEQ	(N/A)	"Coffin butte landfill is releasing methane gas and stink into the atmosphere. The stink is becoming worse each day. I don't have enough time to notify you each day of the occurrence but it is becoming much more frequent, approximately 5 days a week now."	(N/A)	(N/A)	S	South wind (2-3 mph).	Possible
84	1/1/2025	12:00 AM	forwarded from DEQ	(N/A)	"The Coffin Butte Landfill stench was wafting through the air. Landfill gasses 5 miles from the Landfill. Very strong odor"	~ 5 miles	(N/A)	SW	Southwest wind (1 mph).	Possible

Notes:

* Distance relative to CBLF working face reference point (44.700815, -123.233034).

** Direction relative to CBLF working face reference point (44.700815, -123.233034).

(N/A) Not applicable.

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/1/2022 0:00	28.8	2	W	265	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 0:30	28.2	4	WNW	299	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 1:00	28	3	NW	310	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 1:30	27.8	2	WNW	304	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 2:00	27.3	2	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 2:30	27.6	2	NW	313	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 3:00	27.4	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 3:30	26	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 4:00	24.8	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 4:30	24.5	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 5:00	25.6	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 5:30	26	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 6:00	26.7	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 6:30	27	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 7:00	27.3	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 7:30	27.3	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 8:00	27.5	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 8:30	27.7	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 9:00	28.1	0	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 9:30	28.5	2	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 10:00	29	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 10:30	29.9	1	NW	314	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 11:00	32.4	1	NW	315	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 11:30	34.3	2	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 12:00	34.8	2	NNE	15	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 12:30	35.3	2	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 13:00	35.9	3	S	172	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 13:30	35.5	2	S	190	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 14:00	36.1	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 14:30	36.6	5	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 15:00	36.4	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 15:30	37.1	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 16:00	35.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 16:30	34.3	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 17:00	32.8	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 17:30	31.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 18:00	30.2	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 18:30	30.3	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 19:00	29.9	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 19:30	29.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 20:00	29.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 20:30	29.9	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 21:00	29.9	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 21:30	29.5	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 22:00	30.2	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 22:30	29.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 23:00	32.6	2	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	7
1/1/2022 23:30	33.7	3	SSE	153	1	11/18/2021 to 2/7/2022	(not specified)	7
1/2/2022 0:00	34.2	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 0:30	33.7	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 1:00	33	2	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 1:30	33.8	1	NW	322	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 2:00	35.3	5	S	180	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 2:30	35	0	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 3:00	34.7	0	SW	219	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 3:30	35	0	WSW	248	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 4:00	34	1	NE	53	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 4:30	35.1	0	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 5:00	35.9	3	SE	134	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 5:30	35.9	4	S	190	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 6:00	35.7	8	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 6:30	36.3	3	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 7:00	37	6	S	170	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 7:30	37.3	8	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 8:00	36.7	4	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 8:30	36.7	6	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 9:00	37.2	9	S	185	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 9:30	37.7	6	SE	146	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 10:00	38.9	7	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 10:30	40.4	5	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/2/2022 11:00	41.4	10	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 11:30	41.5	4	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 12:00	43.5	4	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 12:30	43.7	7	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 13:00	44.8	8	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 13:30	45.6	2	SW	220	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 14:00	46.4	5	S	182	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 14:30	46.8	9	S	188	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 15:00	47.3	9	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 15:30	47.3	12	S	187	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 16:00	47.4	10	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 16:30	47.7	8	SSW	204	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 17:00	47.1	6	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 17:30	46.8	9	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 18:00	46.5	5	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 18:30	45.4	4	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 19:00	44.2	8	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 19:30	44.2	9	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 20:00	44.2	10	S	185	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 20:30	44.8	8	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 21:00	45.4	6	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 21:30	45.8	5	S	190	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 22:00	45.3	8	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 22:30	45	11	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 23:00	45	8	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	1
1/2/2022 23:30	44.5	7	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	1
1/3/2022 0:00	44.4	9	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 0:30	44.3	12	SSW	214	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 1:00	44.3	7	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 1:30	44.2	4	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 2:00	44.4	7	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 2:30	44.5	9	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 3:00	44.6	4	S	188	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 3:30	44.8	4	WSW	248	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 4:00	44.9	9	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 4:30	44.2	4	S	178	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 5:00	42.1	1	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 5:30	41.9	1	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 6:00	41.6	6	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 6:30	40.3	7	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 7:00	39.8	5	S	184	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 7:30	39.7	10	S	186	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 8:00	39.6	5	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 8:30	39.6	12	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 9:00	38.8	5	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 9:30	38.3	6	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 10:00	37.9	6	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 10:30	37.9	6	S	171	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 11:00	38	6	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 11:30	38.3	7	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 12:00	38.6	3	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 12:30	38.8	2	S	188	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 13:00	38.6	1	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 13:30	38.2	2	S	179	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 14:00	38	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 14:30	37.8	5	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 15:00	37.2	2	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 15:30	34.7	4	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 16:00	34.7	3	WSW	244	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 16:30	35.4	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 17:00	35.5	0	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 17:30	35.3	1	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 18:00	35.6	2	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 18:30	36.6	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 19:00	36.5	3	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 19:30	36.7	5	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 20:00	37	5	S	188	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 20:30	36.6	4	S	178	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 21:00	36.1	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 21:30	36.8	2	S	171	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/3/2022 22:00	36.8	5	SW	224	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 22:30	36.9	11	SSW	213	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 23:00	37.4	6	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	2
1/3/2022 23:30	37.5	6	S	173	1	11/18/2021 to 2/7/2022	(not specified)	2
1/4/2022 0:00	37.2	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 0:30	36.6	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 1:00	36.4	4	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 1:30	37	1	S	172	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 2:00	37	0	S	172	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 2:30	37.6	1	S	184	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 3:00	37.3	3	S	184	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 3:30	37.6	1	S	175	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 4:00	37.1	2	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 4:30	37.4	4	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 5:00	38	4	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 5:30	38.3	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 6:00	38.2	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 6:30	38.9	11	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 7:00	38.7	8	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 7:30	38.9	3	S	183	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 8:00	39.1	4	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 8:30	39	6	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 9:00	39.3	3	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 9:30	39.8	5	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 10:00	40.2	5	SSW	162	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 10:30	40.6	6	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 11:00	41.2	3	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 11:30	41.6	4	S	170	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 12:00	42.3	3	SSW	212	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 12:30	42.4	3	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 13:00	43	3	S	174	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 13:30	43.2	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 14:00	43.5	2	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 14:30	43.7	2	SE	134	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 15:00	43.8	1	ENE	67	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 15:30	43.7	3	ESE	111	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 16:00	43.5	4	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 16:30	43.2	3	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 17:00	43	5	ESE	118	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 17:30	43	7	S	181	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 18:00	43	5	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 18:30	43	9	S	177	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 19:00	43.2	11	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 19:30	43.2	9	S	175	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 20:00	43.1	9	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 20:30	43.1	6	SSE	166	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 21:00	43.4	8	S	184	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 21:30	43.7	6	S	175	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 22:00	43.6	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 22:30	43.7	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 23:00	43.8	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/4/2022 23:30	44.5	2	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	3
1/5/2022 0:00	45.3	2	SE	143	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 0:30	45.4	1	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 1:00	45.6	1	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 1:30	45.5	0	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 2:00	45	3	S	175	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 2:30	44.8	0	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 3:00	44.4	2	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 3:30	43.8	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 4:00	43.8	3	S	184	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 4:30	43.3	4	S	184	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 5:00	43.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 5:30	42.9	4	S	187	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 6:00	42.7	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 6:30	42.3	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 7:00	42.2	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 7:30	42	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 8:00	41.7	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 8:30	41.9	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/5/2022 9:00	41.9	0	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 9:30	42.6	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 10:00	42.9	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 10:30	43	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 11:00	43.2	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 11:30	43.5	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 12:00	43.6	0	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 12:30	44.1	0	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 13:00	43.7	0	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 13:30	43.9	2	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 14:00	44	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 14:30	44.2	1	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 15:00	44.3	2	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 15:30	44.4	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 16:00	44.3	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 16:30	44.3	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 17:00	44.2	1	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 17:30	44.2	0	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 18:00	44.3	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 18:30	44.6	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 19:00	44.9	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 19:30	46.6	3	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 20:00	46.7	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 20:30	46.8	8	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 21:00	47.6	4	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 21:30	48.3	4	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 22:00	48.9	7	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 22:30	49.7	4	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 23:00	50	7	SW	218	1	11/18/2021 to 2/7/2022	(not specified)	4
1/5/2022 23:30	50.2	3	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	4
1/6/2022 0:00	50.9	5	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 0:30	51.3	7	SW	236	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 1:00	51.6	8	W	261	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 1:30	51.9	6	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 2:00	52.1	9	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 2:30	52.2	7	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 3:00	52.3	3	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 3:30	52.3	5	S	180	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 4:00	52.4	3	S	172	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 4:30	52.1	4	S	185	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 5:00	52.3	6	S	175	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 5:30	52.4	4	ENE	57	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 6:00	52.5	3	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 6:30	52.7	5	S	174	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 7:00	52.8	12	S	187	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 7:30	53	7	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 8:00	52.9	7	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 8:30	52.6	11	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 9:00	52.5	11	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 9:30	53.1	10	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 10:00	53.7	10	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 10:30	53.8	7	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 11:00	53.9	8	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 11:30	52.5	8	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 12:00	52.5	8	S	172	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 12:30	52.6	8	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 13:00	52.4	8	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 13:30	52.7	9	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 14:00	53.1	11	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 14:30	53.4	4	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 15:00	53.4	8	SW	235	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 15:30	53.6	13	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 16:00	53.5	11	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 16:30	53.1	14	SE	146	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 17:00	52.6	5	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 17:30	52.2	7	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 18:00	51.9	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 18:30	51.9	2	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 19:00	51.6	3	S	184	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 19:30	51.5	4	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/6/2022 20:00	51.5	4	SSW	212	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 20:30	51.5	6	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 21:00	51.1	12	WSW	239	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 21:30	50.9	7	SSW	170	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 22:00	50	1	S	181	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 22:30	49.7	9	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 23:00	49.2	4	S	177	1	11/18/2021 to 2/7/2022	(not specified)	5
1/6/2022 23:30	48.8	5	SE	133	1	11/18/2021 to 2/7/2022	(not specified)	5
1/7/2022 0:00	48.1	6	SW	220	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 0:30	47.8	12	S	175	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 1:00	47.8	7	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 1:30	47.8	10	S	170	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 2:00	48	5	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 2:30	48.2	8	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 3:00	48.4	9	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 3:30	48.5	10	S	172	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 4:00	48.4	3	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 4:30	48.5	8	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 5:00	48.4	8	S	190	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 5:30	48.5	10	S	177	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 6:00	49.4	14	S	191	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 6:30	48.1	16	SW	222	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 7:00	46.9	16	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 7:30	45.3	6	SW	222	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 8:00	44	10	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 8:30	43.2	13	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 9:00	42.4	16	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 9:30	42.1	3	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 10:00	41.7	9	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 10:30	41.7	2	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 11:00	42.2	2	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 11:30	42	8	S	189	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 12:00	42.7	4	S	190	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 12:30	43.4	6	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 13:00	43.2	8	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 13:30	42.6	9	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 14:00	44.4	6	S	190	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 14:30	43.8	9	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 15:00	44.2	12	SW	230	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 15:30	42.9	9	SW	224	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 16:00	42.6	3	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 16:30	41.6	8	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 17:00	40.7	5	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 17:30	39.7	6	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 18:00	39	2	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 18:30	38.8	1	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 19:00	39	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 19:30	39	0	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 20:00	38.6	0	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 20:30	38.9	0	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 21:00	39.1	3	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 21:30	39	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 22:00	38.7	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 22:30	38.6	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 23:00	38.5	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	6
1/7/2022 23:30	38.7	3	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	6
1/8/2022 0:00	38.4	2	ESE	108	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 0:30	38.8	3	NNW	341	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 1:00	39.1	0	WNW	297	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 1:30	39.4	3	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 2:00	39.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 2:30	39.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 3:00	39.4	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 3:30	39.5	3	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 4:00	39.6	4	S	181	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 4:30	39.6	3	S	182	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 5:00	39.6	5	S	191	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 5:30	39.4	0	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 6:00	39.2	1	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 6:30	38.9	1	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/8/2022 7:00	38.9	2	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 7:30	38.8	4	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 8:00	39.1	5	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 8:30	39.7	2	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 9:00	40.3	2	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 9:30	41.1	1	S	175	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 10:00	41.7	4	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 10:30	42.8	2	S	185	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 11:00	44.8	6	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 11:30	45.5	3	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 12:00	46.8	0	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 12:30	47.2	1	S	171	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 13:00	47.9	2	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 13:30	48.4	0	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 14:00	48.7	1	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 14:30	49.3	4	S	189	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 15:00	49.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 15:30	47.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 16:00	45.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 16:30	43.1	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 17:00	41.1	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 17:30	39.7	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 18:00	38.8	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 18:30	37.7	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 19:00	37	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 19:30	35.5	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 20:00	35.4	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 20:30	35.6	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 21:00	35	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 21:30	34.2	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 22:00	32.9	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 22:30	33.5	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 23:00	33.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/8/2022 23:30	33.1	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	7
1/9/2022 0:00	33	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 0:30	33.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 1:00	32.4	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 1:30	31.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 2:00	32.1	1	SE	137	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 2:30	32.3	0	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 3:00	32.2	2	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 3:30	31.1	1	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 4:00	31	1	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 4:30	30.5	0	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 5:00	31.1	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 5:30	30.7	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 6:00	30.3	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 6:30	29.7	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 7:00	30.8	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 7:30	30.1	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 8:00	30.3	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 8:30	30	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 9:00	29.6	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 9:30	30.1	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 10:00	30.5	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 10:30	32.4	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 11:00	34.7	3	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 11:30	35.4	4	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 12:00	36.8	2	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 12:30	39.3	1	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 13:00	40.9	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 13:30	42.1	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 14:00	43.7	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 14:30	44.7	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 15:00	44.1	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 15:30	44.5	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 16:00	44	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 16:30	42	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 17:00	39.2	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 17:30	38.3	1	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/9/2022 18:00	36.6	2	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 18:30	36.1	1	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 19:00	35.4	3	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 19:30	34.7	1	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 20:00	34.8	0	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 20:30	34.5	0	SE	130	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 21:00	33.8	0	SE	127	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 21:30	32.3	0	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 22:00	31.6	0	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 22:30	31	3	ESE	102	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 23:00	30.6	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/9/2022 23:30	30.3	4	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/10/2022 0:00	30.5	3	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 0:30	30.8	4	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 1:00	30.7	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 1:30	30.8	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 2:00	30.7	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 2:30	30	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 3:00	29.9	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 3:30	29.9	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 4:00	30.1	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 4:30	30.7	1	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 5:00	31.1	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 5:30	31.3	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 6:00	31.8	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 6:30	31.8	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 7:00	32.6	1	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 7:30	33.5	3	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 8:00	33.4	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 8:30	33.2	3	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 9:00	33.5	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 9:30	34.4	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 10:00	35.2	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 10:30	36.7	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 11:00	36.9	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 11:30	38.4	2	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 12:00	38.7	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 12:30	40.1	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 13:00	40.6	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 13:30	42.6	0	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 14:00	44	2	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 14:30	44.1	2	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 15:00	43.8	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 15:30	44.2	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 16:00	44.1	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 16:30	42.6	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 17:00	41.8	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 17:30	39.5	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 18:00	40	2	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 18:30	38.9	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 19:00	38.5	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 19:30	37.1	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 20:00	38.1	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 20:30	38.9	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 21:00	39.8	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 21:30	40	0	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 22:00	40.6	2	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 22:30	41	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 23:00	41.2	1	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	2
1/10/2022 23:30	41.1	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	2
1/11/2022 0:00	41	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 0:30	41.2	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 1:00	40.9	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 1:30	41.7	2	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 2:00	43.8	0	S	185	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 2:30	45.3	2	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 3:00	43.2	9	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 3:30	42.7	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 4:00	44.3	6	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 4:30	44.8	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/11/2022 5:00	45.6	1	S	176	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 5:30	44.6	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 6:00	44	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 6:30	43.9	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 7:00	43.5	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 7:30	44.3	3	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 8:00	43.6	0	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 8:30	44.9	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 9:00	45.8	2	ESE	103	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 9:30	46.2	1	E	99	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 10:00	46.4	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 10:30	46.9	4	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 11:00	48.5	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 11:30	50.6	4	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 12:00	52.9	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 12:30	53	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 13:00	52.8	1	S	180	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 13:30	53	2	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 14:00	53.1	3	SE	134	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 14:30	55.6	3	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 15:00	55.6	6	S	172	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 15:30	55.7	5	S	189	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 16:00	55.7	5	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 16:30	53.9	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 17:00	52.2	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 17:30	54.2	1	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 18:00	52.4	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 18:30	53.6	4	S	176	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 19:00	54.3	2	SE	125	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 19:30	53.4	6	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 20:00	53.8	4	S	182	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 20:30	54.6	5	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 21:00	54.1	11	S	178	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 21:30	54.2	4	SSE	153	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 22:00	53.5	0	N	355	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 22:30	53.7	1	ESE	104	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 23:00	55.1	2	ESE	114	1	11/18/2021 to 2/7/2022	(not specified)	3
1/11/2022 23:30	54.5	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/12/2022 0:00	53.2	9	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 0:30	55.1	6	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 1:00	53	3	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 1:30	51	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 2:00	50.3	3	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 2:30	49.8	5	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 3:00	50.1	4	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 3:30	50.3	4	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 4:00	50.3	1	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 4:30	52.3	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 5:00	52.7	0	S	183	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 5:30	51	1	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 6:00	51	2	ENE	66	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 6:30	49.3	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 7:00	46.1	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 7:30	45.5	4	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 8:00	44.6	3	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 8:30	44.8	4	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 9:00	45.6	2	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 9:30	48.5	2	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 10:00	51.3	2	SE	128	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 10:30	54.8	4	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 11:00	56.1	5	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 11:30	57	5	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 12:00	57.3	1	SE	141	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 12:30	58	0	ESE	118	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 13:00	59	0	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 13:30	58.3	2	SE	133	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 14:00	57.8	3	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 14:30	56.6	2	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 15:00	55	7	S	182	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 15:30	54.6	6	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/12/2022 16:00	54.8	1	NE	52	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 16:30	52.8	3	NE	45	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 17:00	49.9	2	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 17:30	46.8	0	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 18:00	45.9	0	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 18:30	45.3	0	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 19:00	45.3	0	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 19:30	46.3	0	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 20:00	45.6	0	SE	141	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 20:30	43.6	1	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 21:00	42.3	0	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 21:30	42	3	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 22:00	46.2	0	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 22:30	46.6	4	W	273	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 23:00	46.7	4	WNW	295	1	11/18/2021 to 2/7/2022	(not specified)	4
1/12/2022 23:30	45.9	3	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	4
1/13/2022 0:00	45.2	1	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 0:30	50.7	4	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 1:00	53.6	5	SSW	203	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 1:30	52.1	8	SSE	151	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 2:00	49.6	4	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 2:30	47.9	1	N	360	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 3:00	47.8	4	SW	228	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 3:30	48.7	2	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 4:00	48.1	4	ENE	68	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 4:30	49.5	9	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 5:00	50	9	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 5:30	50.4	3	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 6:00	50.8	8	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 6:30	50.4	2	SE	132	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 7:00	49.4	2	S	179	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 7:30	48.5	3	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 8:00	48.3	5	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 8:30	48.2	4	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 9:00	48	1	E	90	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 9:30	48.1	4	S	170	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 10:00	48.2	6	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 10:30	48.1	4	SW	231	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 11:00	48.4	6	S	171	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 11:30	48.3	8	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 12:00	48.4	3	WSW	244	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 12:30	48.7	2	S	173	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 13:00	48.9	5	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 13:30	49.2	1	WNW	283	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 14:00	49.4	2	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 14:30	49.6	2	S	184	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 15:00	49.8	1	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 15:30	49.9	0	SW	216	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 16:00	50.1	1	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 16:30	50	0	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 17:00	49.8	1	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 17:30	49.6	0	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 18:00	49.4	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 18:30	49.1	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 19:00	49	1	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 19:30	48.9	1	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 20:00	48.8	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 20:30	47.5	2	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 21:00	47	1	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 21:30	47.5	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 22:00	47.3	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 22:30	47.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 23:00	46.3	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	5
1/13/2022 23:30	45.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	5
1/14/2022 0:00	43.9	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 0:30	42.5	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 1:00	42	1	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 1:30	42.8	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 2:00	42.8	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 2:30	42.7	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/14/2022 3:00	42.2	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 3:30	41.6	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 4:00	41.8	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 4:30	41.7	1	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 5:00	42.2	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 5:30	42.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 6:00	42.8	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 6:30	42.8	2	NW	315	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 7:00	42.7	1	NW	311	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 7:30	43	0	NW	311	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 8:00	43.6	0	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 8:30	44.2	1	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 9:00	45.6	1	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 9:30	45.7	1	WNW	300	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 10:00	46.3	2	WNW	294	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 10:30	46.8	0	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 11:00	47.2	0	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 11:30	47.4	1	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 12:00	47.4	2	NE	39	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 12:30	47.6	0	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 13:00	47.6	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 13:30	48.2	0	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 14:00	48.4	3	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 14:30	48.8	0	NNW	331	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 15:00	49.3	1	W	267	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 15:30	48.9	0	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 16:00	49.6	3	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 16:30	48.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 17:00	46.7	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 17:30	46.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 18:00	43.9	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 18:30	42	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 19:00	41.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 19:30	40.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 20:00	40.1	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 20:30	39.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 21:00	38.7	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 21:30	39	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 22:00	38.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 22:30	36.6	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 23:00	37	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/14/2022 23:30	36.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	6
1/15/2022 0:00	35.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 0:30	35.1	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 1:00	35	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 1:30	35.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 2:00	34.9	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 2:30	34.5	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 3:00	34.9	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 3:30	35.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 4:00	35.5	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 4:30	35.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 5:00	35.9	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 5:30	36.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 6:00	36.6	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 6:30	36.6	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 7:00	36.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 7:30	36.3	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 8:00	35.8	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 8:30	36.4	3	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 9:00	36.9	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 9:30	37.2	3	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 10:00	37.5	1	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 10:30	38.4	0	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 11:00	39	3	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 11:30	39.6	3	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 12:00	39.6	2	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 12:30	39.3	3	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 13:00	39.2	1	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 13:30	39.3	1	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/15/2022 14:00	39.4	4	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 14:30	39.7	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 15:00	39.9	4	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 15:30	41	2	NNW	330	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 16:00	40.4	1	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 16:30	39.4	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 17:00	38.7	4	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 17:30	38.2	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 18:00	38.1	0	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 18:30	38.1	2	W	273	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 19:00	38	3	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 19:30	38	2	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 20:00	38	2	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 20:30	37.6	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 21:00	37.8	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 21:30	37.5	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 22:00	37.4	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 22:30	37.3	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 23:00	36.9	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/15/2022 23:30	36.9	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	7
1/16/2022 0:00	36.8	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 0:30	36.4	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 1:00	36.2	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 1:30	36.3	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 2:00	36.3	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 2:30	36.3	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 3:00	36	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 3:30	35.8	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 4:00	35.8	1	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 4:30	35.8	2	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 5:00	35.5	1	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 5:30	35.4	3	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 6:00	35.4	0	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 6:30	35.3	1	WSW	258	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 7:00	35.2	0	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 7:30	35.2	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 8:00	35.2	0	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 8:30	35.2	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 9:00	35.3	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 9:30	35.5	2	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 10:00	35.8	2	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 10:30	36.1	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 11:00	36	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 11:30	36.2	2	W	270	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 12:00	36.4	2	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 12:30	36.9	3	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 13:00	37	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 13:30	37.1	2	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 14:00	37.6	3	W	265	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 14:30	38	0	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 15:00	38.1	0	NE	41	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 15:30	38.2	2	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 16:00	38.3	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 16:30	37.7	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 17:00	36.8	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 17:30	36.2	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 18:00	36.3	0	NW	312	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 18:30	36.5	2	WNW	284	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 19:00	36.3	0	WNW	284	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 19:30	36.3	1	WNW	284	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 20:00	36.2	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 20:30	35.9	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 21:00	36.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 21:30	36.5	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 22:00	36.3	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 22:30	36.7	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 23:00	36.9	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/16/2022 23:30	35.9	1	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/17/2022 0:00	36	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 0:30	36.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/17/2022 1:00	36.8	1	W	273	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 1:30	36.2	1	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 2:00	36.4	1	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 2:30	36.6	0	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 3:00	36.5	2	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 3:30	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 4:00	36.1	1	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 4:30	36.1	1	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 5:00	36.3	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 5:30	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 6:00	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 6:30	36.3	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 7:00	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 7:30	36.2	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 8:00	36	1	SSE	154	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 8:30	36.1	2	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 9:00	36.4	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 9:30	36.8	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 10:00	37.1	1	SSE	155	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 10:30	37.7	2	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 11:00	37.7	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 11:30	38.2	3	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 12:00	39.3	2	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 12:30	39.8	4	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 13:00	39.8	1	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 13:30	40.2	2	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 14:00	40.5	1	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 14:30	40.5	1	NNW	348	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 15:00	40.8	3	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 15:30	40.3	0	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 16:00	40.4	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 16:30	40.2	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 17:00	40	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 17:30	39.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 18:00	39.8	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 18:30	39.6	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 19:00	39.3	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 19:30	39.2	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 20:00	38.8	1	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 20:30	38.5	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 21:00	38.7	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 21:30	38.3	0	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 22:00	37	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 22:30	37.2	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 23:00	37.4	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/17/2022 23:30	37.5	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	2
1/18/2022 0:00	37.8	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 0:30	37.9	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 1:00	38	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 1:30	38.2	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 2:00	38.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 2:30	38.8	4	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 3:00	39.3	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 3:30	39.3	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 4:00	39.4	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 4:30	39.2	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 5:00	39.4	0	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 5:30	39.5	1	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 6:00	39.8	2	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 6:30	40.9	0	E	94	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 7:00	41.1	2	E	94	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 7:30	41.1	1	SSE	157	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 8:00	41.4	2	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 8:30	42	3	SSE	154	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 9:00	42.5	0	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 9:30	43.3	3	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 10:00	44.2	0	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 10:30	45.3	1	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 11:00	46.4	2	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 11:30	46.5	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/18/2022 12:00	47.6	6	ESE	115	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 12:30	48.2	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 13:00	47.6	2	ESE	112	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 13:30	48.1	0	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 14:00	49.9	5	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 14:30	51.6	1	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 15:00	51.4	5	S	186	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 15:30	50.9	0	SE	146	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 16:00	49.9	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 16:30	48.6	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 17:00	47.4	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 17:30	47.4	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 18:00	47.6	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 18:30	48.3	0	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 19:00	48.3	0	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 19:30	48.1	2	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 20:00	48.3	1	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 20:30	48.3	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 21:00	48	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 21:30	48	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 22:00	47.8	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 22:30	47.9	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 23:00	48	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/18/2022 23:30	47.7	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	3
1/19/2022 0:00	47.4	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 0:30	47.1	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 1:00	46.4	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 1:30	45.7	0	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 2:00	46.3	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 2:30	47	2	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 3:00	47.4	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 3:30	47.6	1	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 4:00	47.9	5	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 4:30	47.9	4	SSE	160	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 5:00	48.1	1	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 5:30	48	0	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 6:00	48.4	2	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 6:30	48.5	2	S	171	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 7:00	48.3	1	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 7:30	48.2	0	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 8:00	48.4	2	S	176	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 8:30	48.5	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 9:00	48.7	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 9:30	48.7	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 10:00	49	2	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 10:30	49.3	5	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 11:00	49.4	5	S	174	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 11:30	49.6	7	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 12:00	49.8	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 12:30	50	4	SSE	152	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 13:00	50.5	4	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 13:30	50.6	4	S	185	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 14:00	51	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 14:30	51.2	4	SE	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 15:00	51.5	2	S	178	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 15:30	51.6	3	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 16:00	51.6	6	S	179	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 16:30	51.6	3	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 17:00	51.7	4	SSE	147	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 17:30	51.7	4	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 18:00	51.8	2	S	189	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 18:30	51.8	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 19:00	51.9	3	S	186	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 19:30	51.9	2	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 20:00	51.9	2	SW	226	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 20:30	52.1	4	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 21:00	52.2	3	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 21:30	52.3	2	S	185	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 22:00	52.3	8	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 22:30	52.2	5	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/19/2022 23:00	52.3	8	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	4
1/19/2022 23:30	52.4	4	S	142	1	11/18/2021 to 2/7/2022	(not specified)	4
1/20/2022 0:00	52.6	2	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 0:30	52.6	3	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 1:00	52.8	6	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 1:30	53.1	3	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 2:00	52.7	4	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 2:30	52.6	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 3:00	52.5	3	S	182	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 3:30	52.7	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 4:00	52.5	4	S	191	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 4:30	52.5	0	SSE	156	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 5:00	52.3	2	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 5:30	52.1	0	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 6:00	52.1	0	ESE	117	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 6:30	52.9	4	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 7:00	52.3	1	WSW	246	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 7:30	52.5	4	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 8:00	52.9	4	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 8:30	52.6	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 9:00	52.3	3	SSW	213	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 9:30	52.4	4	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 10:00	52.9	3	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 10:30	52.8	6	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 11:00	53.2	4	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 11:30	53.5	8	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 12:00	54.5	4	SSW	214	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 12:30	54.6	7	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 13:00	55.3	6	SW	236	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 13:30	55.6	10	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 14:00	55.3	8	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 14:30	53.8	11	S	186	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 15:00	54.4	9	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 15:30	53.2	4	SW	218	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 16:00	51.5	6	S	181	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 16:30	49.8	8	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 17:00	47.9	7	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 17:30	47	0	SSW	213	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 18:00	45.6	1	S	190	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 18:30	44.5	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 19:00	43.6	1	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 19:30	43	3	SSW	201	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 20:00	43.8	1	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 20:30	43.6	3	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 21:00	41.7	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 21:30	40.7	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 22:00	40	1	S	188	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 22:30	40.3	1	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 23:00	40.6	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	5
1/20/2022 23:30	39.6	0	W	273	1	11/18/2021 to 2/7/2022	(not specified)	5
1/21/2022 0:00	38.3	0	W	273	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 0:30	36.9	1	W	273	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 1:00	35.6	2	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 1:30	36.6	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 2:00	35.7	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 2:30	35	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 3:00	35	0	W	265	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 3:30	34.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 4:00	32.4	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 4:30	32.9	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 5:00	33.1	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 5:30	33.2	1	W	262	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 6:00	33.9	0	W	262	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 6:30	33.6	3	W	262	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 7:00	32.7	2	WSW	241	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 7:30	33.1	2	WSW	241	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 8:00	32	3	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 8:30	32.8	2	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 9:00	34	1	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 9:30	38.4	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/21/2022 10:00	40.4	3	W	261	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 10:30	42.2	2	NE	54	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 11:00	43.6	7	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 11:30	43.7	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 12:00	44.6	9	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 12:30	45.3	5	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 13:00	45.6	5	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 13:30	45.6	2	NE	43	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 14:00	45.8	1	ENE	65	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 14:30	45.7	6	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 15:00	45.7	6	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 15:30	45.2	1	ENE	67	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 16:00	45.2	3	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 16:30	44.5	3	NE	43	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 17:00	43.7	1	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 17:30	42.8	0	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 18:00	42.2	1	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 18:30	42.3	0	NE	56	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 19:00	42.6	1	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 19:30	42.7	0	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 20:00	42.7	2	NNE	14	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 20:30	42.9	1	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 21:00	42.8	3	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 21:30	42.7	5	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 22:00	42.5	5	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 22:30	42.4	7	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 23:00	42.2	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	6
1/21/2022 23:30	42	3	N	5	1	11/18/2021 to 2/7/2022	(not specified)	6
1/22/2022 0:00	41.6	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 0:30	41.4	3	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 1:00	41.3	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 1:30	41.3	5	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 2:00	41.3	3	NNW	336	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 2:30	41.3	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 3:00	41.1	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 3:30	41.1	4	E	84	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 4:00	41.1	3	N	9	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 4:30	41.1	3	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 5:00	41.2	2	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 5:30	41	0	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 6:00	40.9	3	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 6:30	40.6	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 7:00	40.5	2	ENE	76	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 7:30	40.3	6	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 8:00	40.2	2	E	101	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 8:30	40.2	1	E	94	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 9:00	40.4	4	NE	55	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 9:30	40.5	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 10:00	40.7	2	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 10:30	41	1	N	355	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 11:00	41.3	4	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 11:30	41.6	4	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 12:00	41.8	1	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 12:30	41.9	0	ENE	61	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 13:00	41.8	3	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 13:30	42.2	4	NE	53	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 14:00	42.7	2	SSE	152	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 14:30	43.4	0	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 15:00	45.2	1	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 15:30	45.6	2	W	269	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 16:00	45.6	0	NE	55	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 16:30	45.3	5	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 17:00	43.7	1	SW	215	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 17:30	43.2	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 18:00	42.8	0	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 18:30	43	2	ESE	104	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 19:00	42.7	1	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 19:30	39.1	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 20:00	35.5	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 20:30	34.3	2	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/22/2022 21:00	33.4	1	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 21:30	33	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 22:00	33	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 22:30	32.7	1	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 23:00	33	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/22/2022 23:30	32.9	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	7
1/23/2022 0:00	31.7	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 0:30	32.1	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 1:00	31.8	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 1:30	31.7	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 2:00	30.1	2	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 2:30	29.2	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 3:00	29.5	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 3:30	29.4	1	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 4:00	28.7	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 4:30	28.3	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 5:00	27.8	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 5:30	27.5	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 6:00	27.2	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 6:30	27.1	5	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 7:00	27	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 7:30	26.8	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 8:00	26.7	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 8:30	27	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 9:00	27.8	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 9:30	28.3	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 10:00	30	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 10:30	32.4	3	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 11:00	34	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 11:30	35	6	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 12:00	35.6	8	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 12:30	36.3	6	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 13:00	37.2	5	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 13:30	37.8	9	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 14:00	39.1	7	NNE	18	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 14:30	38.2	5	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 15:00	38.2	8	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 15:30	38.1	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 16:00	37.9	4	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 16:30	38	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 17:00	37.2	3	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 17:30	35.7	2	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 18:00	34.6	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 18:30	34.2	1	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 19:00	32.8	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 19:30	33.3	1	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 20:00	32.8	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 20:30	32.4	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 21:00	32	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 21:30	31.4	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 22:00	30.5	0	ENE	78	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 22:30	30.1	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 23:00	29.9	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
1/23/2022 23:30	29.7	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
1/24/2022 0:00	30.1	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 0:30	30.5	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 1:00	30.9	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 1:30	30.3	1	SW	236	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 2:00	29.8	3	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 2:30	29.2	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 3:00	28.8	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 3:30	28.7	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 4:00	28.9	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 4:30	28.8	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 5:00	29.1	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 5:30	28.9	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 6:00	29	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 6:30	29	1	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 7:00	29.1	0	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 7:30	29.7	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/24/2022 8:00	29.4	1	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 8:30	29.7	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 9:00	29.4	4	SSW	206	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 9:30	30.4	0	NNE	12	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 10:00	31.4	0	NNW	327	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 10:30	31.8	6	W	270	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 11:00	31.7	1	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 11:30	32.7	1	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 12:00	33.5	0	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 12:30	33.9	0	ESE	104	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 13:00	35.2	2	SSE	151	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 13:30	36	4	N	360	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 14:00	36.1	0	N	360	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 14:30	36.5	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 15:00	36	3	WNW	290	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 15:30	35.7	4	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 16:00	35.4	3	W	261	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 16:30	35.5	0	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 17:00	35	3	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 17:30	35	5	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 18:00	34.6	4	NW	313	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 18:30	34.8	1	NW	317	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 19:00	34.8	4	NW	309	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 19:30	34.5	3	NW	315	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 20:00	34.4	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 20:30	33.8	3	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 21:00	33.3	1	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 21:30	32.6	2	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 22:00	32.4	2	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 22:30	32.2	1	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 23:00	31.9	2	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	2
1/24/2022 23:30	31.7	0	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	2
1/25/2022 0:00	32.4	2	NW	310	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 0:30	32.2	3	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 1:00	31.4	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 1:30	31.1	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 2:00	30.5	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 2:30	30	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 3:00	29.6	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 3:30	29.2	1	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 4:00	28.8	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 4:30	28.2	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 5:00	27.4	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 5:30	26.8	0	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 6:00	26.7	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 6:30	26.1	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 7:00	25.6	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 7:30	25.3	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 8:00	25.2	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 8:30	25.3	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 9:00	26.8	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 9:30	27.8	1	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 10:00	29.3	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 10:30	31.6	4	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 11:00	33.2	3	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 11:30	36.8	0	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 12:00	39.5	4	WSW	244	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 12:30	41.7	2	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 13:00	44	6	W	261	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 13:30	45.3	1	ENE	70	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 14:00	45.4	3	ENE	77	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 14:30	46.1	1	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 15:00	47.3	4	NE	52	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 15:30	48.8	0	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 16:00	48.4	2	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 16:30	47.7	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 17:00	45.1	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 17:30	41.4	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 18:00	37.2	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 18:30	35.7	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/25/2022 19:00	34.5	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 19:30	33.4	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 20:00	32.8	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 20:30	31	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 21:00	31.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 21:30	31.9	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 22:00	30.9	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 22:30	30.4	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 23:00	28.5	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/25/2022 23:30	30.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	3
1/26/2022 0:00	30.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 0:30	28.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 1:00	27.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 1:30	27.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 2:00	26.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 2:30	27.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 3:00	27.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 3:30	25.7	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 4:00	25.1	1	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 4:30	26.1	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 5:00	26	2	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 5:30	24.4	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 6:00	23.3	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 6:30	23.6	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 7:00	24.7	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 7:30	24.8	0	W	263	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 8:00	24.5	2	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 8:30	24.3	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 9:00	25.2	3	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 9:30	26.3	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 10:00	28.2	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 10:30	30.6	4	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 11:00	32.2	3	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 11:30	33.7	2	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 12:00	36.4	1	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 12:30	39.1	1	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 13:00	40.2	1	NE	39	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 13:30	41.5	2	WSW	248	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 14:00	42.8	3	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 14:30	43.4	2	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 15:00	44.7	1	NE	54	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 15:30	45	4	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 16:00	44.8	2	ENE	57	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 16:30	44	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 17:00	42.8	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 17:30	37.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 18:00	35.5	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 18:30	34.6	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 19:00	33.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 19:30	32	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 20:00	31.8	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 20:30	31.3	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 21:00	30.7	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 21:30	29.9	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 22:00	28.5	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 22:30	28.7	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 23:00	27.8	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/26/2022 23:30	27.2	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	4
1/27/2022 0:00	27.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 0:30	26.6	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 1:00	26.4	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 1:30	26.8	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 2:00	26.4	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 2:30	25.9	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 3:00	25.8	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 3:30	24.6	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 4:00	24.3	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 4:30	24.7	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 5:00	24	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 5:30	24.5	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/27/2022 6:00	25.9	2	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 6:30	25.9	0	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 7:00	24.7	1	ENE	58	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 7:30	24.5	2	WNW	286	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 8:00	24.8	0	WNW	285	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 8:30	24.6	1	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 9:00	31.9	2	S	185	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 9:30	34.8	4	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 10:00	36.5	3	SW	231	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 10:30	38.5	2	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 11:00	40	3	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 11:30	41.5	2	NE	45	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 12:00	43.2	5	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 12:30	43.6	5	SSW	208	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 13:00	45	4	WSW	259	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 13:30	46.1	0	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 14:00	47	7	W	267	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 14:30	47.9	6	W	260	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 15:00	48.4	8	W	271	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 15:30	49	1	WSW	253	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 16:00	48.6	2	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 16:30	48.2	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 17:00	46.5	2	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 17:30	41.2	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 18:00	41	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 18:30	36.4	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 19:00	34.2	0	ESE	105	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 19:30	32.7	2	SE	125	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 20:00	30.7	1	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 20:30	31.6	0	ESE	108	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 21:00	31	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 21:30	30.5	2	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 22:00	29.9	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 22:30	29	2	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 23:00	28.7	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/27/2022 23:30	28.4	2	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	5
1/28/2022 0:00	27.7	1	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 0:30	27.6	3	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 1:00	31.9	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 1:30	27.4	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 2:00	26.7	2	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 2:30	26.1	2	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 3:00	26	1	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 3:30	25.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 4:00	25	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 4:30	25.3	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 5:00	24.8	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 5:30	24.8	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 6:00	25	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 6:30	25.8	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 7:00	25.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 7:30	25.9	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 8:00	24.6	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 8:30	26	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 9:00	27.4	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 9:30	28.2	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 10:00	29.5	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 10:30	34.3	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 11:00	37.7	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 11:30	41.3	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 12:00	41.8	7	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 12:30	41.4	4	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 13:00	42.9	1	NNW	333	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 13:30	44.2	1	W	267	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 14:00	44.6	5	NE	42	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 14:30	45.5	4	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 15:00	46.7	2	NE	37	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 15:30	46.5	1	NNE	16	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 16:00	45.2	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 16:30	43.8	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/28/2022 17:00	42.2	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 17:30	38.4	0	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 18:00	35.5	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 18:30	35.5	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 19:00	34.7	1	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 19:30	34.7	2	NNE	25	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 20:00	33.4	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 20:30	32.3	2	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 21:00	32.1	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 21:30	32.3	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 22:00	32.2	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 22:30	31.7	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 23:00	30.6	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/28/2022 23:30	30.1	1	S	178	1	11/18/2021 to 2/7/2022	(not specified)	6
1/29/2022 0:00	28.5	3	S	178	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 0:30	27.9	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 1:00	29.1	2	S	178	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 1:30	28.4	1	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 2:00	27.3	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 2:30	26.7	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 3:00	27.4	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 3:30	26.1	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 4:00	25.1	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 4:30	24.4	2	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 5:00	24	1	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 5:30	25.8	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 6:00	25.7	0	S	180	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 6:30	26.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 7:00	27.2	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 7:30	26.1	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 8:00	25.5	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 8:30	26.4	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 9:00	26.8	0	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 9:30	29	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 10:00	30.5	1	ESE	120	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 10:30	33.6	0	ESE	110	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 11:00	36.6	2	N	10	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 11:30	38.6	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 12:00	40.7	2	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 12:30	43.1	0	ENE	59	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 13:00	44.6	2	NNW	331	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 13:30	45.7	2	NNW	347	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 14:00	46.6	1	N	360	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 14:30	46.8	1	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 15:00	46.9	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 15:30	48.1	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 16:00	47.2	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 16:30	45.6	3	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 17:00	44	2	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 17:30	40.9	0	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 18:00	37.4	1	NE	35	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 18:30	35.3	1	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 19:00	36.4	0	E	81	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 19:30	35.3	0	E	81	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 20:00	35.4	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 20:30	34.4	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 21:00	33.3	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 21:30	32.5	2	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 22:00	30.6	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 22:30	30.9	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 23:00	31	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/29/2022 23:30	31.8	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	7
1/30/2022 0:00	30.8	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 0:30	29.9	0	E	83	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 1:00	30.9	1	E	83	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 1:30	29.1	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 2:00	29.7	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 2:30	29.6	0	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 3:00	30.7	0	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 3:30	31.1	3	WSW	240	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/30/2022 4:00	32	3	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 4:30	32.6	4	SE	138	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 5:00	32	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 5:30	32	2	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 6:00	31.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 6:30	31.3	3	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 7:00	30.5	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 7:30	29.3	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 8:00	28.7	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 8:30	30.1	0	WNW	282	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 9:00	31.5	2	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 9:30	32.6	2	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 10:00	33.4	1	SW	226	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 10:30	38.6	3	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 11:00	43.4	5	SSE	158	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 11:30	46.7	3	SSE	149	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 12:00	47.4	6	S	171	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 12:30	47.3	6	SSE	162	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 13:00	48	4	SW	222	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 13:30	48.2	3	SE	139	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 14:00	47.8	3	SSW	199	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 14:30	48.2	3	S	175	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 15:00	49	10	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 15:30	49.7	2	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 16:00	50.5	10	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 16:30	49.6	7	S	183	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 17:00	49	7	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 17:30	48.4	4	SW	219	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 18:00	47.6	7	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 18:30	45.8	5	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 19:00	45.5	11	SW	230	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 19:30	44.5	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 20:00	42.9	1	ESE	107	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 20:30	43.4	14	SSW	198	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 21:00	42.8	12	S	171	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 21:30	42.7	13	S	172	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 22:00	42.2	4	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 22:30	41	3	S	187	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 23:00	40.2	3	SSW	211	1	11/18/2021 to 2/7/2022	(not specified)	1
1/30/2022 23:30	40.9	4	S	187	1	11/18/2021 to 2/7/2022	(not specified)	1
1/31/2022 0:00	40.3	10	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 0:30	39.9	7	S	183	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 1:00	39.2	4	SSW	204	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 1:30	37.7	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 2:00	36.8	1	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 2:30	36.5	0	S	173	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 3:00	35.7	0	S	173	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 3:30	35.5	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 4:00	35.6	1	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 4:30	34.7	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 5:00	34.6	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 5:30	34.4	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 6:00	34.5	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 6:30	33.3	2	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 7:00	33.9	0	S	182	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 7:30	35.1	2	S	191	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 8:00	36.2	2	S	191	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 8:30	37.2	2	SW	217	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 9:00	37.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 9:30	40	2	SSW	192	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 10:00	41	4	SSE	153	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 10:30	42.2	4	SW	232	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 11:00	43.7	2	SE	137	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 11:30	44.2	6	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 12:00	42.8	5	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 12:30	44.4	6	S	180	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 13:00	44.3	4	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 13:30	46.1	3	S	175	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 14:00	44.5	4	S	190	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 14:30	45.9	12	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/31/2022 15:00	45.5	6	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 15:30	45.8	4	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 16:00	46.3	4	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 16:30	44.7	6	SSW	210	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 17:00	42.7	2	SSW	202	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 17:30	40.9	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 18:00	39	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 18:30	37.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 19:00	35.7	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 19:30	35.7	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 20:00	34.3	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 20:30	33.8	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 21:00	34.2	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 21:30	33.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 22:00	33.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 22:30	32.8	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 23:00	32.5	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
1/31/2022 23:30	32.5	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	2
2/1/2022 0:00	31.7	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 0:30	31.6	3	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 1:00	32.7	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 1:30	32.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 2:00	32.1	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 2:30	32.8	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 3:00	32.1	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 3:30	31.7	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 4:00	32	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 4:30	32.4	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 5:00	30.7	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 5:30	30.9	0	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 6:00	31.3	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 6:30	30.1	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 7:00	29.1	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 7:30	29.4	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 8:00	30.4	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 8:30	31.9	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 9:00	32.4	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 9:30	33	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 10:00	34.5	1	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 10:30	36.4	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 11:00	38.5	2	SSW	200	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 11:30	39.1	1	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 12:00	41.2	4	S	171	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 12:30	42.4	1	S	171	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 13:00	42.4	1	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 13:30	43.4	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 14:00	43.1	2	NE	49	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 14:30	42.7	0	NE	44	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 15:00	43	3	SW	223	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 15:30	43	0	WSW	257	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 16:00	42.3	1	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 16:30	41.6	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 17:00	40.8	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 17:30	40.2	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 18:00	39.4	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 18:30	39.1	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 19:00	39	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 19:30	39.1	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 20:00	39.1	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 20:30	38.8	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 21:00	38.5	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 21:30	38.8	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 22:00	38.4	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 22:30	38.9	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 23:00	38.7	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/1/2022 23:30	38.5	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	3
2/2/2022 0:00	38.9	0	NE	51	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 0:30	39.2	0	NE	52	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 1:00	39.3	1	SSE	147	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 1:30	39.3	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/2/2022 2:00	39.7	2	S	188	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 2:30	40	1	S	181	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 3:00	40.1	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 3:30	40	1	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 4:00	39.7	4	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 4:30	38.9	5	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 5:00	38.9	1	SE	140	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 5:30	39	1	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 6:00	38.9	2	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 6:30	38.9	8	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 7:00	38.8	3	SSW	197	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 7:30	38.7	2	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 8:00	38.9	3	S	180	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 8:30	39.2	3	SE	137	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 9:00	39.5	5	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 9:30	40.3	4	S	175	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 10:00	40.7	4	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 10:30	41	5	S	171	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 11:00	41.6	2	S	179	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 11:30	42.2	4	SSE	164	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 12:00	42.9	4	S	175	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 12:30	44	3	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 13:00	44.1	4	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 13:30	44.7	10	SSE	169	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 14:00	45	7	SE	136	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 14:30	45.4	6	S	173	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 15:00	45	5	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 15:30	45	3	SSW	195	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 16:00	45.2	3	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 16:30	45.3	1	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 17:00	44.8	3	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 17:30	43.3	5	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 18:00	43.1	3	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 18:30	42.7	0	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 19:00	42.1	0	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 19:30	42.1	0	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 20:00	42.2	1	S	191	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 20:30	42	2	S	190	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 21:00	42.2	4	SSW	207	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 21:30	42.1	3	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 22:00	42.1	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 22:30	41.6	3	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 23:00	41.6	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/2/2022 23:30	41.2	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	4
2/3/2022 0:00	40.5	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 0:30	40.3	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 1:00	40	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 1:30	39.8	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 2:00	40.1	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 2:30	40.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 3:00	39.5	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 3:30	38.3	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 4:00	36.9	1	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 4:30	36.6	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 5:00	35.7	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 5:30	34.4	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 6:00	35	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 6:30	35.6	2	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 7:00	35.9	0	SSW	196	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 7:30	37	1	S	176	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 8:00	38.1	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 8:30	38.1	0	SSE	163	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 9:00	39.6	2	SE	135	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 9:30	41.5	0	SSE	154	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 10:00	43.4	2	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 10:30	44.7	5	NNE	12	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 11:00	45	1	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 11:30	48	4	SW	225	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 12:00	49.2	7	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 12:30	49.7	4	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/3/2022 13:00	49.7	0	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 13:30	51.1	0	SW	221	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 14:00	52.1	3	WNW	292	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 14:30	52.4	1	SW	228	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 15:00	53.7	1	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 15:30	52.9	1	SE	138	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 16:00	52.3	2	N	5	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 16:30	52.5	1	N	5	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 17:00	50.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 17:30	45.4	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 18:00	42.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 18:30	41.4	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 19:00	40.5	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 19:30	39.1	0	NNE	13	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 20:00	37.3	2	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 20:30	37.2	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 21:00	37.3	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 21:30	36.7	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 22:00	36.4	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 22:30	35	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 23:00	35.3	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/3/2022 23:30	34.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	5
2/4/2022 0:00	33.5	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 0:30	33.1	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 1:00	32.9	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 1:30	32.5	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 2:00	34	1	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 2:30	34.7	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 3:00	35.2	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 3:30	35.7	2	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 4:00	35.7	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 4:30	36.3	0	N	11	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 5:00	36.3	3	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 5:30	36.5	0	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 6:00	37.5	0	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 6:30	37.7	1	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 7:00	37.4	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 7:30	37.2	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 8:00	36.6	0	SSE	167	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 8:30	37.2	3	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 9:00	37.7	0	S	184	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 9:30	38.1	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 10:00	38.8	4	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 10:30	40.2	2	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 11:00	41.4	4	NNE	27	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 11:30	42.7	3	N	360	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 12:00	42.8	4	SSE	148	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 12:30	43	6	SSE	159	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 13:00	44.7	1	ESE	118	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 13:30	46.4	0	SSE	168	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 14:00	45.5	2	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 14:30	45.6	2	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 15:00	46	4	SSE	166	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 15:30	46.8	4	SSE	161	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 16:00	47.9	5	SSW	214	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 16:30	47.7	2	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 17:00	47.2	1	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 17:30	46.6	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 18:00	46.3	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 18:30	46.4	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 19:00	46.2	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 19:30	45	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 20:00	43.9	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 20:30	43.9	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 21:00	43.9	0	S	187	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 21:30	44.9	3	SE	143	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 22:00	45.3	2	SSE	151	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 22:30	43.4	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 23:00	43	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6
2/4/2022 23:30	43	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/5/2022 0:00	41.4	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 0:30	41.5	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 1:00	39.8	0	S	179	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 1:30	41.6	1	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 2:00	40.8	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 2:30	40.4	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 3:00	40.7	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 3:30	40.3	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 4:00	41.1	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 4:30	40.4	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 5:00	37.8	0	SSE	165	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 5:30	39.7	2	NNE	22	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 6:00	40.1	2	NNE	23	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 6:30	41.1	1	NNW	336	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 7:00	41.7	0	NNW	333	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 7:30	41.3	0	NNW	333	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 8:00	41.4	0	ESE	115	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 8:30	41.6	0	SSW	194	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 9:00	42.1	4	SSW	193	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 9:30	42.7	1	WSW	238	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 10:00	43.4	10	NNE	24	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 10:30	44.3	8	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 11:00	44.9	7	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 11:30	45.8	5	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 12:00	46.4	3	N	5	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 12:30	47	6	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 13:00	47.4	4	WSW	256	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 13:30	47.1	3	W	261	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 14:00	47.7	4	W	267	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 14:30	48	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 15:00	48.3	10	WSW	252	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 15:30	48.9	1	WSW	254	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 16:00	48.2	2	SSW	205	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 16:30	48.2	3	NNE	17	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 17:00	46.6	3	E	85	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 17:30	45.5	2	S	188	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 18:00	44.3	2	SSW	209	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 18:30	44.2	4	S	171	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 19:00	44	3	WSW	250	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 19:30	43.6	2	SW	233	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 20:00	43.6	1	E	96	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 20:30	44	5	W	262	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 21:00	43.7	3	SW	234	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 21:30	43.4	1	W	265	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 22:00	42.3	1	ESE	120	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 22:30	42.5	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 23:00	40.8	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	7
2/5/2022 23:30	40.4	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	7
2/6/2022 0:00	39.7	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 0:30	36	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 1:00	33.7	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 1:30	32.3	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 2:00	32.3	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 2:30	32.7	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 3:00	32.1	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 3:30	30.8	2	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 4:00	31	2	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 4:30	30.8	1	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 5:00	32.1	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 5:30	31.6	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 6:00	31.4	0	ESE	119	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 6:30	29.3	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 7:00	29	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 7:30	30.9	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 8:00	29.5	3	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 8:30	30.1	0	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 9:00	31.5	1	NNE	33	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 9:30	31.6	2	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 10:00	33.2	1	NE	38	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 10:30	36.7	0	NE	36	1	11/18/2021 to 2/7/2022	(not specified)	1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/6/2022 11:00	38.7	3	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 11:30	39.9	4	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 12:00	41.4	5	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 12:30	41.1	2	NNE	26	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 13:00	42.8	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 13:30	44.5	3	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 14:00	46.9	2	NNE	34	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 14:30	47.7	4	NNE	21	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 15:00	48.6	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 15:30	49.3	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 16:00	49	2	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 16:30	49.1	3	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 17:00	46.2	2	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 17:30	43	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 18:00	40.9	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 18:30	39.9	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 19:00	39.9	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 19:30	38.6	0	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 20:00	36.4	1	NNE	20	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 20:30	35.5	1	NNE	19	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 21:00	36	2	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 21:30	35.3	0	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 22:00	34	4	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 22:30	36.7	2	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 23:00	34.5	3	SE	126	1	11/18/2021 to 2/7/2022	(not specified)	1
2/6/2022 23:30	32.4	1	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	1
2/7/2022 0:00	31	0	SE	144	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 0:30	32.3	0	SE	145	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 1:00	31.7	0	SE	145	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 1:30	31.5	0	SSE	150	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 2:00	31.3	3	NE	46	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 2:30	30.9	0	S	178	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 3:00	31.8	0	S	175	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 3:30	32.3	2	S	175	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 4:00	32.8	2	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 4:30	33	0	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 5:00	32.8	0	S	177	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 5:30	32.8	3	NNE	29	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 6:00	32.3	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 6:30	32.4	3	WSW	251	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 7:00	32.1	0	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 7:30	32.8	2	SW	229	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 8:00	33.7	4	NE	41	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 8:30	35.5	3	NNE	32	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 9:00	35.7	0	WSW	241	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 9:30	37.8	0	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 10:00	38.9	1	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 10:30	40.3	1	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 11:00	42.5	0	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 11:30	43.6	2	WSW	242	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 12:00	46.6	1	WSW	243	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 12:30	49.2	4	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 13:00	51.3	2	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 13:30	52.6	4	NNE	30	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 14:00	53	1	NNW	339	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 14:30	52.9	2	N	355	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 15:00	52.9	0	N	355	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 15:30	52.4	0	N	355	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 16:00	52.9	4	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 16:30	53.5	2	NNE	31	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 17:00	52.9	0	NNE	28	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 17:30	51.2	2	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 18:00	49.3	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 18:30	47	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 19:00	44.9	1	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 19:30	42.8	0	NE	40	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 20:00	41.9	0	NE	41	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 20:30	41.7	2	NE	47	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 21:00	42.2	0	NE	48	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 21:30	39.5	0	ENE	76	1	11/18/2021 to 2/7/2022	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/7/2022 22:00	38.3	2	E	84	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 22:30	37.3	2	E	84	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 23:00	36.1	2	E	84	1	11/18/2021 to 2/7/2022	(not specified)	2
2/7/2022 23:30	34.7	2	SW	227	1	11/18/2021 to 2/7/2022	(not specified)	2
7/1/2022 0:00	58	2	S	188				6
7/1/2022 0:30	57.3	2	SW	215				6
7/1/2022 1:00	56.3	0	SW	215				6
7/1/2022 1:30	55.1	0	SW	215				6
7/1/2022 2:00	54	0	SW	215				6
7/1/2022 2:30	53.1	0	SW	215				6
7/1/2022 3:00	52.3	0	SW	215				6
7/1/2022 3:30	51.9	0	SW	215				6
7/1/2022 4:00	51.3	0	SW	215				6
7/1/2022 4:30	50.7	0	SW	215				6
7/1/2022 5:00	50.5	0	SW	215				6
7/1/2022 5:30	50.6	0	SW	215				6
7/1/2022 6:00	49.7	0	SW	215				6
7/1/2022 6:30	51.5	0	SW	215				6
7/1/2022 7:00	53.5	0	SW	215				6
7/1/2022 7:30	55.7	1	SW	217				6
7/1/2022 8:00	56.9	0	SW	217				6
7/1/2022 8:30	58.3	0	SW	217				6
7/1/2022 9:00	59.9	3	SW	219				6
7/1/2022 9:30	61.4	1	SW	224				6
7/1/2022 10:00	62.8	0	SW	228	2	7/1/2022	10:00 AM	6
7/1/2022 10:30	64.6	0	SW	229				6
7/1/2022 11:00	67.3	4	NNW	342				6
7/1/2022 11:30	67.3	3	NNW	342				6
7/1/2022 12:00	68.1	2	NNW	340				6
7/1/2022 12:30	68.6	7	NNE	19				6
7/1/2022 13:00	69.8	2	NW	326				6
7/1/2022 13:30	71.9	2	NW	306				6
7/1/2022 14:00	71.7	1	W	275				6
7/1/2022 14:30	73.4	6	SW	218				6
7/1/2022 15:00	74.4	4	ENE	57				6
7/1/2022 15:30	75.2	3	SSW	207				6
7/1/2022 16:00	75.8	8	N	5				6
7/1/2022 16:30	76.5	7	NNE	12				6
7/1/2022 17:00	76.6	1	NNW	338				6
7/1/2022 17:30	76.8	7	NNE	18				6
7/1/2022 18:00	77.1	1	SW	228				6
7/1/2022 18:30	76.6	1	NW	305				6
7/1/2022 19:00	76	4	SW	234				6
7/1/2022 19:30	74.5	2	WSW	254				6
7/1/2022 20:00	70.4	2	SSW	199				6
7/1/2022 20:30	66.2	6	SW	223				6
7/1/2022 21:00	63.7	6	SSW	211				6
7/1/2022 21:30	61.9	4	SSW	201				6
7/1/2022 22:00	60.5	3	SSW	197				6
7/1/2022 22:30	59.3	3	SSW	200				6
7/1/2022 23:00	58.2	3	SSW	200				6
7/1/2022 23:30	57.7	3	SSW	195				6
7/26/2022 0:00	66	2	SW	232				3
7/26/2022 0:30	65.6	2	SW	232				3
7/26/2022 1:00	64.5	2	SW	232				3
7/26/2022 1:30	64	1	SW	232				3
7/26/2022 2:00	62.7	1	SW	232				3
7/26/2022 2:30	63.7	0	SW	232				3
7/26/2022 3:00	62	0	SW	232				3
7/26/2022 3:30	60.9	0	SW	232				3
7/26/2022 4:00	60.1	0	SW	232				3
7/26/2022 4:30	59	0	SW	232				3
7/26/2022 5:00	58.2	0	SW	232				3
7/26/2022 5:30	58	0	SW	232				3
7/26/2022 6:00	57.5	0	SW	232				3
7/26/2022 6:30	57.8	0	SW	232				3
7/26/2022 7:00	58.9	0	SW	232				3
7/26/2022 7:30	60.7	0	SW	232				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/26/2022 8:00	63.8	1	SW	232	3	7/26/2022	8:00 AM	3
7/26/2022 8:30	67.9	0	SW	232				3
7/26/2022 9:00	72.8	1	N	355				3
7/26/2022 9:30	76	3	NE	38				3
7/26/2022 10:00	78.7	3	NNE	23				3
7/26/2022 10:30	81.2	1	NNE	27				3
7/26/2022 11:00	82.9	4	N	9				3
7/26/2022 11:30	84.7	2	E	94				3
7/26/2022 12:00	86.8	4	N	5				3
7/26/2022 12:30	88.1	2	NNE	19				3
7/26/2022 13:00	90.4	5	NNE	19				3
7/26/2022 13:30	91.5	2	SSE	153				3
7/26/2022 14:00	93.2	2	NNE	20				3
7/26/2022 14:30	94.3	1	NE	53				3
7/26/2022 15:00	95.9	2	NNE	14				3
7/26/2022 15:30	96.6	0	NE	51				3
7/26/2022 16:00	97.3	2	NNE	22				3
7/26/2022 16:30	97.8	5	N	9				3
7/26/2022 17:00	98.2	2	NE	18				3
7/26/2022 17:30	99	4	SW	221				3
7/26/2022 18:00	96.7	3	WSW	241				3
7/26/2022 18:30	92.6	5	S	185				3
7/26/2022 19:00	89	4	SW	215				3
7/26/2022 19:30	85.8	5	SSW	194				3
7/26/2022 20:00	82.8	4	SSW	203				3
7/26/2022 20:30	79.8	4	S	187				3
7/26/2022 21:00	77.5	6	S	188				3
7/26/2022 21:30	75.6	8	SW	219				3
7/26/2022 22:00	74.2	5	SSW	192				3
7/26/2022 22:30	73.2	0	SSW	192				3
7/26/2022 23:00	70.3	3	SSW	192				3
7/26/2022 23:30	70	0	SSW	192				3
7/30/2022 0:00	71.3	2	S	171				7
7/30/2022 0:30	69.5	2	S	171				7
7/30/2022 1:00	68.2	2	S	171				7
7/30/2022 1:30	67	2	S	171				7
7/30/2022 2:00	66.7	0	S	171				7
7/30/2022 2:30	65.2	0	SSE	165				7
7/30/2022 3:00	64.6	0	SSE	163				7
7/30/2022 3:30	65.8	1	NE	47				7
7/30/2022 4:00	65.5	1	NE	46				7
7/30/2022 4:30	63.5	0	NE	46				7
7/30/2022 5:00	62.7	0	NE	46				7
7/30/2022 5:30	62.1	0	NE	46				7
7/30/2022 6:00	63	0	NE	46				7
7/30/2022 6:30	62.2	1	NE	46				7
7/30/2022 7:00	62.6	4	ENE	71				7
7/30/2022 7:30	64.2	0	SSE	158				7
7/30/2022 8:00	67.3	0	SSE	158	4	7/30/2022	8:00 AM	7
7/30/2022 8:30	69.2	2	SSE	158				7
7/30/2022 9:00	73.1	0	SSE	157				7
7/30/2022 9:30	74.2	4	NE	46				7
7/30/2022 10:00	77.4	2	NNE	30				7
7/30/2022 10:30	82	2	NNE	20				7
7/30/2022 11:00	84.1	3	NE	54				7
7/30/2022 11:30	86	2	NNW	339				7
7/30/2022 12:00	87.8	2	WSW	259				7
7/30/2022 12:30	88.8	2	W	274				7
7/30/2022 13:00	89.4	11	W	261				7
7/30/2022 13:30	92	7	SSW	206				7
7/30/2022 14:00	93.5	4	SW	232				7
7/30/2022 14:30	94.9	1	SSW	205				7
7/30/2022 15:00	92.6	6	WSW	245				7
7/30/2022 15:30	93.9	1	WSW	254				7
7/30/2022 16:00	95.9	2	W	269				7
7/30/2022 16:30	93.7	1	SSE	156				7
7/30/2022 17:00	97.2	4	NNE	28				7
7/30/2022 17:30	98.2	10	NE	36				7
7/30/2022 18:00	97.5	6	NE	37				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/30/2022 18:30	97.7	5	ENE	76				7
7/30/2022 19:00	97	1	WSW	244				7
7/30/2022 19:30	91.9	4	SSW	209				7
7/30/2022 20:00	87.7	3	SSW	199				7
7/30/2022 20:30	84.3	2	SSW	210				7
7/30/2022 21:00	80	4	SSW	210				7
7/30/2022 21:30	77	3	SSW	202				7
7/30/2022 22:00	76.5	3	SSW	202				7
7/30/2022 22:30	74.2	2	SSW	202				7
7/30/2022 23:00	71.9	0	SSW	202				7
7/30/2022 23:30	73.1	0	SSW	202				7
8/15/2022 0:00	63.2	1	SSW	202				2
8/15/2022 0:30	60.8	0	SSW	202				2
8/15/2022 1:00	59	0	SSW	202				2
8/15/2022 1:30	57.1	0	SSW	202				2
8/15/2022 2:00	57.2	2	SSW	202				2
8/15/2022 2:30	56.3	0	SSW	202				2
8/15/2022 3:00	54.4	0	SSW	202				2
8/15/2022 3:30	53.6	0	SSW	202				2
8/15/2022 4:00	53.7	1	SSW	202				2
8/15/2022 4:30	52.8	0	SSW	202				2
8/15/2022 5:00	51.6	0	SSW	202				2
8/15/2022 5:30	51.7	0	SSW	202				2
8/15/2022 6:00	51.5	0	SSW	202				2
8/15/2022 6:30	51.3	0	SSW	202				2
8/15/2022 7:00	51.6	0	SSW	202				2
8/15/2022 7:30	53.3	0	SSW	202				2
8/15/2022 8:00	55.6	0	SSW	202				2
8/15/2022 8:30	58.1	0	NNE	26				2
8/15/2022 9:00	62	5	S	187	5	8/15/2022	9:13 AM	2
8/15/2022 9:30	67.7	1	SW	227				2
8/15/2022 10:00	70.2	2	NW	314				2
8/15/2022 10:30	72.7	1	WSW	256				2
8/15/2022 11:00	75.2	2	NNW	335				2
8/15/2022 11:30	77.1	4	N	5				2
8/15/2022 12:00	78.4	1	WSW	256				2
8/15/2022 12:30	79.8	3	SSW	212				2
8/15/2022 13:00	81	1	SW	228				2
8/15/2022 13:30	82.6	4	SSE	168				2
8/15/2022 14:00	84	4	NNW	332				2
8/15/2022 14:30	85.4	5	SW	225				2
8/15/2022 15:00	86.8	2	SW	236				2
8/15/2022 15:30	87.1	3	ESE	110				2
8/15/2022 16:00	88	2	WSW	250				2
8/15/2022 16:30	88.4	1	WSW	257				2
8/15/2022 17:00	87.5	3	SW	230				2
8/15/2022 17:30	86.7	5	SW	225				2
8/15/2022 18:00	85.7	4	WSW	248				2
8/15/2022 18:30	83.5	7	S	188				2
8/15/2022 19:00	80.6	8	S	178				2
8/15/2022 19:30	78.5	6	SSW	203				2
8/15/2022 20:00	74.9	4	S	185				2
8/15/2022 20:30	72.2	8	WSW	252				2
8/15/2022 21:00	70.3	3	SSW	198				2
8/15/2022 21:30	68.8	3	SSW	200				2
8/15/2022 22:00	67.9	2	SSW	209				2
8/15/2022 22:30	66.2	3	SSW	209				2
8/15/2022 23:00	62.4	1	SSW	209				2
8/15/2022 23:30	63.3	0	SSW	209				2
8/17/2022 0:00	75.1	1	SSE	161	6	8/17/2022	(not specified)	4
8/17/2022 0:30	74.6	3	SW	216	6	8/17/2022	(not specified)	4
8/17/2022 1:00	73.6	3	SW	219	6	8/17/2022	(not specified)	4
8/17/2022 1:30	71.9	5	SSE	164	6	8/17/2022	(not specified)	4
8/17/2022 2:00	69.4	1	S	176	6	8/17/2022	(not specified)	4
8/17/2022 2:30	71	2	NE	38	6	8/17/2022	(not specified)	4
8/17/2022 3:00	71.2	2	ENE	64	6	8/17/2022	(not specified)	4
8/17/2022 3:30	71.1	2	NNW	331	6	8/17/2022	(not specified)	4
8/17/2022 4:00	70.4	0	NW	308	6	8/17/2022	(not specified)	4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/17/2022 4:30	69.3	1	W	269	6	8/17/2022	(not specified)	4
8/17/2022 5:00	64.2	0	W	263	6	8/17/2022	(not specified)	4
8/17/2022 5:30	61.4	0	W	263	6	8/17/2022	(not specified)	4
8/17/2022 6:00	61.6	0	NNW	342	6	8/17/2022	(not specified)	4
8/17/2022 6:30	60.4	1	WNW	298	6	8/17/2022	(not specified)	4
8/17/2022 7:00	58	2	WNW	298	6	8/17/2022	(not specified)	4
8/17/2022 7:30	59.1	0	WNW	298	6	8/17/2022	(not specified)	4
8/17/2022 8:00	62.1	0	WNW	290	6	8/17/2022	(not specified)	4
8/17/2022 8:30	68.7	1	NNW	329	6	8/17/2022	(not specified)	4
8/17/2022 9:00	70.1	1	NNW	327	6	8/17/2022	(not specified)	4
8/17/2022 9:30	72.4	5	SW	232	6	8/17/2022	(not specified)	4
8/17/2022 10:00	74	2	WSW	256	6	8/17/2022	(not specified)	4
8/17/2022 10:30	76.7	2	W	275	6	8/17/2022	(not specified)	4
8/17/2022 11:00	78.6	4	NNW	341	6	8/17/2022	(not specified)	4
8/17/2022 11:30	81.1	2	NE	44	6	8/17/2022	(not specified)	4
8/17/2022 12:00	83.1	6	NE	50	6	8/17/2022	(not specified)	4
8/17/2022 12:30	84.6	3	N	5	6	8/17/2022	(not specified)	4
8/17/2022 13:00	85.4	3	NE	48	6	8/17/2022	(not specified)	4
8/17/2022 13:30	85.7	1	NNE	15	6	8/17/2022	(not specified)	4
8/17/2022 14:00	88.8	3	NNE	19	6	8/17/2022	(not specified)	4
8/17/2022 14:30	89.2	3	E	93	6	8/17/2022	(not specified)	4
8/17/2022 15:00	89.8	3	NNE	14	6	8/17/2022	(not specified)	4
8/17/2022 15:30	91	3	NNE	15	6	8/17/2022	(not specified)	4
8/17/2022 16:00	90.1	1	NNE	23	6	8/17/2022	(not specified)	4
8/17/2022 16:30	92.1	0	ENE	58	6	8/17/2022	(not specified)	4
8/17/2022 17:00	92.8	1	WSW	259	6	8/17/2022	(not specified)	4
8/17/2022 17:30	94.7	0	SW	228	6	8/17/2022	(not specified)	4
8/17/2022 18:00	94.9	2	NNW	332	6	8/17/2022	(not specified)	4
8/17/2022 18:30	94.4	0	NE	49	6	8/17/2022	(not specified)	4
8/17/2022 19:00	94.9	1	NNE	17	6	8/17/2022	(not specified)	4
8/17/2022 19:30	91.7	0	SSW	195	6	8/17/2022	(not specified)	4
8/17/2022 20:00	87.5	2	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 20:30	82.5	0	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 21:00	78.6	2	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 21:30	77.1	0	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 22:00	75.5	1	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 22:30	74	2	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 23:00	74.2	1	SSW	198	6	8/17/2022	(not specified)	4
8/17/2022 23:30	74.4	2	SW	224	6	8/17/2022	(not specified)	4
12/13/2022 0:00	33.3	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 0:30	33.1	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 1:00	32.3	1	SE	132	7	12/13/2022	(not specified)	3
12/13/2022 1:30	31.9	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 2:00	32.6	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 2:30	32.9	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 3:00	33.4	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 3:30	31.4	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 4:00	31.2	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 4:30	31.9	1	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 5:00	32.4	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 5:30	31.7	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 6:00	31.6	0	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 6:30	31	3	SE	133	7	12/13/2022	(not specified)	3
12/13/2022 7:00	30.7	1	SE	132	7	12/13/2022	(not specified)	3
12/13/2022 7:30	31.1	3	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 8:00	31.3	1	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 8:30	31.3	2	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 9:00	31.9	1	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 9:30	32.6	0	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 10:00	33.9	3	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 10:30	34.7	3	NNE	32	7	12/13/2022	(not specified)	3
12/13/2022 11:00	36.8	1	NNE	34	7	12/13/2022	(not specified)	3
12/13/2022 11:30	38	4	NNE	33	7	12/13/2022	(not specified)	3
12/13/2022 12:00	38.2	4	NNE	24	7	12/13/2022	(not specified)	3
12/13/2022 12:30	39	1	NNE	30	7	12/13/2022	(not specified)	3
12/13/2022 13:00	39.5	3	NNE	29	7	12/13/2022	(not specified)	3
12/13/2022 13:30	40.7	3	NNE	26	7	12/13/2022	(not specified)	3
12/13/2022 14:00	41.5	0	NNE	21	7	12/13/2022	(not specified)	3
12/13/2022 14:30	41.7	2	N	355	7	12/13/2022	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/13/2022 15:00	41.8	0	NW	323	7	12/13/2022	(not specified)	3
12/13/2022 15:30	42.7	0	WNW	300	7	12/13/2022	(not specified)	3
12/13/2022 16:00	42.3	1	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 16:30	40.3	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 17:00	37.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 17:30	35.3	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 18:00	34.1	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 18:30	33.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 19:00	33.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 19:30	33.5	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 20:00	33.8	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 20:30	34.1	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 21:00	33.4	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 21:30	33.7	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 22:00	31.1	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 22:30	31.9	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 23:00	31.5	0	WSW	254	7	12/13/2022	(not specified)	3
12/13/2022 23:30	31.4	0	WSW	254	7	12/13/2022	(not specified)	3
9/28/2023 0:00	52.3	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 0:30	52.4	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 1:00	52.4	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 1:30	52.4	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 2:00	52.4	2	S	183	8	9/28/2023	(not specified)	5
9/28/2023 2:30	52.5	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 3:00	52.2	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 3:30	52.5	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 4:00	52.7	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 4:30	53.3	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 5:00	53.7	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 5:30	54	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 6:00	54.1	4	S	183	8	9/28/2023	(not specified)	5
9/28/2023 6:30	53.8	2	S	183	8	9/28/2023	(not specified)	5
9/28/2023 7:00	53.8	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 7:30	53.6	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 8:00	54.1	1	S	183	8	9/28/2023	(not specified)	5
9/28/2023 8:30	54.8	3	S	183	8	9/28/2023	(not specified)	5
9/28/2023 9:00	55.3	2	S	183	8	9/28/2023	(not specified)	5
9/28/2023 9:30	56.7	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 10:00	57.7	3	S	183	8	9/28/2023	(not specified)	5
9/28/2023 10:30	60.4	4	S	183	8	9/28/2023	(not specified)	5
9/28/2023 11:00	60.1	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 11:30	60.6	0	S	183	8	9/28/2023	(not specified)	5
9/28/2023 12:00	61.4	1	SSE	156	8	9/28/2023	(not specified)	5
9/28/2023 12:30	61.2	3	SSW	205	8	9/28/2023	(not specified)	5
9/28/2023 13:00	62.2	2	S	188	8	9/28/2023	(not specified)	5
9/28/2023 13:30	62.7	2	NNE	26	8	9/28/2023	(not specified)	5
9/28/2023 14:00	62.8	5	SSE	157	8	9/28/2023	(not specified)	5
9/28/2023 14:30	64.1	2	S	182	8	9/28/2023	(not specified)	5
9/28/2023 15:00	63.7	2	SSE	160	8	9/28/2023	(not specified)	5
9/28/2023 15:30	63.5	0	SSE	159	8	9/28/2023	(not specified)	5
9/28/2023 16:00	64.1	1	SSE	159	8	9/28/2023	(not specified)	5
9/28/2023 16:30	64.1	0	S	174	8	9/28/2023	(not specified)	5
9/28/2023 17:00	63.8	0	S	174	8	9/28/2023	(not specified)	5
9/28/2023 17:30	63.1	1	S	174	8	9/28/2023	(not specified)	5
9/28/2023 18:00	62.3	3	NNE	34	8	9/28/2023	(not specified)	5
9/28/2023 18:30	60.6	1	NNE	24	8	9/28/2023	(not specified)	5
9/28/2023 19:00	59.3	0	WNW	291	8	9/28/2023	(not specified)	5
9/28/2023 19:30	57.5	1	WNW	291	8	9/28/2023	(not specified)	5
9/28/2023 20:00	57.3	4	NNE	22	8	9/28/2023	(not specified)	5
9/28/2023 20:30	56.6	0	NNE	34	8	9/28/2023	(not specified)	5
9/28/2023 21:00	56.2	0	NNE	34	8	9/28/2023	(not specified)	5
9/28/2023 21:30	56	5	NNE	33	8	9/28/2023	(not specified)	5
9/28/2023 22:00	55.9	2	W	275	8	9/28/2023	(not specified)	5
9/28/2023 22:30	55.7	0	W	275	8	9/28/2023	(not specified)	5
9/28/2023 23:00	55.5	2	W	275	8	9/28/2023	(not specified)	5
9/28/2023 23:30	55.4	0	W	277	8	9/28/2023	(not specified)	5
11/21/2023 0:00	34.2	3	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 0:30	34.5	0	WSW	242	9	11/21/2023	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/21/2023 1:00	34.7	1	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 1:30	35	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 2:00	35.5	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 2:30	35.5	1	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 3:00	35.8	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 3:30	34.4	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 4:00	34.8	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 4:30	34.2	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 5:00	34.8	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 5:30	33.9	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 6:00	34.9	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 6:30	34.5	0	WSW	242	9	11/21/2023	(not specified)	3
11/21/2023 7:00	34.7	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 7:30	34.5	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 8:00	33.7	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 8:30	33.9	0	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 9:00	35.2	1	WSW	244	9	11/21/2023	(not specified)	3
11/21/2023 9:30	36.7	1	WSW	245	9	11/21/2023	(not specified)	3
11/21/2023 10:00	37.9	6	NNE	23	9	11/21/2023	(not specified)	3
11/21/2023 10:30	38.5	2	S	172	9	11/21/2023	(not specified)	3
11/21/2023 11:00	39.8	0	S	175	9	11/21/2023	(not specified)	3
11/21/2023 11:30	41.1	3	NNE	18	9	11/21/2023	(not specified)	3
11/21/2023 12:00	43.7	3	N	11	9	11/21/2023	(not specified)	3
11/21/2023 12:30	45.5	0	NNE	17	9	11/21/2023	(not specified)	3
11/21/2023 13:00	46.6	1	SSE	157	9	11/21/2023	(not specified)	3
11/21/2023 13:30	47.6	0	SSE	153	9	11/21/2023	(not specified)	3
11/21/2023 14:00	48.1	3	NNE	26	9	11/21/2023	(not specified)	3
11/21/2023 14:30	49.5	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 15:00	50.8	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 15:30	49.8	1	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 16:00	49.6	1	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 16:30	47.9	3	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 17:00	44.8	2	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 17:30	42.8	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 18:00	42.1	0	NNE	21	9	11/21/2023	(not specified)	3
11/21/2023 18:30	44.1	5	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 19:00	45	4	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 19:30	45.3	1	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 20:00	44.6	0	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 20:30	44.7	0	NNE	22	9	11/21/2023	(not specified)	3
11/21/2023 21:00	45.4	0	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 21:30	46.3	0	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 22:00	46.6	2	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 22:30	46.5	2	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 23:00	47.1	1	NNE	28	9	11/21/2023	(not specified)	3
11/21/2023 23:30	47.1	3	NNE	28	9	11/21/2023	(not specified)	3
11/29/2023 0:00	26.1	1	NNW	335				4
11/29/2023 0:30	25.3	0	NNW	335				4
11/29/2023 1:00	24	0	NNW	335				4
11/29/2023 1:30	26.3	0	NNW	335				4
11/29/2023 2:00	28.2	0	NNW	335				4
11/29/2023 2:30	27.6	0	NNW	335				4
11/29/2023 3:00	27	0	NNW	335				4
11/29/2023 3:30	27.4	0	NNW	334				4
11/29/2023 4:00	29	0	NNW	334				4
11/29/2023 4:30	29.1	0	NNW	334				4
11/29/2023 5:00	29.1	0	NNW	334				4
11/29/2023 5:30	29.8	0	NNW	334				4
11/29/2023 6:00	29.5	0	NNW	334				4
11/29/2023 6:30	29.6	0	NNW	334				4
11/29/2023 7:00	29.9	2	NNE	20				4
11/29/2023 7:30	30.1	2	NNE	20				4
11/29/2023 8:00	30.2	1	NNE	20				4
11/29/2023 8:30	30.6	2	NNE	19				4
11/29/2023 9:00	31	0	NNE	19				4
11/29/2023 9:30	31.7	0	NNE	19				4
11/29/2023 10:00	32.7	2	NNE	19				4
11/29/2023 10:30	33.2	2	NNE	20				4
11/29/2023 11:00	34.4	2	NNE	20				4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/29/2023 11:30	35.3	3	NNE	20				4
11/29/2023 12:00	36.7	4	NNE	22				4
11/29/2023 12:30	37.9	0	NNE	22	10	11/29/2023	12:40 PM	4
11/29/2023 13:00	39.2	0	NNE	18				4
11/29/2023 13:30	39.2	2	N	5				4
11/29/2023 14:00	39.3	3	N	5				4
11/29/2023 14:30	39.3	3	N	5				4
11/29/2023 15:00	39.6	0	N	5				4
11/29/2023 15:30	39.5	0	N	5				4
11/29/2023 16:00	39.3	0	N	5				4
11/29/2023 16:30	38.5	0	N	5				4
11/29/2023 17:00	37.4	0	N	5				4
11/29/2023 17:30	36.2	0	N	5				4
11/29/2023 18:00	35.7	0	N	5				4
11/29/2023 18:30	35.9	0	N	5				4
11/29/2023 19:00	35.5	0	N	5				4
11/29/2023 19:30	35.3	0	N	5				4
11/29/2023 20:00	35.6	0	N	5				4
11/29/2023 20:30	35.5	0	N	5				4
11/29/2023 21:00	35.1	0	N	5				4
11/29/2023 21:30	35.1	0	N	5				4
11/29/2023 22:00	34.6	0	N	5				4
11/29/2023 22:30	34.4	0	N	5				4
11/29/2023 23:00	33.9	0	N	5				4
11/29/2023 23:30	34.4	0	N	5				4
12/1/2023 0:00	41.6	3	S	190				6
12/1/2023 0:30	41.8	5	SW	215				6
12/1/2023 1:00	42.1	4	WSW	240				6
12/1/2023 1:30	42.2	7	S	171				6
12/1/2023 2:00	42.3	0	SSW	198				6
12/1/2023 2:30	42.3	2	S	181				6
12/1/2023 3:00	42.3	3	SW	223				6
12/1/2023 3:30	42.4	4	S	176				6
12/1/2023 4:00	42.3	2	S	175				6
12/1/2023 4:30	42.5	3	SSW	210				6
12/1/2023 5:00	42.7	8	SSW	212				6
12/1/2023 5:30	42.7	3	S	180				6
12/1/2023 6:00	43.3	3	SSW	200				6
12/1/2023 6:30	43.4	4	SSW	194				6
12/1/2023 7:00	43.3	7	S	173				6
12/1/2023 7:30	44.5	7	SSW	194				6
12/1/2023 8:00	46.7	5	S	173				6
12/1/2023 8:30	47.5	7	S	184				6
12/1/2023 9:00	47.4	10	SSW	202				6
12/1/2023 9:30	47.1	10	S	182				6
12/1/2023 10:00	47.6	11	SSE	165				6
12/1/2023 10:30	48.5	4	SSW	192				6
12/1/2023 11:00	48.3	8	S	170				6
12/1/2023 11:30	49	10	SSE	165				6
12/1/2023 12:00	50.6	7	S	177				6
12/1/2023 12:30	50.3	6	SSW	213				6
12/1/2023 13:00	51.3	6	S	182				6
12/1/2023 13:30	52	4	SW	225				6
12/1/2023 14:00	51.4	9	SE	138				6
12/1/2023 14:30	50.9	11	SSW	211				6
12/1/2023 15:00	50	5	SW	220				6
12/1/2023 15:30	49.6	6	S	180	11	12/1/2023	3:36 PM	6
12/1/2023 16:00	49	9	S	185				6
12/1/2023 16:30	48.8	5	S	190				6
12/1/2023 17:00	48.7	4	S	185				6
12/1/2023 17:30	48.1	0	SSW	204				6
12/1/2023 18:00	47.3	2	SW	219				6
12/1/2023 18:30	46.7	3	SW	215				6
12/1/2023 19:00	47.4	4	SSW	200				6
12/1/2023 19:30	46.7	4	SW	221				6
12/1/2023 20:00	46.1	6	SSE	166				6
12/1/2023 20:30	45.8	6	S	180				6
12/1/2023 21:00	45.6	7	SSW	199				6
12/1/2023 21:30	45.6	5	SSW	205				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/1/2023 22:00	45.8	6	SW	228				6
12/1/2023 22:30	46	6	SSE	167				6
12/1/2023 23:00	45.8	6	SSW	208				6
12/1/2023 23:30	46.3	6	SSW	203				6
12/12/2023 0:00	47.4	1	NE	55				3
12/12/2023 0:30	46.9	2	NNE	20				3
12/12/2023 1:00	46.6	0	ENE	68				3
12/12/2023 1:30	46.2	4	WSW	246				3
12/12/2023 2:00	45.8	0	SW	232				3
12/12/2023 2:30	45	0	SSE	166				3
12/12/2023 3:00	44.6	1	W	264				3
12/12/2023 3:30	44	3	W	262				3
12/12/2023 4:00	43.6	0	WSW	256				3
12/12/2023 4:30	43.2	6	W	273				3
12/12/2023 5:00	43.2	1	WSW	257				3
12/12/2023 5:30	42.7	1	W	270				3
12/12/2023 6:00	41.6	2	SSW	200				3
12/12/2023 6:30	41	0	SSW	200				3
12/12/2023 7:00	40.6	2	SSW	200				3
12/12/2023 7:30	41	0	SSW	200				3
12/12/2023 8:00	40.8	0	SSW	205				3
12/12/2023 8:30	40.6	2	SSW	205				3
12/12/2023 9:00	41.2	1	WSW	251				3
12/12/2023 9:30	41.9	2	W	261				3
12/12/2023 10:00	43.2	4	W	271				3
12/12/2023 10:30	45.1	3	W	274				3
12/12/2023 11:00	46.1	10	WSW	256				3
12/12/2023 11:30	47.1	8	W	266				3
12/12/2023 12:00	48	2	W	267				3
12/12/2023 12:30	49.3	2	NE	37				3
12/12/2023 13:00	49.7	2	WNW	299				3
12/12/2023 13:30	50	2	WNW	289	12	12/12/2023	1:35 PM	3
12/12/2023 14:00	50.9	5	WSW	256				3
12/12/2023 14:30	51.3	4	NW	275				3
12/12/2023 15:00	51.6	4	WSW	276				3
12/12/2023 15:30	51.6	2	W	261				3
12/12/2023 16:00	50.9	2	W	269				3
12/12/2023 16:30	47.9	3	W	266				3
12/12/2023 17:00	46.6	0	W	266				3
12/12/2023 17:30	45.1	1	W	266				3
12/12/2023 18:00	43.3	0	W	266				3
12/12/2023 18:30	44	0	W	266				3
12/12/2023 19:00	43.5	0	W	266				3
12/12/2023 19:30	42.8	0	W	266				3
12/12/2023 20:00	42.8	1	W	266				3
12/12/2023 20:30	42.5	0	W	266				3
12/12/2023 21:00	42.6	2	W	280				3
12/12/2023 21:30	40.8	2	W	281				3
12/12/2023 22:00	38.6	1	W	281				3
12/12/2023 22:30	36.8	0	W	281				3
12/12/2023 23:00	36.1	0	W	281				3
12/12/2023 23:30	35.5	0	W	281				3
12/14/2023 0:00	37.6	2	NNE	34	13	12/14/2023	(not specified)	5
12/14/2023 0:30	37.7	0	NE	42	13	12/14/2023	(not specified)	5
12/14/2023 1:00	37.6	0	NE	42	13	12/14/2023	(not specified)	5
12/14/2023 1:30	37.3	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 2:00	37.4	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 2:30	38	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 3:00	38.4	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 3:30	38.6	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 4:00	38.5	1	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 4:30	38.1	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 5:00	38.5	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 5:30	38.8	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 6:00	39.3	1	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 6:30	39.5	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 7:00	39.6	1	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 7:30	40.1	2	NE	47	13	12/14/2023	(not specified)	5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/14/2023 8:00	40.4	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 8:30	40.7	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 9:00	41.3	0	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 9:30	41.8	2	NE	47	13	12/14/2023	(not specified)	5
12/14/2023 10:00	42.5	0	ENE	59	13	12/14/2023	(not specified)	5
12/14/2023 10:30	43	1	E	85	13	12/14/2023	(not specified)	5
12/14/2023 11:00	43.5	0	NW	325	13	12/14/2023	(not specified)	5
12/14/2023 11:30	44	3	NW	325	13	12/14/2023	(not specified)	5
12/14/2023 12:00	44.5	1	NNW	327	13	12/14/2023	(not specified)	5
12/14/2023 12:30	45.5	0	NW	325	13	12/14/2023	(not specified)	5
12/14/2023 13:00	46.8	3	NW	313	13	12/14/2023	(not specified)	5
12/14/2023 13:30	46.6	1	WNW	284	13	12/14/2023	(not specified)	5
12/14/2023 14:00	47.2	1	WNW	284	13	12/14/2023	(not specified)	5
12/14/2023 14:30	47.5	1	WNW	287	13	12/14/2023	(not specified)	5
12/14/2023 15:00	47.5	1	WNW	287	13	12/14/2023	(not specified)	5
12/14/2023 15:30	47.6	0	WNW	288	13	12/14/2023	(not specified)	5
12/14/2023 16:00	47.6	0	WNW	288	13	12/14/2023	(not specified)	5
12/14/2023 16:30	47.3	1	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 17:00	47	1	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 17:30	46.8	0	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 18:00	45.3	0	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 18:30	44.2	0	WNW	286	13	12/14/2023	(not specified)	5
12/14/2023 19:00	42.5	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 19:30	42.3	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 20:00	42.2	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 20:30	41.4	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 21:00	40.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 21:30	39.8	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 22:00	38.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 22:30	38.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 23:00	37.7	0	WNW	285	13	12/14/2023	(not specified)	5
12/14/2023 23:30	37.2	0	WNW	285	13	12/14/2023	(not specified)	5
12/15/2023 0:00	37.8	0	WNW	285				6
12/15/2023 0:30	36.5	0	WNW	285				6
12/15/2023 1:00	35.9	0	WNW	285				6
12/15/2023 1:30	36.6	0	WNW	285				6
12/15/2023 2:00	37.1	0	WNW	285				6
12/15/2023 2:30	37.4	0	WNW	285				6
12/15/2023 3:00	37.5	0	WNW	285				6
12/15/2023 3:30	37.5	0	WNW	285				6
12/15/2023 4:00	37.6	0	WNW	285				6
12/15/2023 4:30	37.6	0	WNW	285				6
12/15/2023 5:00	37.4	0	WNW	285				6
12/15/2023 5:30	36.8	0	WNW	285				6
12/15/2023 6:00	36.1	0	WNW	285				6
12/15/2023 6:30	34.9	0	WNW	285				6
12/15/2023 7:00	34.5	2	WNW	286				6
12/15/2023 7:30	33.6	2	WNW	286				6
12/15/2023 8:00	33.4	0	WNW	286				6
12/15/2023 8:30	32.9	0	WNW	286				6
12/15/2023 9:00	33.7	2	WNW	286				6
12/15/2023 9:30	34.7	0	WNW	286				6
12/15/2023 10:00	36.4	2	WNW	286				6
12/15/2023 10:30	37.5	3	WNW	287				6
12/15/2023 11:00	37.6	1	WNW	287				6
12/15/2023 11:30	40.7	3	WNW	293				6
12/15/2023 12:00	42.2	1	WNW	293	14	12/15/2023	12:00 PM	6
12/15/2023 12:30	43.5	1	WNW	294				6
12/15/2023 13:00	45.2	1	NW	311				6
12/15/2023 13:30	46	2	W	268				6
12/15/2023 14:00	47	0	NE	55				6
12/15/2023 14:30	47.6	0	SSE	161				6
12/15/2023 15:00	48.3	3	WSW	253				6
12/15/2023 15:30	48.2	3	W	262				6
12/15/2023 16:00	46.6	0	W	262				6
12/15/2023 16:30	44.2	0	W	262				6
12/15/2023 17:00	41.2	0	W	262				6
12/15/2023 17:30	39.1	0	W	262				6
12/15/2023 18:00	38.2	1	W	262				6
12/15/2023 18:30	37.7	0	W	261				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/15/2023 19:00	37.1	0	W	262				6
12/15/2023 19:30	35.5	0	W	262				6
12/15/2023 20:00	35	0	W	262				6
12/15/2023 20:30	34.1	0	W	262				6
12/15/2023 21:00	33.2	0	W	262				6
12/15/2023 21:30	33	0	W	262				6
12/15/2023 22:00	32.1	0	W	261				6
12/15/2023 22:30	31.7	0	W	262				6
12/15/2023 23:00	32.9	1	W	262				6
12/15/2023 23:30	32.1	0	W	262				6
12/16/2023 0:00	31.7	0	W	262				7
12/16/2023 0:30	31.3	2	W	262				7
12/16/2023 1:00	32.3	0	W	262				7
12/16/2023 1:30	32.7	0	W	262				7
12/16/2023 2:00	31.1	3	NNE	30				7
12/16/2023 2:30	30.7	4	NNE	30				7
12/16/2023 3:00	30.8	0	NNE	30				7
12/16/2023 3:30	31	2	NNE	30				7
12/16/2023 4:00	30.5	0	NNE	30				7
12/16/2023 4:30	29.1	0	NNE	34				7
12/16/2023 5:00	29	0	NNE	34				7
12/16/2023 5:30	29.4	0	NNE	34				7
12/16/2023 6:00	30.4	0	NNE	34				7
12/16/2023 6:30	30.1	0	NNE	34				7
12/16/2023 7:00	30	0	NE	36				7
12/16/2023 7:30	29.6	0	E	94				7
12/16/2023 8:00	29.6	0	E	94				7
12/16/2023 8:30	30.3	0	E	94				7
12/16/2023 9:00	31	0	E	94				7
12/16/2023 9:30	31.1	1	SSE	166				7
12/16/2023 10:00	31.5	0	S	175				7
12/16/2023 10:30	32.6	0	S	175				7
12/16/2023 11:00	34.7	3	S	172				7
12/16/2023 11:30	35.9	4	SSE	169				7
12/16/2023 12:00	36.9	5	SSE	169				7
12/16/2023 12:30	38	4	NNE	24				7
12/16/2023 13:00	38.6	3	NNE	26				7
12/16/2023 13:30	39.8	4	NNE	19				7
12/16/2023 14:00	39.4	4	NNE	24	15	12/16/2023	2:00 PM	7
12/16/2023 14:30	39.3	4	NNE	20				7
12/16/2023 15:00	38.7	2	NNE	24				7
12/16/2023 15:30	38.6	2	NNE	24				7
12/16/2023 16:00	38.4	0	NNE	24				7
12/16/2023 16:30	37.7	0	NNE	24				7
12/16/2023 17:00	36.7	1	NNE	25				7
12/16/2023 17:30	36.4	0	NNE	25				7
12/16/2023 18:00	35.8	1	NNE	25				7
12/16/2023 18:30	35.2	0	NNE	25				7
12/16/2023 19:00	34.4	0	NNE	25				7
12/16/2023 19:30	34	0	NNE	31				7
12/16/2023 20:00	34.3	1	NNE	31				7
12/16/2023 20:30	33.9	0	NNE	30				7
12/16/2023 21:00	33.9	0	NNE	30				7
12/16/2023 21:30	33.7	1	NNE	30				7
12/16/2023 22:00	33.2	0	NNE	32				7
12/16/2023 22:30	32.9	1	NNE	32				7
12/16/2023 23:00	32.3	0	NNE	32				7
12/16/2023 23:30	31.7	1	ESE	105				7
12/25/2023 0:00	41.9	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 0:30	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 1:00	41.8	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 1:30	41.7	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 2:00	41.7	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 2:30	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 3:00	42.5	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 3:30	42.8	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 4:00	42.6	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 4:30	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 5:00	42	0	SW	234	16	12/25/2023	(not specified)	2

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/25/2023 5:30	41.9	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 6:00	42	0	SW	234	16	12/25/2023	(not specified)	2
12/25/2023 6:30	42	4	NE	36	16	12/25/2023	(not specified)	2
12/25/2023 7:00	42.2	4	NNE	34	16	12/25/2023	(not specified)	2
12/25/2023 7:30	42.3	3	NNE	33	16	12/25/2023	(not specified)	2
12/25/2023 8:00	42.7	3	NNE	32	16	12/25/2023	(not specified)	2
12/25/2023 8:30	43.1	2	NNE	30	16	12/25/2023	(not specified)	2
12/25/2023 9:00	43.7	0	NNE	29	16	12/25/2023	(not specified)	2
12/25/2023 9:30	44	0	NNE	30	16	12/25/2023	(not specified)	2
12/25/2023 10:00	44.7	0	NNE	24	16	12/25/2023	(not specified)	2
12/25/2023 10:30	44.1	0	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 11:00	44.8	0	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 11:30	44.6	0	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 12:00	44.6	1	NNE	25	16	12/25/2023	(not specified)	2
12/25/2023 12:30	44.6	1	NW	323	16	12/25/2023	(not specified)	2
12/25/2023 13:00	44.6	1	NW	323	16	12/25/2023	(not specified)	2
12/25/2023 13:30	45.2	3	NW	325	16	12/25/2023	(not specified)	2
12/25/2023 14:00	45.2	0	NNE	22	16	12/25/2023	(not specified)	2
12/25/2023 14:30	45.5	0	NNE	22	16	12/25/2023	(not specified)	2
12/25/2023 15:00	45.4	0	NNE	22	16	12/25/2023	(not specified)	2
12/25/2023 15:30	45.3	1	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 16:00	45.1	0	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 16:30	45.2	0	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 17:00	45.2	3	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 17:30	45	1	WSW	252	16	12/25/2023	(not specified)	2
12/25/2023 18:00	45	3	NNE	32	16	12/25/2023	(not specified)	2
12/25/2023 18:30	44.8	2	NNE	27	16	12/25/2023	(not specified)	2
12/25/2023 19:00	45.3	2	NNE	27	16	12/25/2023	(not specified)	2
12/25/2023 19:30	47.1	3	NNE	32	16	12/25/2023	(not specified)	2
12/25/2023 20:00	48.8	4	SSW	194	16	12/25/2023	(not specified)	2
12/25/2023 20:30	50.7	5	S	190	16	12/25/2023	(not specified)	2
12/25/2023 21:00	50.8	9	SSW	192	16	12/25/2023	(not specified)	2
12/25/2023 21:30	51.1	4	SW	217	16	12/25/2023	(not specified)	2
12/25/2023 22:00	51.5	6	SSE	169	16	12/25/2023	(not specified)	2
12/25/2023 22:30	51.9	6	WSW	239	16	12/25/2023	(not specified)	2
12/25/2023 23:00	52	4	SW	236	16	12/25/2023	(not specified)	2
12/25/2023 23:30	52.1	5	SSW	192	16	12/25/2023	(not specified)	2
1/12/2024 0:00	42.1	7	S	188				6
1/12/2024 0:30	42.4	6	S	187				6
1/12/2024 1:00	41.6	5	S	188				6
1/12/2024 1:30	41.7	2	S	182				6
1/12/2024 2:00	41.7	4	S	184				6
1/12/2024 2:30	42.4	4	S	183				6
1/12/2024 3:00	42.2	3	SSW	192				6
1/12/2024 3:30	42.2	7	S	173				6
1/12/2024 4:00	42.4	3	S	182				6
1/12/2024 4:30	42.2	2	S	188				6
1/12/2024 5:00	42.5	12	S	189				6
1/12/2024 5:30	42.5	6	SSW	201				6
1/12/2024 6:00	42	3	S	190				6
1/12/2024 6:30	41.7	4	SSE	167				6
1/12/2024 7:00	41.6	3	SSE	167				6
1/12/2024 7:30	41.5	1	SSE	167				6
1/12/2024 8:00	41.3	4	SSE	167				6
1/12/2024 8:30	41.2	1	SSE	167				6
1/12/2024 9:00	41.3	1	SSE	167				6
1/12/2024 9:30	41.5	3	SSE	167				6
1/12/2024 10:00	41.9	4	S	184				6
1/12/2024 10:30	42.5	4	S	184				6
1/12/2024 11:00	43.3	3	S	178				6
1/12/2024 11:30	43.5	5	S	171				6
1/12/2024 12:00	41.1	6	NNE	22	17	1/12/2024	12:15 PM	6
1/12/2024 12:30	40.4	4	N	11				6
1/12/2024 13:00	40.4	2	NNE	27				6
1/12/2024 13:30	40.6	3	NE	39				6
1/12/2024 14:00	40.7	3	NNE	32				6
1/12/2024 14:30	40.5	2	NNE	32				6
1/12/2024 15:00	40.6	3	NNE	29				6
1/12/2024 15:30	40.2	0	NNE	26				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/12/2024 16:00	39.8	1	NNE	24				6
1/12/2024 16:30	39.7	1	NNE	24				6
1/12/2024 17:00	39.3	2	NNE	24				6
1/12/2024 17:30	39	4	NNE	23				6
1/12/2024 18:00	37.9	9	NNE	26				6
1/12/2024 18:30	35.8	5	NNE	28				6
1/12/2024 19:00	33.6	4	W	279				6
1/12/2024 19:30	32.3	4	WSW	258				6
1/12/2024 20:00	31.6	1	WNW	288				6
1/12/2024 20:30	31.3	2	W	271				6
1/12/2024 21:00	30.8	1	WSW	255				6
1/12/2024 21:30	30.3	3	SSW	208				6
1/12/2024 22:00	30	10	WSW	251				6
1/12/2024 22:30	29.4	1	NE	55				6
1/12/2024 23:00	28.1	0	SSW	209				6
1/12/2024 23:30	27	0	NNE	14				6
1/18/2024 0:00	44.2	0	SW	224				5
1/18/2024 0:30	44.7	2	SW	224				5
1/18/2024 1:00	42.7	4	SW	224				5
1/18/2024 1:30	40.8	3	SW	225				5
1/18/2024 2:00	43.1	1	SW	225				5
1/18/2024 2:30	44.2	2	SW	224				5
1/18/2024 3:00	45.4	3	SW	217				5
1/18/2024 3:30	45.5	6	SSW	208				5
1/18/2024 4:00	45.4	1	S	186				5
1/18/2024 4:30	45.7	2	S	190				5
1/18/2024 5:00	46.1	0	S	175				5
1/18/2024 5:30	43.7	6	NNE	31				5
1/18/2024 6:00	42.2	5	NNE	28				5
1/18/2024 6:30	41.5	3	NE	36				5
1/18/2024 7:00	41.1	0	NNE	34				5
1/18/2024 7:30	42.2	3	NNE	28				5
1/18/2024 8:00	42.1	3	NE	35				5
1/18/2024 8:30	41.7	2	NE	36				5
1/18/2024 9:00	42.5	3	NE	35				5
1/18/2024 9:30	43	3	NE	35				5
1/18/2024 10:00	43.4	1	NE	36				5
1/18/2024 10:30	42.3	3	NE	36				5
1/18/2024 11:00	42.5	0	NE	36				5
1/18/2024 11:30	42.5	0	NE	36				5
1/18/2024 12:00	42.4	0	NE	36	18 & 19	1/18/2024	12:00 PM	5
1/18/2024 12:30	42.7	3	WNW	298				5
1/18/2024 13:00	39.8	8	NW	325				5
1/18/2024 13:30	39.2	2	NNW	340	20	1/18/2024	1:30 PM	5
1/18/2024 14:00	38.9	2	NW	311				5
1/18/2024 14:30	38.3	8	NW	322				5
1/18/2024 15:00	38.3	1	WNW	292				5
1/18/2024 15:30	37.5	3	SW	236	21	1/18/2024	3:30 PM	5
1/18/2024 16:00	37.4	6	NW	316	22	1/18/2024	4:00 PM	5
1/18/2024 16:30	36.5	9	NW	305				5
1/18/2024 17:00	36.5	5	SW	231				5
1/18/2024 17:30	36	2	W	271				5
1/18/2024 18:00	35.4	3	WSW	238				5
1/18/2024 18:30	34.8	0	WSW	248				5
1/18/2024 19:00	34.5	2	WSW	257				5
1/18/2024 19:30	34.5	0	SW	225				5
1/18/2024 20:00	34.4	2	WSW	242				5
1/18/2024 20:30	34.2	0	W	265				5
1/18/2024 21:00	34.2	3	NNW	331				5
1/18/2024 21:30	34	0	W	275				5
1/18/2024 22:00	33.9	0	WNW	288				5
1/18/2024 22:30	34.1	1	WNW	301				5
1/18/2024 23:00	34.1	3	WNW	296				5
1/18/2024 23:30	34	3	WNW	295				5
1/19/2024 0:00	33.9	2	WNW	290				6
1/19/2024 0:30	33.7	3	WNW	290				6
1/19/2024 1:00	33.6	0	WNW	290				6
1/19/2024 1:30	33.5	2	W	276				6
1/19/2024 2:00	33.5	1	W	270				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
1/19/2024 2:30	33.6	0	WSW	259				6
1/19/2024 3:00	33.5	1	WSW	259				6
1/19/2024 3:30	33.6	1	W	264				6
1/19/2024 4:00	33.7	0	SW	232				6
1/19/2024 4:30	33.6	3	SW	232				6
1/19/2024 5:00	33.7	0	SW	228				6
1/19/2024 5:30	33.6	0	SW	228				6
1/19/2024 6:00	33.7	0	SW	229				6
1/19/2024 6:30	33.7	0	SW	229				6
1/19/2024 7:00	33.7	0	SW	229				6
1/19/2024 7:30	33.8	0	SW	229				6
1/19/2024 8:00	33.7	2	SW	229	23	1/19/2024	8:00 AM	6
1/19/2024 8:30	33.8	0	SW	229				6
1/19/2024 9:00	34.4	3	WNW	300				6
1/19/2024 9:30	35	1	WNW	288				6
1/19/2024 10:00	35.6	2	SW	227				6
1/19/2024 10:30	36.4	4	WSW	255				6
1/19/2024 11:00	36.8	3	W	277				6
1/19/2024 11:30	37	0	WSW	249				6
1/19/2024 12:00	37.3	5	WSW	255				6
1/19/2024 12:30	37.7	0	SW	215				6
1/19/2024 13:00	39.6	3	NW	312				6
1/19/2024 13:30	38.2	7	WSW	252				6
1/19/2024 14:00	37.9	3	WSW	263				6
1/19/2024 14:30	38.1	4	WSW	250				6
1/19/2024 15:00	38.6	10	W	264				6
1/19/2024 15:30	38.1	2	W	271				6
1/19/2024 16:00	37.8	8	WSW	246				6
1/19/2024 16:30	37.6	4	WSW	237				6
1/19/2024 17:00	37.2	3	WNW	292				6
1/19/2024 17:30	37.1	2	WSW	255				6
1/19/2024 18:00	37	4	SW	231				6
1/19/2024 18:30	37.1	2	SW	236				6
1/19/2024 19:00	36.9	2	SW	229				6
1/19/2024 19:30	36.9	2	SW	219				6
1/19/2024 20:00	37	4	SW	229				6
1/19/2024 20:30	36.7	0	SW	235				6
1/19/2024 21:00	36.3	2	SW	229				6
1/19/2024 21:30	35.7	5	SSW	213				6
1/19/2024 22:00	35.7	0	SSW	213				6
1/19/2024 22:30	35.8	0	SSW	213				6
1/19/2024 23:00	35.8	2	WSW	238				6
1/19/2024 23:30	35.8	1	WSW	238				6
2/3/2024 0:00	36.9	0	SSE	168	28	2/3/2024	(not specified)	7
2/3/2024 0:30	36.3	1	NNE	28	28	2/3/2024	(not specified)	7
2/3/2024 1:00	37.8	4	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 1:30	37.8	2	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 2:00	38.3	0	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 2:30	38.3	1	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 3:00	37.6	0	NNE	30	28	2/3/2024	(not specified)	7
2/3/2024 3:30	39.5	1	S	189	28	2/3/2024	(not specified)	7
2/3/2024 4:00	39	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 4:30	38.3	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 5:00	36.6	2	S	180	28	2/3/2024	(not specified)	7
2/3/2024 5:30	35.3	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 6:00	35.1	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 6:30	35.6	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 7:00	34	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 7:30	32.7	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 8:00	33.5	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 8:30	34	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 9:00	35.3	2	S	180	24	2/3/2024	9:00 AM	7
2/3/2024 9:30	36.3	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 10:00	37.9	0	S	180	25	2/3/2024	10:00 AM	7
2/3/2024 10:30	41.9	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 11:00	45.7	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 11:30	48	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 12:00	48.9	0	S	180	28	2/3/2024	(not specified)	7
2/3/2024 12:30	50.3	0	NNE	22	28	2/3/2024	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/3/2024 13:00	51.3	2	NNE	21	26	2/3/2024	1:00 PM	7
2/3/2024 13:30	52.5	1	N	360	28	2/3/2024	(not specified)	7
2/3/2024 14:00	52.7	4	NNE	15	28	2/3/2024	(not specified)	7
2/3/2024 14:30	52.8	1	NNE	33	28	2/3/2024	(not specified)	7
2/3/2024 15:00	53.6	0	NNE	19	27	2/3/2024	3:00 PM	7
2/3/2024 15:30	54.7	0	NNE	19	28	2/3/2024	(not specified)	7
2/3/2024 16:00	53.4	3	ENE	66	28	2/3/2024	(not specified)	7
2/3/2024 16:30	52	1	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 17:00	50.6	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 17:30	46.3	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 18:00	43.2	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 18:30	40.9	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 19:00	38.7	0	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 19:30	37.4	1	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 20:00	36.2	2	NNE	25	28	2/3/2024	(not specified)	7
2/3/2024 20:30	36.8	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 21:00	35.5	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 21:30	35.4	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 22:00	35.1	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 22:30	33.4	3	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 23:00	33.2	0	NNE	26	28	2/3/2024	(not specified)	7
2/3/2024 23:30	32.8	1	NNE	26	28	2/3/2024	(not specified)	7
2/8/2024 0:00	39.9	0	WSW	246				5
2/8/2024 0:30	39.8	0	WSW	246				5
2/8/2024 1:00	39.9	0	WSW	246				5
2/8/2024 1:30	39.6	0	WSW	246				5
2/8/2024 2:00	39.6	0	WSW	246				5
2/8/2024 2:30	39.8	0	WSW	246				5
2/8/2024 3:00	39.7	0	WSW	246				5
2/8/2024 3:30	39.4	0	WSW	246				5
2/8/2024 4:00	39.5	0	WSW	246				5
2/8/2024 4:30	40	0	WSW	246				5
2/8/2024 5:00	40.1	0	WSW	246				5
2/8/2024 5:30	39.8	0	WSW	246				5
2/8/2024 6:00	39.8	0	WSW	246				5
2/8/2024 6:30	39.7	0	WSW	246				5
2/8/2024 7:00	39.2	0	WSW	246				5
2/8/2024 7:30	38.7	0	WSW	246				5
2/8/2024 8:00	39.1	0	WSW	246				5
2/8/2024 8:30	39.7	0	WSW	246				5
2/8/2024 9:00	41.1	0	WSW	246				5
2/8/2024 9:30	42.2	0	WSW	246				5
2/8/2024 10:00	43.1	0	WSW	246				5
2/8/2024 10:30	45.2	0	WSW	246				5
2/8/2024 11:00	46.8	0	WSW	246				5
2/8/2024 11:30	48.4	0	WSW	246				5
2/8/2024 12:00	49.2	1	WSW	246				5
2/8/2024 12:30	47.1	5	NNE	20				5
2/8/2024 13:00	48.2	1	NNE	24	29	2/8/2024	12:46 PM	5
2/8/2024 13:30	49.7	2	NE	40				5
2/8/2024 14:00	50.6	4	NNW	344				5
2/8/2024 14:30	51	6	WSW	258				5
2/8/2024 15:00	50.9	8	SSW	213				5
2/8/2024 15:30	49.5	4	WSW	237				5
2/8/2024 16:00	48.3	1	WSW	237				5
2/8/2024 16:30	47.7	6	SSW	192				5
2/8/2024 17:00	46.7	2	WSW	240				5
2/8/2024 17:30	45.7	2	SSW	205				5
2/8/2024 18:00	44.6	1	S	186				5
2/8/2024 18:30	44.1	0	S	180				5
2/8/2024 19:00	43.5	0	S	180				5
2/8/2024 19:30	42.3	0	S	180				5
2/8/2024 20:00	42.2	0	S	180				5
2/8/2024 20:30	40.3	0	S	180				5
2/8/2024 21:00	39.2	0	S	180				5
2/8/2024 21:30	37.6	0	S	180				5
2/8/2024 22:00	37.2	0	S	180				5
2/8/2024 22:30	36.6	0	S	180				5
2/8/2024 23:00	36.9	0	S	180				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/8/2024 23:30	37.7	0	S	180				5
2/10/2024 0:00	41.7	0	S	178				7
2/10/2024 0:30	41.5	0	S	178				7
2/10/2024 1:00	41.1	0	S	178				7
2/10/2024 1:30	40.7	0	S	178				7
2/10/2024 2:00	41.4	0	S	178				7
2/10/2024 2:30	41.3	0	S	178				7
2/10/2024 3:00	40.2	0	S	178				7
2/10/2024 3:30	40.1	0	S	178				7
2/10/2024 4:00	40.4	0	S	178				7
2/10/2024 4:30	40.7	0	S	178				7
2/10/2024 5:00	40.8	0	S	178				7
2/10/2024 5:30	40.9	0	S	178				7
2/10/2024 6:00	40.8	0	S	178				7
2/10/2024 6:30	40.8	0	S	178				7
2/10/2024 7:00	40.7	0	S	178				7
2/10/2024 7:30	40.7	0	S	178	30	2/10/2024	7:30 AM	7
2/10/2024 8:00	40.7	0	S	178				7
2/10/2024 8:30	39.9	0	S	178	31	2/10/2024	8:30 AM	7
2/10/2024 9:00	40.5	0	S	178				7
2/10/2024 9:30	41.5	0	S	178	32	2/10/2024	9:29 AM	7
2/10/2024 10:00	41.7	0	S	178				7
2/10/2024 10:30	46.1	0	S	178				7
2/10/2024 11:00	48	1	NNE	22				7
2/10/2024 11:30	48.3	0	NE	40				7
2/10/2024 12:00	48.8	0	NE	39				7
2/10/2024 12:30	50.7	0	S	180				7
2/10/2024 13:00	52.1	0	SW	220				7
2/10/2024 13:30	51.5	0	NNE	19				7
2/10/2024 14:00	52.8	0	S	173				7
2/10/2024 14:30	51.3	0	S	190				7
2/10/2024 15:00	52.4	0	S	190				7
2/10/2024 15:30	54.4	0	S	190				7
2/10/2024 16:00	53.8	0	N	9				7
2/10/2024 16:30	52.9	1	N	11				7
2/10/2024 17:00	51.6	0	N	11				7
2/10/2024 17:30	48.6	0	N	11				7
2/10/2024 18:00	46	0	N	11				7
2/10/2024 18:30	45	0	N	11				7
2/10/2024 19:00	44.2	0	N	11				7
2/10/2024 19:30	43.3	0	N	11				7
2/10/2024 20:00	42.6	0	N	11				7
2/10/2024 20:30	42.5	0	N	11				7
2/10/2024 21:00	41.9	0	N	11				7
2/10/2024 21:30	41.7	0	N	11				7
2/10/2024 22:00	42.2	0	N	11				7
2/10/2024 22:30	42	0	N	11				7
2/10/2024 23:00	41.6	0	N	11				7
2/10/2024 23:30	41.3	0	N	11				7
2/13/2024 0:00	32.9	0	SW	217	33	2/13/2024	(not specified)	3
2/13/2024 0:30	33.3	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 1:00	32.7	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 1:30	33.4	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 2:00	34	0	SE	126	33	2/13/2024	(not specified)	3
2/13/2024 2:30	34.8	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 3:00	34.8	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 3:30	34.4	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 4:00	34.6	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 4:30	35.1	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 5:00	35.8	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 5:30	36.4	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 6:00	37.2	0	SE	128	33	2/13/2024	(not specified)	3
2/13/2024 6:30	38.2	0	ENE	64	33	2/13/2024	(not specified)	3
2/13/2024 7:00	39.1	0	ENE	64	33	2/13/2024	(not specified)	3
2/13/2024 7:30	38.9	3	NE	40	33	2/13/2024	(not specified)	3
2/13/2024 8:00	38.7	1	NE	36	33	2/13/2024	(not specified)	3
2/13/2024 8:30	38.9	0	NNE	30	33	2/13/2024	(not specified)	3
2/13/2024 9:00	38.6	4	NNE	24	33	2/13/2024	(not specified)	3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/13/2024 9:30	37.9	1	NNE	26	33	2/13/2024	(not specified)	3
2/13/2024 10:00	37.7	2	NNE	22	33	2/13/2024	(not specified)	3
2/13/2024 10:30	38.4	0	NNE	22	33	2/13/2024	(not specified)	3
2/13/2024 11:00	38.7	0	NNE	21	33	2/13/2024	(not specified)	3
2/13/2024 11:30	39.6	0	SSE	157	33	2/13/2024	(not specified)	3
2/13/2024 12:00	40.3	0	NNE	25	33	2/13/2024	(not specified)	3
2/13/2024 12:30	41.2	0	NNE	23	33	2/13/2024	(not specified)	3
2/13/2024 13:00	42.5	0	NNE	21	33	2/13/2024	(not specified)	3
2/13/2024 13:30	44.3	4	SSE	161	33	2/13/2024	(not specified)	3
2/13/2024 14:00	44.5	6	N	9	33	2/13/2024	(not specified)	3
2/13/2024 14:30	43.4	1	NNE	18	33	2/13/2024	(not specified)	3
2/13/2024 15:00	42.7	3	NNE	18	33	2/13/2024	(not specified)	3
2/13/2024 15:30	42.2	4	NNE	19	33	2/13/2024	(not specified)	3
2/13/2024 16:00	41.7	5	NNE	31	33	2/13/2024	(not specified)	3
2/13/2024 16:30	41.6	1	NNE	24	33	2/13/2024	(not specified)	3
2/13/2024 17:00	41.5	3	NNE	28	33	2/13/2024	(not specified)	3
2/13/2024 17:30	41.2	0	NNE	28	33	2/13/2024	(not specified)	3
2/13/2024 18:00	40.6	4	NNE	24	33	2/13/2024	(not specified)	3
2/13/2024 18:30	40.1	0	NNE	27	33	2/13/2024	(not specified)	3
2/13/2024 19:00	40.1	0	NNE	27	33	2/13/2024	(not specified)	3
2/13/2024 19:30	40	0	NNE	27	33	2/13/2024	(not specified)	3
2/13/2024 20:00	39.8	0	NNE	26	33	2/13/2024	(not specified)	3
2/13/2024 20:30	39.6	0	SE	125	33	2/13/2024	(not specified)	3
2/13/2024 21:00	39.3	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 21:30	39.4	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 22:00	39.1	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 22:30	38.6	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 23:00	38.4	0	SSE	165	33	2/13/2024	(not specified)	3
2/13/2024 23:30	38	0	N	9	33	2/13/2024	(not specified)	3
2/14/2024 0:00	37.6	0	NNE	21				4
2/14/2024 0:30	37.4	0	NNE	22				4
2/14/2024 1:00	37.3	0	NNE	22				4
2/14/2024 1:30	37	2	NNE	25				4
2/14/2024 2:00	36.6	0	NNE	26				4
2/14/2024 2:30	36.6	0	NNE	26				4
2/14/2024 3:00	36.5	0	NNE	26				4
2/14/2024 3:30	36.1	2	NNE	27				4
2/14/2024 4:00	36	0	NNE	27				4
2/14/2024 4:30	36.1	0	NNE	27				4
2/14/2024 5:00	36	2	NNE	27				4
2/14/2024 5:30	35.7	1	NNE	30				4
2/14/2024 6:00	35.9	0	SW	228				4
2/14/2024 6:30	35.8	4	SW	231				4
2/14/2024 7:00	35.3	0	S	173				4
2/14/2024 7:30	35.4	0	SSE	157				4
2/14/2024 8:00	35.6	0	SSE	157				4
2/14/2024 8:30	35.9	0	NNE	25	34	2/14/2024	8:30 AM	4
2/14/2024 9:00	36.2	0	NNE	25				4
2/14/2024 9:30	36.4	0	NNE	24				4
2/14/2024 10:00	36.5	0	SSE	162				4
2/14/2024 10:30	36.5	0	SSE	161				4
2/14/2024 11:00	36.6	0	NNE	33	35	2/14/2024	11:00 AM	4
2/14/2024 11:30	36.6	0	NNE	28				4
2/14/2024 12:00	36.7	0	NNE	20				4
2/14/2024 12:30	37.1	0	NNE	22				4
2/14/2024 13:00	37.7	0	N	11				4
2/14/2024 13:30	37.9	0	WNW	300				4
2/14/2024 14:00	38.6	2	NW	313				4
2/14/2024 14:30	38.8	0	NW	306				4
2/14/2024 15:00	39	1	W	271				4
2/14/2024 15:30	39.1	0	W	281				4
2/14/2024 16:00	39.3	0	W	281				4
2/14/2024 16:30	39.3	0	W	281				4
2/14/2024 17:00	39.2	0	W	281				4
2/14/2024 17:30	39.2	0	SW	232				4
2/14/2024 18:00	39.2	0	SW	232				4
2/14/2024 18:30	39.2	0	SW	232				4
2/14/2024 19:00	39.3	1	WSW	252				4
2/14/2024 19:30	39.6	0	NNE	30				4
2/14/2024 20:00	41.9	0	S	170				4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/14/2024 20:30	44.2	2	S	170				4
2/14/2024 21:00	44.9	1	SSW	192				4
2/14/2024 21:30	44.9	6	S	185				4
2/14/2024 22:00	45	3	S	177				4
2/14/2024 22:30	45.1	6	SSW	213				4
2/14/2024 23:00	45.1	6	SSW	213				4
2/14/2024 23:30	44.9	10	SSW	211				4
2/15/2024 0:00	45.1	9	SE	136				5
2/15/2024 0:30	45.2	7	SE	126				5
2/15/2024 1:00	45	9	SSE	159				5
2/15/2024 1:30	45.1	7	SE	138				5
2/15/2024 2:00	44.9	8	SE	142				5
2/15/2024 2:30	44.8	11	ESE	105				5
2/15/2024 3:00	44.8	7	S	172				5
2/15/2024 3:30	44.7	5	SSW	214				5
2/15/2024 4:00	44.8	3	SSW	193				5
2/15/2024 4:30	44.9	0	SSE	162				5
2/15/2024 5:00	44.9	1	SSE	159				5
2/15/2024 5:30	44.8	1	SSE	157				5
2/15/2024 6:00	44.6	1	SSE	157				5
2/15/2024 6:30	44	2	SSE	157				5
2/15/2024 7:00	43.8	0	SSE	157				5
2/15/2024 7:30	43.7	0	SSE	157				5
2/15/2024 8:00	43.4	0	SSE	157				5
2/15/2024 8:30	44	2	SSE	157				5
2/15/2024 9:00	44.3	0	SSE	157				5
2/15/2024 9:30	45.3	1	SSE	157				5
2/15/2024 10:00	46	1	SSE	158				5
2/15/2024 10:30	46.7	1	SSE	158				5
2/15/2024 11:00	48	2	SSE	158				5
2/15/2024 11:30	48.5	3	SSE	158				5
2/15/2024 12:00	48.6	2	SSE	159				5
2/15/2024 12:30	48.3	0	SSE	159				5
2/15/2024 13:00	47.9	0	SSE	159				5
2/15/2024 13:30	47.9	0	SSE	159				5
2/15/2024 14:00	47.6	1	SSE	159				5
2/15/2024 14:30	47.3	0	SSE	159				5
2/15/2024 15:00	47.6	1	SSE	159				5
2/15/2024 15:30	47.2	2	SSE	159				5
2/15/2024 16:00	46.7	0	NNE	30				5
2/15/2024 16:30	46.4	2	NNE	29				5
2/15/2024 17:00	46.3	0	NNE	29				5
2/15/2024 17:30	46.1	0	NNE	29				5
2/15/2024 18:00	46	0	NNE	29				5
2/15/2024 18:30	46	0	NNE	29				5
2/15/2024 19:00	45.8	0	NNE	29				5
2/15/2024 19:30	45.8	0	NNE	29				5
2/15/2024 20:00	46	0	NW	318				5
2/15/2024 20:30	44.4	1	NW	306				5
2/15/2024 21:00	43.7	5	N	5				5
2/15/2024 21:30	43.4	2	NW	311				5
2/15/2024 22:00	43.2	1	N	11				5
2/15/2024 22:30	43.3	0	NE	36				5
2/15/2024 23:00	43.4	3	WSW	257	36	2/15/2024	10:51 PM	5
2/15/2024 23:30	42.7	4	NNE	18				5
2/16/2024 0:00	41.6	4	NW	311				6
2/16/2024 0:30	41.1	10	NNW	346				6
2/16/2024 1:00	40.6	2	NNW	331				6
2/16/2024 1:30	40.1	2	NW	313				6
2/16/2024 2:00	40.2	7	WNW	298				6
2/16/2024 2:30	39.6	2	NE	42				6
2/16/2024 3:00	39.4	8	W	267				6
2/16/2024 3:30	39.1	0	W	269				6
2/16/2024 4:00	38.8	10	W	270				6
2/16/2024 4:30	38.5	6	W	261				6
2/16/2024 5:00	38.5	4	W	265				6
2/16/2024 5:30	38.2	10	WSW	256				6
2/16/2024 6:00	37.9	6	W	270				6
2/16/2024 6:30	37.7	7	WNW	296				6
2/16/2024 7:00	37.7	4	WNW	290				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/16/2024 7:30	37.4	3	W	278				6
2/16/2024 8:00	37.3	4	NNW	338				6
2/16/2024 8:30	37.4	4	NW	316				6
2/16/2024 9:00	37.7	8	W	275				6
2/16/2024 9:30	38.3	3	NW	307				6
2/16/2024 10:00	38.5	8	WSW	257				6
2/16/2024 10:30	38.9	8	WSW	252				6
2/16/2024 11:00	39.8	3	WNW	301				6
2/16/2024 11:30	41.1	3	W	261				6
2/16/2024 12:00	43	4	WSW	242				6
2/20/2024 0:00	43.8	1	WSW	241				3
2/20/2024 0:30	43.7	1	WSW	241				3
2/20/2024 1:00	44.2	5	SSE	163				3
2/20/2024 1:30	43.5	1	SSE	162				3
2/20/2024 2:00	43.1	1	SSE	162				3
2/20/2024 2:30	43.8	0	SSE	162				3
2/20/2024 3:00	43.3	0	SSE	162				3
2/20/2024 3:30	42.5	0	SSE	162				3
2/20/2024 4:00	41.1	0	SSE	162				3
2/20/2024 4:30	41.6	0	SSE	162				3
2/20/2024 5:00	42.4	0	SSE	162				3
2/20/2024 5:30	43	0	SSE	162				3
2/20/2024 6:00	43.2	4	SSE	162				3
2/20/2024 6:30	43.2	1	NNE	30				3
2/20/2024 7:00	42.9	3	ENE	65				3
2/20/2024 7:30	42.9	1	ENE	60				3
2/20/2024 8:00	43.1	2	ENE	60				3
2/20/2024 8:30	43.3	0	ENE	63				3
2/20/2024 9:00	44	3	S	180	37	2/20/2024	9:00 AM	3
2/20/2024 9:30	44.1	1	SSW	207				3
2/20/2024 10:00	44.3	1	SSW	207				3
2/20/2024 10:30	45	2	SSW	207				3
2/20/2024 11:00	45.9	1	SSW	210				3
2/20/2024 11:30	46.5	0	SSW	210				3
2/20/2024 12:00	47	2	SSW	210				3
2/20/2024 12:30	48.1	0	SSW	210				3
2/20/2024 13:00	49.9	2	SSW	213				3
2/20/2024 13:30	50.4	0	NNE	25				3
2/20/2024 14:00	50.3	0	NNE	22				3
2/20/2024 14:30	50.6	4	NNE	18				3
2/20/2024 15:00	51	0	NNE	19	38	2/20/2024	3:00 PM	3
2/20/2024 15:30	51.5	0	NNE	20	39	2/20/2024	3:37 PM	3
2/20/2024 16:00	51.5	0	NNE	19				3
2/20/2024 16:30	50.7	0	SW	224				3
2/20/2024 17:00	49.9	0	SW	224				3
2/20/2024 17:30	49.6	1	SW	224				3
2/20/2024 18:00	49.1	3	SW	221				3
2/20/2024 18:30	48.7	5	SW	219				3
2/20/2024 19:00	48.9	2	SW	217				3
2/20/2024 19:30	48.7	1	SSW	207				3
2/20/2024 20:00	48	2	SSW	207				3
2/20/2024 20:30	47.9	4	SSW	213				3
2/20/2024 21:00	48.2	4	SW	219				3
2/20/2024 21:30	48.2	2	S	180				3
2/20/2024 22:00	47.4	0	ENE	72				3
2/20/2024 22:30	47.1	2	SSE	150				3
2/20/2024 23:00	46.9	1	SSE	161				3
2/20/2024 23:30	46.7	0	SSE	161				3
2/22/2024 0:00	45.3	0	S	190				5
2/22/2024 0:30	45.4	0	S	190				5
2/22/2024 1:00	45.7	0	S	190				5
2/22/2024 1:30	45.4	0	S	190				5
2/22/2024 2:00	44.8	0	S	190				5
2/22/2024 2:30	42.9	0	S	190				5
2/22/2024 3:00	43	0	S	190				5
2/22/2024 3:30	42.7	0	S	190				5
2/22/2024 4:00	43.6	3	S	190				5
2/22/2024 4:30	43.4	0	S	190				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/22/2024 5:00	43.3	0	S	190				5
2/22/2024 5:30	43.2	0	S	190				5
2/22/2024 6:00	42.4	0	S	190				5
2/22/2024 6:30	40.6	0	S	190				5
2/22/2024 7:00	40.9	0	S	190				5
2/22/2024 7:30	40.6	0	S	190				5
2/22/2024 8:00	41.7	0	S	190				5
2/22/2024 8:30	44.1	0	S	190				5
2/22/2024 9:00	45.3	0	S	190				5
2/22/2024 9:30	46	1	S	190				5
2/22/2024 10:00	46.7	0	S	189				5
2/22/2024 10:30	48.4	0	S	190				5
2/22/2024 11:00	50.9	3	W	261	40	2/22/2024	10:48 AM	5
2/22/2024 11:30	51.4	0	NNW	337				5
2/22/2024 12:00	52.8	4	WNW	286				5
2/22/2024 12:30	54.1	1	WNW	284				5
2/22/2024 13:00	55.7	6	S	188				5
2/22/2024 13:30	56	0	NE	51				5
2/22/2024 14:00	56.7	2	NNE	24				5
2/22/2024 14:30	57.8	5	NNW	348				5
2/22/2024 15:00	58.4	5	WSW	255				5
2/22/2024 15:30	58.4	2	WSW	256				5
2/22/2024 16:00	57.6	2	WNW	294				5
2/22/2024 16:30	56.7	2	SW	232				5
2/22/2024 17:00	55.1	0	SW	232				5
2/22/2024 17:30	53.5	0	SW	232				5
2/22/2024 18:00	51.6	0	SW	232				5
2/22/2024 18:30	49.6	0	SW	232				5
2/22/2024 19:00	48	0	SW	232				5
2/22/2024 19:30	46.7	1	SW	232				5
2/22/2024 20:00	45.6	0	SW	232				5
2/22/2024 20:30	44.3	0	SW	232				5
2/22/2024 21:00	44	1	SW	232				5
2/22/2024 21:30	42.7	0	SW	232				5
2/22/2024 22:00	41.9	0	SW	232				5
2/22/2024 22:30	40.7	0	SW	232				5
2/22/2024 23:00	40.8	0	SW	232				5
2/22/2024 23:30	40.5	1	SW	232				5
2/24/2024 0:00	39.3	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 0:30	40.4	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 1:00	39.8	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 1:30	37.9	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 2:00	37.3	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 2:30	38	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 3:00	38.8	0	S	173	42	2/24/2024	(not specified)	7
2/24/2024 3:30	37.5	2	S	173	42	2/24/2024	(not specified)	7
2/24/2024 4:00	36.5	2	S	173	42	2/24/2024	(not specified)	7
2/24/2024 4:30	35.2	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 5:00	37.6	1	S	173	42	2/24/2024	(not specified)	7
2/24/2024 5:30	37.5	0	E	86	42	2/24/2024	(not specified)	7
2/24/2024 6:00	36	0	E	86	42	2/24/2024	(not specified)	7
2/24/2024 6:30	35.8	1	E	86	42	2/24/2024	(not specified)	7
2/24/2024 7:00	34.6	1	E	87	42	2/24/2024	(not specified)	7
2/24/2024 7:30	34.3	0	E	87	42	2/24/2024	(not specified)	7
2/24/2024 8:00	35.7	0	E	80	42	2/24/2024	(not specified)	7
2/24/2024 8:30	36.7	0	E	80	42	2/24/2024	(not specified)	7
2/24/2024 9:00	39.5	2	E	80	42	2/24/2024	(not specified)	7
2/24/2024 9:30	42	0	E	80	42	2/24/2024	(not specified)	7
2/24/2024 10:00	44.9	3	WNW	282	42	2/24/2024	(not specified)	7
2/24/2024 10:30	46.2	0	W	277	42	2/24/2024	(not specified)	7
2/24/2024 11:00	48.6	0	NW	308	42	2/24/2024	(not specified)	7
2/24/2024 11:30	50.2	4	NNE	13	42	2/24/2024	(not specified)	7
2/24/2024 12:00	51.7	3	NNW	330	42	2/24/2024	(not specified)	7
2/24/2024 12:30	52.6	3	NNW	339	42	2/24/2024	(not specified)	7
2/24/2024 13:00	53.9	3	NNE	32	41	2/24/2024	1:00 PM	7
2/24/2024 13:30	54.6	3	NNE	24	42	2/24/2024	(not specified)	7
2/24/2024 14:00	55.2	5	NNE	15	42	2/24/2024	(not specified)	7
2/24/2024 14:30	55.5	3	NNW	346	42	2/24/2024	(not specified)	7
2/24/2024 15:00	56.3	4	NNE	13	42	2/24/2024	(not specified)	7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
2/24/2024 15:30	56.6	3	NNE	16	42	2/24/2024	(not specified)	7
2/24/2024 16:00	56.8	1	N	5	42	2/24/2024	(not specified)	7
2/24/2024 16:30	56.6	1	NNE	30	42	2/24/2024	(not specified)	7
2/24/2024 17:00	55.8	1	NE	38	42	2/24/2024	(not specified)	7
2/24/2024 17:30	53.8	1	NE	38	42	2/24/2024	(not specified)	7
2/24/2024 18:00	50.2	0	NE	38	42	2/24/2024	(not specified)	7
2/24/2024 18:30	48.8	0	NE	40	42	2/24/2024	(not specified)	7
2/24/2024 19:00	48	0	NE	51	42	2/24/2024	(not specified)	7
2/24/2024 19:30	47	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 20:00	46.1	1	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 20:30	45.6	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 21:00	45.6	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 21:30	45.4	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 22:00	44.7	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 22:30	44.1	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 23:00	44.2	0	ENE	69	42	2/24/2024	(not specified)	7
2/24/2024 23:30	44.4	0	ENE	69	42	2/24/2024	(not specified)	7
3/6/2024 0:00	32.2	0	WSW	259				4
3/6/2024 0:30	33.6	0	WSW	259				4
3/6/2024 1:00	32.1	0	WSW	259				4
3/6/2024 1:30	35.2	0	WSW	259				4
3/6/2024 2:00	34.5	0	SE	130				4
3/6/2024 2:30	32.7	0	SSE	147				4
3/6/2024 3:00	29.4	0	NNW	330				4
3/6/2024 3:30	28	0	NNW	329				4
3/6/2024 4:00	26.8	0	NNW	329				4
3/6/2024 4:30	27.5	0	NNW	329				4
3/6/2024 5:00	26.4	0	NE	55				4
3/6/2024 5:30	26.5	0	SSE	163				4
3/6/2024 6:00	26.7	0	SSE	163				4
3/6/2024 6:30	25.9	0	SSE	163				4
3/6/2024 7:00	26.5	0	SSE	163				4
3/6/2024 7:30	27.6	0	SSE	163	43	3/6/2024	7:30 AM	4
3/6/2024 8:00	28.5	0	SSE	163				4
3/6/2024 8:30	29.3	0	SSE	163				4
3/6/2024 9:00	31.3	0	SSE	163				4
3/6/2024 9:30	34.5	0	NW	326				4
3/6/2024 10:00	37.8	4	SW	232				4
3/6/2024 10:30	40.1	0	NNE	28				4
3/6/2024 11:00	41.6	0	WNW	297				4
3/6/2024 11:30	43.5	4	NE	39				4
3/6/2024 12:00	43.7	0	S	175				4
3/6/2024 12:30	44.5	3	NNE	24				4
3/6/2024 13:00	45.3	3	W	275				4
3/6/2024 13:30	46.7	3	NNW	338				4
3/6/2024 14:00	46.1	1	N	360				4
3/6/2024 14:30	45.9	10	NNE	30				4
3/6/2024 15:00	46.8	5	NNE	28				4
3/6/2024 15:30	45.4	1	NE	41				4
3/6/2024 16:00	46.4	2	NNE	20				4
3/6/2024 16:30	45.7	2	NE	40				4
3/6/2024 17:00	45.3	0	NNE	24				4
3/6/2024 17:30	46.4	0	NNE	22				4
3/6/2024 18:00	43.8	0	NNE	30				4
3/6/2024 18:30	41.6	0	NNE	30				4
3/6/2024 19:00	40.6	0	NNE	30				4
3/6/2024 19:30	39.5	0	NNE	30				4
3/6/2024 20:00	38.6	0	NNE	30				4
3/6/2024 20:30	38.2	0	NNE	29				4
3/6/2024 21:00	37	0	NNE	29				4
3/6/2024 21:30	35.5	0	NNE	29				4
3/6/2024 22:00	34	0	NNE	29				4
3/6/2024 22:30	33.2	0	NNE	29				4
3/6/2024 23:00	32.4	0	NNE	29				4
3/6/2024 23:30	31.9	0	NNE	29				4
3/8/2024 0:00	30.3	0	SSE	147				6
3/8/2024 0:30	31.4	0	SSE	147				6
3/8/2024 1:00	30.5	0	SSE	147				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
3/8/2024 1:30	29.8	0	SSE	147				6
3/8/2024 2:00	29.2	0	SSE	147				6
3/8/2024 2:30	28.7	0	SSE	147				6
3/8/2024 3:00	28.5	0	SSE	147				6
3/8/2024 3:30	28.9	0	SSE	147				6
3/8/2024 4:00	28.8	0	SSE	147				6
3/8/2024 4:30	29.4	0	SSE	147				6
3/8/2024 5:00	29.5	0	SSE	147				6
3/8/2024 5:30	29.1	0	SSE	147				6
3/8/2024 6:00	29.1	0	SSE	147				6
3/8/2024 6:30	29.4	0	SSE	147				6
3/8/2024 7:00	29.6	0	SSE	147				6
3/8/2024 7:30	30.8	0	SSE	147				6
3/8/2024 8:00	31.8	0	SSE	147				6
3/8/2024 8:30	33.2	0	SSE	147	44	3/8/2024	8:30 AM	6
3/8/2024 9:00	35.7	0	SSE	147				6
3/8/2024 9:30	38.4	0	SE	146				6
3/8/2024 10:00	41.6	0	ESE	119				6
3/8/2024 10:30	44	0	NNE	22				6
3/8/2024 11:00	46.2	0	NNE	34				6
3/8/2024 11:30	48.1	0	NNE	21				6
3/8/2024 12:00	49.9	2	NNE	23				6
3/8/2024 12:30	51.3	0	NNE	13				6
3/8/2024 13:00	52.9	1	NNE	25	45	3/8/2024	1:00 PM	6
3/8/2024 13:30	54.1	9	NNE	24				6
3/8/2024 14:00	55.3	3	NNE	28				6
3/8/2024 14:30	56.8	6	SSW	200				6
3/8/2024 15:00	58	0	SE	134				6
3/8/2024 15:30	58.7	0	S	178				6
3/8/2024 16:00	59.9	5	SSE	159				6
3/8/2024 16:30	59.7	0	S	172				6
3/8/2024 17:00	59	0	SE	140				6
3/8/2024 17:30	55.5	0	SE	140				6
3/8/2024 18:00	52.2	0	SE	140				6
3/8/2024 18:30	48.4	0	SE	140				6
3/8/2024 19:00	46.7	0	SE	140				6
3/8/2024 19:30	44.6	0	SE	140				6
3/8/2024 20:00	43.6	0	SE	140				6
3/8/2024 20:30	42.7	0	S	185				6
3/8/2024 21:00	41.8	0	SSE	163				6
3/8/2024 21:30	41.3	0	SSE	163				6
3/8/2024 22:00	41	0	S	186				6
3/8/2024 22:30	41	0	NW	320				6
3/8/2024 23:00	39.7	0	W	262				6
3/8/2024 23:30	39	0	W	276				6
3/12/2024 0:00	45.4	7	SSE	165				3
3/12/2024 0:30	45.3	14	SSW	207				3
3/12/2024 1:00	45.6	3	SSE	147				3
3/12/2024 1:30	45.3	6	S	185				3
3/12/2024 2:00	45.7	4	SSW	198				3
3/12/2024 2:30	45.7	5	SSE	163				3
3/12/2024 3:00	45.8	8	S	172				3
3/12/2024 3:30	45.7	7	S	174				3
3/12/2024 4:00	45.2	4	S	189				3
3/12/2024 4:30	44.8	4	SSW	198				3
3/12/2024 5:00	44.7	2	SSW	213				3
3/12/2024 5:30	45.3	3	SSW	206				3
3/12/2024 6:00	44.7	7	SSW	192				3
3/12/2024 6:30	44	3	S	187				3
3/12/2024 7:00	44	1	S	187				3
3/12/2024 7:30	43.9	6	S	177				3
3/12/2024 8:00	42.7	3	S	191				3
3/12/2024 8:30	42.8	4	SSW	196				3
3/12/2024 9:00	43.8	6	SW	227				3
3/12/2024 9:30	44.3	5	SSW	197				3
3/12/2024 10:00	44.8	5	S	191				3
3/12/2024 10:30	46.2	7	SSW	209				3
3/12/2024 11:00	46.2	7	SSW	209				3
3/12/2024 11:30	46.2	7	SSW	209				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
3/12/2024 12:00	48.4	11	SSW	197				3
3/12/2024 12:30	49.9	9	SW	234				3
3/12/2024 13:00	51	10	W	281				3
3/12/2024 13:30	51.9	9	SSW	198				3
3/12/2024 14:00	49.2	6	SW	221				3
3/12/2024 14:30	50.1	9	SSW	196	46	3/12/2024	2:30 PM	3
3/12/2024 15:00	50.3	8	SSW	194				3
3/12/2024 15:30	52.6	10	WSW	248				3
3/12/2024 16:00	51.9	10	SSW	192				3
3/12/2024 16:30	49.7	9	SSW	197				3
3/12/2024 17:00	49.4	10	SSW	206				3
3/12/2024 17:30	49.9	8	SW	232				3
3/12/2024 18:00	45	8	SW	231				3
3/12/2024 18:30	44.3	4	SSW	193				3
3/12/2024 19:00	43.6	0	SSW	192				3
3/12/2024 19:30	42	0	SSW	192				3
3/12/2024 20:00	40.3	0	SSW	192				3
3/12/2024 20:30	39.5	0	SSW	192				3
3/12/2024 21:00	39.1	0	SSW	210				3
3/12/2024 21:30	38.9	0	SSW	210				3
3/12/2024 22:00	40.3	0	SSW	210				3
3/12/2024 22:30	40.2	0	SSW	207				3
3/12/2024 23:00	39.9	0	SSW	207				3
3/12/2024 23:30	39.8	0	SSW	202				3
3/23/2024 0:00	45.9	0	S	180				7
3/23/2024 0:30	45.3	0	S	180				7
3/23/2024 1:00	44.8	0	S	180				7
3/23/2024 1:30	45	1	S	180				7
3/23/2024 2:00	45.3	0	S	180				7
3/23/2024 2:30	44.7	0	S	180				7
3/23/2024 3:00	45	0	NNE	34				7
3/23/2024 3:30	45.1	0	SE	132				7
3/23/2024 4:00	44.6	0	ESE	115				7
3/23/2024 4:30	43.6	2	ENE	57				7
3/23/2024 5:00	43.3	2	NE	44				7
3/23/2024 5:30	43.3	0	NE	38				7
3/23/2024 6:00	43.4	0	NE	38				7
3/23/2024 6:30	42.9	0	NE	37				7
3/23/2024 7:00	42.7	1	NE	37				7
3/23/2024 7:30	44	0	NE	37				7
3/23/2024 8:00	44.7	0	NE	40	47	3/23/2024	8:00 AM	7
3/23/2024 8:30	45.3	6	SSW	194				7
3/23/2024 9:00	46.4	6	SW	219				7
3/23/2024 9:30	47.9	4	SW	236				7
3/23/2024 10:00	47.9	4	SW	220				7
3/23/2024 10:30	47.4	4	SSE	166				7
3/23/2024 11:00	48	2	SSE	161				7
3/23/2024 11:30	48.6	4	SW	223				7
3/23/2024 12:00	48.7	4	SSW	195				7
3/23/2024 12:30	50.3	2	SE	144				7
3/23/2024 13:00	50.3	2	SSE	169				7
3/23/2024 13:30	50.5	9	S	188				7
3/23/2024 14:00	50.7	11	S	177				7
3/23/2024 14:30	50.3	3	S	176				7
3/23/2024 15:00	50.3	4	SSE	161				7
3/23/2024 15:30	50.1	2	S	173				7
3/23/2024 16:00	51	1	SSE	157				7
3/23/2024 16:30	52.2	6	SSE	164				7
3/23/2024 17:00	49.7	0	SSW	207				7
3/23/2024 17:30	50.3	0	SSW	195				7
3/23/2024 18:00	52.1	0	S	178				7
3/23/2024 18:30	50.5	0	SSE	168				7
3/23/2024 19:00	50.2	0	SSE	168				7
3/23/2024 19:30	49	0	SSE	168				7
3/23/2024 20:00	47.9	0	SSE	168				7
3/23/2024 20:30	47.1	1	SSE	168				7
3/23/2024 21:00	46.5	0	SSE	168				7
3/23/2024 21:30	45.2	0	SSE	168				7
3/23/2024 22:00	44.2	0	SSE	168				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
3/23/2024 22:30	42.9	0	SSE	168				7
3/23/2024 23:00	42.1	0	SSE	168				7
3/23/2024 23:30	41.7	0	SSE	168				7
4/1/2024 0:00	44.9	0	SSW	213				2
4/1/2024 0:30	44.6	0	SSW	213				2
4/1/2024 1:00	44.8	0	SSW	213				2
4/1/2024 1:30	44.1	0	SSW	213				2
4/1/2024 2:00	41.8	0	SSW	213				2
4/1/2024 2:30	40.7	0	SSW	213				2
4/1/2024 3:00	41	0	SSW	213				2
4/1/2024 3:30	41.3	0	SSW	213				2
4/1/2024 4:00	40	1	SSW	213				2
4/1/2024 4:30	40.2	0	SSW	213				2
4/1/2024 5:00	37.9	0	SSW	212				2
4/1/2024 5:30	37.4	0	SSW	212				2
4/1/2024 6:00	38.7	0	SSW	212				2
4/1/2024 6:30	37.2	0	SSW	212				2
4/1/2024 7:00	36.7	0	SSW	212				2
4/1/2024 7:30	37	0	SSW	212				2
4/1/2024 8:00	37.9	0	SSW	213	48	4/1/2024	8:00 AM	2
4/1/2024 8:30	39.8	0	SSW	213				2
4/1/2024 9:00	42.3	0	SSW	213	49	4/1/2024	9:00 AM	2
4/1/2024 9:30	43.9	0	SSW	213				2
4/1/2024 10:00	46.8	0	SSW	213				2
4/1/2024 10:30	52.2	2	N	9				2
4/1/2024 11:00	56	0	NNE	22				2
4/1/2024 11:30	58.1	0	S	183				2
4/1/2024 12:00	58.8	0	S	180				2
4/1/2024 12:30	60.6	2	SSE	168				2
4/1/2024 13:00	62.2	2	SSE	150				2
4/1/2024 13:30	63.8	1	ENE	59				2
4/1/2024 14:00	64.6	3	NNE	29				2
4/1/2024 14:30	65.8	4	N	5				2
4/1/2024 15:00	66.8	0	NNE	29				2
4/1/2024 15:30	68.1	3	NNE	23				2
4/1/2024 16:00	68.6	5	NNE	23				2
4/1/2024 16:30	69.1	4	NNE	22				2
4/1/2024 17:00	69.6	0	SSE	163				2
4/1/2024 17:30	69.3	2	NNE	18				2
4/1/2024 18:00	70.1	1	NNE	17				2
4/1/2024 18:30	69.2	0	NNE	17				2
4/1/2024 19:00	67.8	0	NNE	17				2
4/1/2024 19:30	64.7	0	NNE	17				2
4/1/2024 20:00	59.6	0	NNE	17				2
4/1/2024 20:30	57.2	0	NNE	17				2
4/1/2024 21:00	56.1	0	NNE	17				2
4/1/2024 21:30	55	0	ESE	111				2
4/1/2024 22:00	52.2	0	ESE	111				2
4/1/2024 22:30	50.9	0	ESE	111				2
4/1/2024 23:00	51	1	ESE	111				2
4/1/2024 23:30	50.9	0	SE	126	50	4/1/2024	11:30 PM	2
4/2/2024 0:00	50.3	0	SE	144				3
4/2/2024 0:30	48.5	0	SSW	192				3
4/2/2024 1:00	47.1	0	NW	306				3
4/2/2024 1:30	46.7	0	NW	306				3
4/2/2024 2:00	46.7	0	NW	306				3
4/2/2024 2:30	45.8	0	NW	306				3
4/2/2024 3:00	44.8	0	NW	306				3
4/2/2024 3:30	44	0	NW	306				3
4/2/2024 4:00	45	0	NW	306				3
4/2/2024 4:30	44.1	0	NW	306				3
4/2/2024 5:00	43.4	0	NW	306				3
4/2/2024 5:30	43.7	0	NW	306				3
4/2/2024 6:00	41.5	0	NW	306				3
4/2/2024 6:30	41.4	0	NW	306				3
4/2/2024 7:00	42	0	NW	306				3
4/2/2024 7:30	40.7	0	NW	306				3
4/2/2024 8:00	42.4	0	NW	306				3
4/2/2024 8:30	45.8	0	NW	306				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
4/2/2024 9:00	48	1	NNE	21				3
4/2/2024 9:30	50.2	2	NNE	23				3
4/2/2024 10:00	52.6	0	N	360				3
4/2/2024 10:30	57.4	1	NW	321				3
4/2/2024 11:00	61.3	2	SSE	165				3
4/2/2024 11:30	64.1	0	S	171				3
4/2/2024 12:00	65.8	1	S	182				3
4/12/2024 0:00	46.7	0	SSW	196				6
4/12/2024 0:30	46.6	0	SSW	196				6
4/12/2024 1:00	46.5	0	SSW	196				6
4/12/2024 1:30	46.3	0	SSW	196				6
4/12/2024 2:00	46.2	0	SSW	196				6
4/12/2024 2:30	46.2	0	SSW	196				6
4/12/2024 3:00	46.2	0	WNW	282				6
4/12/2024 3:30	46.2	0	WNW	282				6
4/12/2024 4:00	46.1	0	WNW	282				6
4/12/2024 4:30	46	0	WNW	282				6
4/12/2024 5:00	46.3	0	WNW	282				6
4/12/2024 5:30	46.3	0	WNW	282				6
4/12/2024 6:00	46.4	0	NNE	31				6
4/12/2024 6:30	46.2	1	NNE	34				6
4/12/2024 7:00	46.3	0	NNE	34	51	4/12/2024	7:00 AM	6
4/12/2024 7:30	46.6	0	W	268				6
4/12/2024 8:00	46.7	1	W	265				6
4/12/2024 8:30	46.8	3	WSW	248				6
4/12/2024 9:00	47.3	4	W	267				6
4/12/2024 9:30	48.7	0	NE	36				6
4/12/2024 10:00	50.1	1	ENE	65				6
4/12/2024 10:30	50.1	0	SW	215				6
4/12/2024 11:00	52.1	1	SSW	198				6
4/12/2024 11:30	53.9	1	S	179				6
4/12/2024 12:00	54.9	0	W	262				6
4/12/2024 12:30	56	0	SSE	166				6
4/12/2024 13:00	56.8	7	SW	217				6
4/12/2024 13:30	56.9	2	WSW	249				6
4/12/2024 14:00	58.6	4	SSW	212				6
4/12/2024 14:30	59.6	0	SE	128				6
4/12/2024 15:00	61.3	2	NNE	32				6
4/12/2024 15:30	60.7	0	N	11				6
4/12/2024 16:00	62.8	5	NW	312				6
4/12/2024 16:30	62.9	0	ENE	78				6
4/12/2024 17:00	62.9	1	WSW	257				6
4/12/2024 17:30	62.3	1	WSW	241				6
4/12/2024 18:00	62.4	0	SW	234				6
4/12/2024 18:30	62.2	0	WSW	237				6
4/12/2024 19:00	61.4	0	WSW	240				6
4/12/2024 19:30	60.9	0	WSW	240				6
4/12/2024 20:00	59.8	0	WSW	240				6
4/12/2024 20:30	58.4	0	WSW	240				6
4/12/2024 21:00	57.6	0	WSW	240				6
4/12/2024 21:30	56.6	0	WSW	240				6
4/12/2024 22:00	56.3	0	WSW	240				6
4/12/2024 22:30	58.3	0	WSW	240				6
4/12/2024 23:00	57.8	0	WSW	240				6
4/12/2024 23:30	58	0	ESE	115				6
5/2/2024 0:00	45.1	0	WSW	240				5
5/2/2024 0:30	44.7	0	SW	215				5
5/2/2024 1:00	44.7	0	NNW	327				5
5/2/2024 1:30	44.6	0	NNW	336				5
5/2/2024 2:00	44.9	0	W	281				5
5/2/2024 2:30	45.3	2	NNE	17				5
5/2/2024 3:00	45.7	0	NNE	20				5
5/2/2024 3:30	46	0	NNE	20				5
5/2/2024 4:00	46.1	1	NNE	19				5
5/2/2024 4:30	46.2	0	NNE	19				5
5/2/2024 5:00	45.9	1	NNE	26				5
5/2/2024 5:30	45.6	0	NE	38				5
5/2/2024 6:00	45.4	2	N	10				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
5/2/2024 6:30	45.4	0	NNE	34				5
5/2/2024 7:00	45.2	2	W	264				5
5/2/2024 7:30	45.2	0	W	263				5
5/2/2024 8:00	45.4	1	W	264				5
5/2/2024 8:30	45.6	1	WSW	252				5
5/2/2024 9:00	46.1	0	WSW	252				5
5/2/2024 9:30	46.4	0	WSW	252				5
5/2/2024 10:00	46.2	6	W	262				5
5/2/2024 10:30	46.7	1	WSW	249				5
5/2/2024 11:00	47.8	2	WSW	250				5
5/2/2024 11:30	48.9	0	WSW	255				5
5/2/2024 12:00	49.2	0	W	263				5
5/2/2024 12:30	51.1	3	NNW	341				5
5/2/2024 13:00	53.3	2	W	268				5
5/2/2024 13:30	56.4	4	NNE	13				5
5/2/2024 14:00	55.1	0	N	11				5
5/2/2024 14:30	53.7	1	ENE	68				5
5/2/2024 15:00	53.7	0	ENE	69				5
5/2/2024 15:30	53.7	0	ENE	69				5
5/2/2024 16:00	53.7	0	ENE	69				5
5/2/2024 16:30	53.7	0	ENE	69				5
5/2/2024 17:00	53.7	0	ENE	69				5
5/2/2024 17:30	53.7	0	ENE	69				5
5/2/2024 18:00	53.7	0	ENE	69				5
5/2/2024 18:30	53.7	0	ENE	69				5
5/2/2024 19:00	53.7	0	ENE	69	52	5/2/2024	7:00 PM	5
5/2/2024 19:30	53.7	0	ENE	69				5
5/2/2024 20:00	53.7	0	ENE	69				5
5/2/2024 20:30	53.7	0	ENE	69				5
5/2/2024 21:00	53.7	0	ENE	69				5
5/2/2024 21:30	53.7	0	ENE	69				5
5/2/2024 22:00	53.7	0	ENE	69				5
5/2/2024 22:30	53.7	0	ENE	69				5
5/2/2024 23:00	53.7	0	ENE	69				5
5/2/2024 23:30	53.7	0	ENE	69				5
5/23/2024 0:00	50	0	S	184				5
5/23/2024 0:30	48.4	0	SSE	167				5
5/23/2024 1:00	46.2	0	SSE	167				5
5/23/2024 1:30	45.4	0	SSE	167				5
5/23/2024 2:00	43.2	1	SSE	167				5
5/23/2024 2:30	42.5	0	SSE	167				5
5/23/2024 3:00	42.2	0	S	184				5
5/23/2024 3:30	42.7	0	S	184				5
5/23/2024 4:00	44	0	S	184				5
5/23/2024 4:30	43.9	0	S	184				5
5/23/2024 5:00	43.2	0	S	184				5
5/23/2024 5:30	42.1	0	S	184				5
5/23/2024 6:00	40.3	0	S	184				5
5/23/2024 6:30	41.1	0	S	185				5
5/23/2024 7:00	42.1	0	S	185				5
5/23/2024 7:30	45.7	4	NNE	24	53	5/23/2024	7:30 AM	5
5/23/2024 8:00	47.9	3	NNE	13	54	5/23/2024	7:50 AM	5
5/23/2024 8:30	50.1	0	NNE	13				5
5/23/2024 9:00	53.9	2	NNE	22				5
5/23/2024 9:30	56	3	NNE	24	55	5/23/2024	9:30 AM	5
5/23/2024 10:00	56.3	0	NNE	22				5
5/23/2024 10:30	55.5	4	SSW	201				5
5/23/2024 11:00	56	3	SSW	199				5
5/23/2024 11:30	57.7	1	SSW	203				5
5/23/2024 12:00	60.1	5	N	11				5
5/23/2024 12:30	59.9	0	E	90				5
5/23/2024 13:00	60.5	6	NE	35				5
5/23/2024 13:30	62	2	ENE	79				5
5/23/2024 14:00	61.7	2	NE	46				5
5/23/2024 14:30	63.3	1	WSW	238				5
5/23/2024 15:00	62.9	5	NNW	345				5
5/23/2024 15:30	63.2	6	NNE	34				5
5/23/2024 16:00	64.4	0	NE	45				5
5/23/2024 16:30	64.6	1	ENE	74				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
5/23/2024 17:00	64.4	5	NE	39				5
5/23/2024 17:30	64.2	5	NE	37				5
5/23/2024 18:00	64.2	10	NE	36	56	5/23/2024	6:00 PM	5
5/23/2024 18:30	63.6	7	NE	38				5
5/23/2024 19:00	63.6	6	NE	51				5
5/23/2024 19:30	62.9	8	NNE	31				5
5/23/2024 20:00	60.9	3	N	355				5
5/23/2024 20:30	59.2	3	N	5				5
5/23/2024 21:00	57.4	0	N	5				5
5/23/2024 21:30	52.1	0	N	5				5
5/23/2024 22:00	50.1	0	N	5				5
5/23/2024 22:30	48.7	0	N	5				5
5/23/2024 23:00	48.2	0	N	5				5
5/23/2024 23:30	47.4	0	N	5				5
7/11/2024 0:00	69.9	6	W	273				5
7/11/2024 0:30	69	0	WSW	252				5
7/11/2024 1:00	67.8	0	NNW	346				5
7/11/2024 1:30	67.2	1	NNW	340				5
7/11/2024 2:00	60.2	1	NW	322				5
7/11/2024 2:30	56.1	2	NW	315				5
7/11/2024 3:00	54.7	2	WNW	300				5
7/11/2024 3:30	54.4	3	WNW	282				5
7/11/2024 4:00	53.3	3	WNW	282				5
7/11/2024 4:30	53.2	1	WNW	282				5
7/11/2024 5:00	52.4	1	WNW	282				5
7/11/2024 5:30	52.1	0	WNW	282				5
7/11/2024 6:00	51	2	WNW	282				5
7/11/2024 6:30	52.6	1	W	281				5
7/11/2024 7:00	53.7	2	W	281				5
7/11/2024 7:30	55.9	2	W	264				5
7/11/2024 8:00	61.5	6	W	269				5
7/11/2024 8:30	63.7	3	WSW	259				5
7/11/2024 9:00	66.9	4	NW	314				5
7/11/2024 9:30	68.3	4	WNW	294				5
7/11/2024 10:00	70.7	2	NNW	342				5
7/11/2024 10:30	72.5	1	NNW	341				5
7/11/2024 11:00	73.5	4	WNW	302				5
7/11/2024 11:30	76	2	NNE	24				5
7/11/2024 12:00	77.5	8	W	270				5
7/11/2024 12:30	78.8	3	SW	225				5
7/11/2024 13:00	80.9	5	N	351				5
7/11/2024 13:30	81.2	6	SW	221				5
7/11/2024 14:00	82.9	5	NNE	17				5
7/11/2024 14:30	83.4	3	W	262				5
7/11/2024 15:00	84	2	W	280				5
7/11/2024 15:30	85.9	9	NNE	28				5
7/11/2024 16:00	86	4	ENE	76				5
7/11/2024 16:30	86.2	4	NNE	28				5
7/11/2024 17:00	86.5	12	NE	40				5
7/11/2024 17:30	86.6	3	NE	56				5
7/11/2024 18:00	85.8	3	N	5				5
7/11/2024 18:30	85.4	10	ENE	59				5
7/11/2024 19:00	85.1	7	WNW	285				5
7/11/2024 19:30	83.5	2	WNW	301				5
7/11/2024 20:00	81	2	SW	234				5
7/11/2024 20:30	78.1	1	S	191				5
7/11/2024 21:00	75.6	5	NW	314				5
7/11/2024 21:30	73.4	5	NE	37				5
7/11/2024 22:00	70.5	0	NNW	327				5
7/11/2024 22:30	68.7	6	N	5				5
7/11/2024 23:00	65.9	2	NW	315				5
7/11/2024 23:30	62.2	1	NW	311				5
7/12/2024 0:00	60.4	3	WSW	257	57	7/12/2024	12:06 AM	6
7/12/2024 0:30	58.9	3	WSW	257				6
7/12/2024 1:00	57.6	4	SSE	165				6
7/12/2024 1:30	56.9	4	SSE	165				6
7/12/2024 2:00	56.6	5	SSE	164				6
7/12/2024 2:30	55.8	3	SSE	153				6
7/12/2024 3:00	52.3	3	SSE	153				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/12/2024 3:30	53	3	SSE	153				6
7/12/2024 4:00	51.8	3	SSE	153				6
7/12/2024 4:30	51.8	3	SSE	153				6
7/12/2024 5:00	50.8	2	SSE	153				6
7/12/2024 5:30	50.3	1	SSE	153				6
7/12/2024 6:00	51	4	SSE	159				6
7/12/2024 6:30	51.2	5	SSE	161				6
7/12/2024 7:00	52	2	SSE	163				6
7/12/2024 7:30	54.5	4	NW	321				6
7/12/2024 8:00	58.1	4	NW	317				6
7/12/2024 8:30	60	3	WNW	299				6
7/12/2024 9:00	62.2	4	WSW	259				6
7/12/2024 9:30	64.6	5	W	300				6
7/12/2024 10:00	66.7	3	W	271				6
7/12/2024 10:30	69.1	5	N	350				6
7/12/2024 11:00	71	7	W	275				6
7/12/2024 11:30	73.4	5	SW	235				6
7/12/2024 12:00	75.4	6	ENE	57				6
7/24/2024 0:00	60.2	2	SSW	199				4
7/24/2024 0:30	57.6	2	SSW	199				4
7/24/2024 1:00	56.3	1	SSE	163				4
7/24/2024 1:30	55.7	1	SSE	163				4
7/24/2024 2:00	53.3	0	SW	231				4
7/24/2024 2:30	52.6	2	S	188				4
7/24/2024 3:00	52.9	0	S	188				4
7/24/2024 3:30	52.2	1	S	188				4
7/24/2024 4:00	51.6	2	S	188				4
7/24/2024 4:30	50.3	0	SSW	194				4
7/24/2024 5:00	50.2	1	SSW	194				4
7/24/2024 5:30	50.3	1	SSW	194				4
7/24/2024 6:00	48.8	2	SSW	194				4
7/24/2024 6:30	49.6	2	SSW	194				4
7/24/2024 7:00	50.3	2	SSW	194				4
7/24/2024 7:30	53.3	3	SSW	194				4
7/24/2024 8:00	57	1	SSW	194				4
7/24/2024 8:30	62.9	1	SSW	195				4
7/24/2024 9:00	64.5	3	W	267				4
7/24/2024 9:30	67.1	2	WSW	244				4
7/24/2024 10:00	68.8	2	WNW	298				4
7/24/2024 10:30	70.2	5	WSW	238				4
7/24/2024 11:00	71.8	5	WNW	296				4
7/24/2024 11:30	74.3	4	NNE	12				4
7/24/2024 12:00	75.7	1	WNW	301				4
7/24/2024 12:30	77.8	4	NW	306				4
7/24/2024 13:00	78.3	6	S	175	58	7/24/2024	1:00 PM	4
7/24/2024 13:30	80	2	NNW	329				4
7/24/2024 14:00	81.2	4	NE	40				4
7/24/2024 14:30	82	8	NNE	16				4
7/24/2024 15:00	82.1	9	WNW	290				4
7/24/2024 15:30	82.3	2	SSW	202				4
7/24/2024 16:00	81.6	6	SSW	194				4
7/24/2024 16:30	81.8	5	WSW	254				4
7/24/2024 17:00	81.2	8	WSW	242				4
7/24/2024 17:30	79.2	5	SSW	209				4
7/24/2024 18:00	77.6	7	W	279				4
7/24/2024 18:30	74.1	5	WSW	254				4
7/24/2024 19:00	72.9	14	WSW	248				4
7/24/2024 19:30	71.2	6	WSW	238				4
7/24/2024 20:00	70.2	3	SW	226				4
7/24/2024 20:30	66.9	4	SW	223				4
7/24/2024 21:00	65.1	1	SW	234				4
7/24/2024 21:30	62.8	3	SW	227				4
7/24/2024 22:00	61.3	2	SW	227				4
7/24/2024 22:30	60	2	SW	222				4
7/24/2024 23:00	58.8	1	SW	221				4
7/24/2024 23:30	57.5	0	SW	221				4
7/30/2024 0:00	63	0	SW	229				3
7/30/2024 0:30	63.2	0	SW	229				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
7/30/2024 1:00	62.8	3	SW	229				3
7/30/2024 1:30	62.7	2	SW	229				3
7/30/2024 2:00	62.4	3	SW	227				3
7/30/2024 2:30	62.5	0	SW	227				3
7/30/2024 3:00	62.3	0	SW	227				3
7/30/2024 3:30	62.1	0	SW	227				3
7/30/2024 4:00	62	0	SW	227				3
7/30/2024 4:30	61.4	0	SW	227				3
7/30/2024 5:00	61	0	SW	227				3
7/30/2024 5:30	60.8	0	SW	227				3
7/30/2024 6:00	61.2	0	SW	227				3
7/30/2024 6:30	60.8	0	SW	227				3
7/30/2024 7:00	61.4	0	SW	227				3
7/30/2024 7:30	61.7	0	SW	227				3
7/30/2024 8:00	62.5	0	SW	227				3
7/30/2024 8:30	64.1	0	SW	227				3
7/30/2024 9:00	65.2	0	SW	227				3
7/30/2024 9:30	67.6	0	S	180				3
7/30/2024 10:00	67.4	5	S	189				3
7/30/2024 10:30	68.3	0	SW	225				3
7/30/2024 11:00	69.7	4	SSW	211				3
7/30/2024 11:30	70.6	4	SW	216				3
7/30/2024 12:00	70.6	1	SSW	194				3
7/30/2024 12:30	71.7	5	SSW	212				3
7/30/2024 13:00	72.8	5	SSW	201				3
7/30/2024 13:30	73.3	4	SSW	205				3
7/30/2024 14:00	74.2	3	SSW	211				3
7/30/2024 14:30	75.4	6	S	181				3
7/30/2024 15:00	75.8	4	NE	41				3
7/30/2024 15:30	75.7	2	SW	231				3
7/30/2024 16:00	77.9	3	WSW	257				3
7/30/2024 16:30	78.4	5	SW	234				3
7/30/2024 17:00	78.1	3	SSW	214				3
7/30/2024 17:30	78.4	6	SW	223	59	7/30/2024	5:30 PM	3
7/30/2024 18:00	78.3	2	WSW	242				3
7/30/2024 18:30	78.2	4	WSW	250				3
7/30/2024 19:00	76.9	4	WSW	241				3
7/30/2024 19:30	75.8	4	WSW	250				3
7/30/2024 20:00	73.1	2	SSW	200				3
7/30/2024 20:30	70	2	S	190				3
7/30/2024 21:00	67.8	3	SSW	193				3
7/30/2024 21:30	66.5	4	SSW	193				3
7/30/2024 22:00	65.6	0	SSW	194				3
7/30/2024 22:30	64.9	2	SSW	194				3
7/30/2024 23:00	64.1	0	SSW	194				3
7/30/2024 23:30	63.6	2	SSW	194				3
8/4/2024 0:00	62.3	1	S	184				1
8/4/2024 0:30	62.6	2	S	184				1
8/4/2024 1:00	62.1	3	S	182				1
8/4/2024 1:30	58.7	1	S	182				1
8/4/2024 2:00	58.2	0	S	182				1
8/4/2024 2:30	57	0	S	182				1
8/4/2024 3:00	56.2	1	S	182				1
8/4/2024 3:30	55.9	0	S	182				1
8/4/2024 4:00	56	0	S	182				1
8/4/2024 4:30	55.2	0	S	182				1
8/4/2024 5:00	54.2	0	S	182				1
8/4/2024 5:30	53.7	1	S	182				1
8/4/2024 6:00	53	0	S	182				1
8/4/2024 6:30	52.8	0	S	182				1
8/4/2024 7:00	54	0	S	182				1
8/4/2024 7:30	55.8	0	S	182				1
8/4/2024 8:00	57.3	0	S	182				1
8/4/2024 8:30	59.4	0	S	182	60	8/4/2024	8:30 AM	1
8/4/2024 9:00	64.1	1	S	178				1
8/4/2024 9:30	68.4	0	N	9				1
8/4/2024 10:00	71.6	5	N	360				1
8/4/2024 10:30	73.3	3	W	278				1
8/4/2024 11:00	75.3	2	WSW	248				1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/4/2024 11:30	78.2	2	N	9				1
8/4/2024 12:00	79.7	4	WSW	258				1
8/4/2024 12:30	81.8	4	SE	136				1
8/4/2024 13:00	83.8	3	WSW	254				1
8/4/2024 13:30	85.9	4	ESE	121				1
8/4/2024 14:00	87.8	3	NNW	327				1
8/4/2024 14:30	88.9	4	WNW	289				1
8/4/2024 15:00	89.7	5	SSW	205				1
8/4/2024 15:30	90.9	5	NW	321				1
8/4/2024 16:00	91.4	3	WNW	282				1
8/4/2024 16:30	91.6	2	NW	315				1
8/4/2024 17:00	92.1	3	WSW	238				1
8/4/2024 17:30	91.9	3	W	263				1
8/4/2024 18:00	90.6	4	SW	236				1
8/4/2024 18:30	89.8	4	WSW	247				1
8/4/2024 19:00	86.7	4	SSW	195				1
8/4/2024 19:30	82.5	6	SSW	196				1
8/4/2024 20:00	78.1	6	SW	227				1
8/4/2024 20:30	74.4	7	SSW	202				1
8/4/2024 21:00	71.7	7	SSW	210				1
8/4/2024 21:30	69.9	3	SSW	199				1
8/4/2024 22:00	68.2	10	SSW	192				1
8/4/2024 22:30	66.8	4	SSW	200				1
8/4/2024 23:00	66	5	SSW	204				1
8/4/2024 23:30	64.4	3	SSW	207				1
8/8/2024 0:00	64.7	3	SSW	208				5
8/8/2024 0:30	63.5	0	SSW	208				5
8/8/2024 1:00	61.5	1	SSW	208				5
8/8/2024 1:30	60.2	3	SSW	208				5
8/8/2024 2:00	61	2	SSW	208				5
8/8/2024 2:30	59.8	2	SSW	208				5
8/8/2024 3:00	58.6	2	SSW	208				5
8/8/2024 3:30	57.2	2	WSW	245				5
8/8/2024 4:00	57.5	2	WSW	245				5
8/8/2024 4:30	56.8	3	WSW	245				5
8/8/2024 5:00	55.8	1	WSW	245				5
8/8/2024 5:30	56.2	0	WSW	245				5
8/8/2024 6:00	55.6	2	WSW	245				5
8/8/2024 6:30	55.2	2	WSW	245				5
8/8/2024 7:00	55.7	2	WSW	245				5
8/8/2024 7:30	58.6	0	WSW	245	61	8/8/2024	7:40 AM	5
8/8/2024 8:00	61	0	WSW	245	62	8/8/2024	7:45 AM	5
8/8/2024 8:30	62.3	0	WSW	245				5
8/8/2024 9:00	67.8	3	WSW	258				5
8/8/2024 9:30	72	3	NW	307				5
8/8/2024 10:00	73.6	1	NNW	331				5
8/8/2024 10:30	76.1	3	WSW	240				5
8/8/2024 11:00	79	2	SW	227				5
8/8/2024 11:30	80.3	3	NW	310				5
8/8/2024 12:00	81.8	3	WNW	302				5
8/8/2024 12:30	82.4	1	NW	313				5
8/8/2024 13:00	83.7	4	S	182				5
8/8/2024 13:30	85.4	3	SW	229				5
8/8/2024 14:00	86.3	4	WSW	255				5
8/8/2024 14:30	87.9	4	NNE	17				5
8/8/2024 15:00	89.4	3	SW	223				5
8/8/2024 15:30	90.5	6	NW	311				5
8/8/2024 16:00	90.9	4	W	261				5
8/8/2024 16:30	91.6	2	NW	309				5
8/8/2024 17:00	91.8	7	SW	223				5
8/8/2024 17:30	90.1	4	SW	230				5
8/8/2024 18:00	87.3	6	SSW	198				5
8/8/2024 18:30	84.3	7	SSW	209				5
8/8/2024 19:00	81.6	7	S	183				5
8/8/2024 19:30	78.6	6	SSW	202				5
8/8/2024 20:00	75.5	7	SW	217				5
8/8/2024 20:30	72.3	6	SSW	207				5
8/8/2024 21:00	70.2	5	SSW	208				5
8/8/2024 21:30	68.7	4	SW	225				5

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/8/2024 22:00	66.9	3	SW	219				5
8/8/2024 22:30	65.5	4	SW	221				5
8/8/2024 23:00	64.7	0	SW	221				5
8/8/2024 23:30	63.1	2	SW	215				5
8/9/2024 0:00	61.9	1	SW	215				6
8/9/2024 0:30	61.6	2	SW	218				6
8/9/2024 1:00	60.2	0	SW	218				6
8/9/2024 1:30	60	1	SW	218				6
8/9/2024 2:00	59.5	2	SW	218				6
8/9/2024 2:30	58.1	0	SW	218				6
8/9/2024 3:00	56.9	0	SW	218				6
8/9/2024 3:30	57.9	2	SW	218				6
8/9/2024 4:00	56.4	0	SW	218				6
8/9/2024 4:30	55.4	0	SW	218				6
8/9/2024 5:00	54.7	0	SW	218				6
8/9/2024 5:30	54.2	0	SW	218				6
8/9/2024 6:00	53.4	0	SW	218				6
8/9/2024 6:30	53.1	0	SW	218				6
8/9/2024 7:00	53.7	0	SW	218				6
8/9/2024 7:30	54.8	0	SW	218				6
8/9/2024 8:00	56.5	0	SW	218				6
8/9/2024 8:30	58.5	0	SW	218				6
8/9/2024 9:00	62.5	0	SW	218				6
8/9/2024 9:30	66.8	1	SW	218				6
8/9/2024 10:00	69.1	1	NE	36				6
8/9/2024 10:30	70.9	2	N	360				6
8/9/2024 11:00	73.8	5	NNE	24				6
8/9/2024 11:30	76.8	7	N	10				6
8/9/2024 12:00	78.5	2	NE	43				6
8/9/2024 12:30	80.1	4	WSW	244				6
8/9/2024 13:00	80.9	7	WSW	257				6
8/9/2024 13:30	83.3	5	WSW	246				6
8/9/2024 14:00	84.8	0	NNE	31				6
8/9/2024 14:30	86.2	2	NNE	30				6
8/9/2024 15:00	86.5	2	WNW	304	63	8/9/2024	3:15 PM	6
8/9/2024 15:30	87.5	2	NE	35				6
8/9/2024 16:00	88.7	3	SW	227				6
8/9/2024 16:30	88.8	3	NW	326				6
8/9/2024 17:00	88.4	3	WSW	248				6
8/9/2024 17:30	86.1	7	S	184				6
8/9/2024 18:00	83.4	10	SW	224	64	8/9/2024	5:53 PM	6
8/9/2024 18:30	82	7	S	189				6
8/9/2024 19:00	80	4	SSW	210				6
8/9/2024 19:30	77.5	10	SSW	212				6
8/9/2024 20:00	74.4	5	S	182				6
8/9/2024 20:30	71.3	6	S	178				6
8/9/2024 21:00	68.8	5	SSW	207				6
8/9/2024 21:30	67.2	8	SSW	205				6
8/9/2024 22:00	65.9	2	SSW	200				6
8/9/2024 22:30	64.8	4	SSW	205				6
8/9/2024 23:00	63.8	2	SSW	200				6
8/9/2024 23:30	62.8	1	SSW	200				6
8/18/2024 0:00	59.1	3	S	188				1
8/18/2024 0:30	58.6	2	S	188				1
8/18/2024 1:00	57.9	0	S	188				1
8/18/2024 1:30	58.4	1	S	188				1
8/18/2024 2:00	58.5	1	S	188				1
8/18/2024 2:30	58.9	0	S	188				1
8/18/2024 3:00	58.9	0	S	188				1
8/18/2024 3:30	58.4	2	S	188				1
8/18/2024 4:00	58.1	0	S	188				1
8/18/2024 4:30	59	4	S	188				1
8/18/2024 5:00	58.5	0	S	188				1
8/18/2024 5:30	58	0	S	188				1
8/18/2024 6:00	58.4	0	S	188				1
8/18/2024 6:30	58.1	2	S	188				1
8/18/2024 7:00	56.4	0	S	188				1
8/18/2024 7:30	57.8	0	S	188	65	8/18/2024	7:30 AM	1
8/18/2024 8:00	58.9	0	S	188				1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/18/2024 8:30	59.2	0	S	188				1
8/18/2024 9:00	58.9	1	S	188				1
8/18/2024 9:30	59.6	2	S	179				1
8/18/2024 10:00	60.2	1	WSW	248				1
8/18/2024 10:30	61	2	WSW	246				1
8/18/2024 11:00	62.4	3	WSW	243				1
8/18/2024 11:30	63.8	3	SSW	192				1
8/18/2024 12:00	67.9	10	WSW	244				1
8/18/2024 12:30	70.1	7	SW	217				1
8/18/2024 13:00	71.2	6	SSW	213				1
8/18/2024 13:30	71.6	8	SSW	199				1
8/18/2024 14:00	73.2	6	WSW	239				1
8/18/2024 14:30	73.6	2	SSW	196				1
8/18/2024 15:00	73.8	5	SSW	206				1
8/18/2024 15:30	74.5	3	SW	223				1
8/18/2024 16:00	74.9	4	SW	229				1
8/18/2024 16:30	74.3	3	SSW	212				1
8/18/2024 17:00	75.5	5	SSW	207				1
8/18/2024 17:30	74.1	6	SSW	204				1
8/18/2024 18:00	74.1	5	WSW	244				1
8/18/2024 18:30	73.2	2	WSW	250				1
8/18/2024 19:00	72.5	3	WSW	252				1
8/18/2024 19:30	70.9	2	W	263				1
8/18/2024 20:00	68.2	1	WSW	244				1
8/18/2024 20:30	65.4	4	SSW	200				1
8/18/2024 21:00	63.2	3	SSW	200				1
8/18/2024 21:30	61.5	3	SSW	200				1
8/18/2024 22:00	60.2	3	SSW	200				1
8/18/2024 22:30	59.8	2	SSW	200				1
8/18/2024 23:00	59.6	0	SSW	200				1
8/18/2024 23:30	60	1	SSW	200				1
8/23/2024 0:00	58.4	0	SW	227				6
8/23/2024 0:30	57.3	0	SW	227				6
8/23/2024 1:00	57.5	1	SW	227				6
8/23/2024 1:30	57.3	0	S	184				6
8/23/2024 2:00	57.2	0	S	184				6
8/23/2024 2:30	56.6	2	S	184				6
8/23/2024 3:00	55.6	0	S	184				6
8/23/2024 3:30	54.2	0	S	184				6
8/23/2024 4:00	53	0	S	184				6
8/23/2024 4:30	52.4	0	S	184				6
8/23/2024 5:00	51.6	0	S	184				6
8/23/2024 5:30	51.2	0	S	184				6
8/23/2024 6:00	49.8	0	S	184				6
8/23/2024 6:30	50	3	S	191				6
8/23/2024 7:00	50.8	0	S	191				6
8/23/2024 7:30	51.3	0	S	191				6
8/23/2024 8:00	52.6	0	S	191				6
8/23/2024 8:30	55.3	2	NNE	30				6
8/23/2024 9:00	56.1	0	SSW	192				6
8/23/2024 9:30	58.4	5	S	174				6
8/23/2024 10:00	60.4	2	SSE	158				6
8/23/2024 10:30	61.3	2	WSW	255				6
8/23/2024 11:00	62	6	S	173				6
8/23/2024 11:30	64.5	4	SE	140				6
8/23/2024 12:00	64.7	3	SW	219				6
8/23/2024 12:30	64.1	11	SSW	213				6
8/23/2024 13:00	65.6	4	SW	221				6
8/23/2024 13:30	65.7	10	S	185				6
8/23/2024 14:00	61.7	3	S	185				6
8/23/2024 14:30	58.7	6	S	188				6
8/23/2024 15:00	60.1	5	SSW	209				6
8/23/2024 15:30	61.6	7	S	190				6
8/23/2024 16:00	65.9	9	SW	222				6
8/23/2024 16:30	66.3	7	SE	188				6
8/23/2024 17:00	63.3	5	SW	234				6
8/23/2024 17:30	60.5	3	WSW	244				6
8/23/2024 18:00	63.4	1	WSW	254				6
8/23/2024 18:30	62.6	1	NW	311	66	8/23/2024	6:30 PM	6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
8/23/2024 19:00	62.3	0	NW	313				6
8/23/2024 19:30	62.1	0	NW	313				6
8/23/2024 20:00	60.8	0	NW	315				6
8/23/2024 20:30	59.7	0	NW	315				6
8/23/2024 21:00	58.4	0	NW	315				6
8/23/2024 21:30	57.4	0	NW	315				6
8/23/2024 22:00	57.1	0	NW	315				6
8/23/2024 22:30	56.6	0	NW	315				6
8/23/2024 23:00	56.3	1	NW	315				6
8/23/2024 23:30	56.3	1	NW	315				6
11/26/2024 0:00	34.9	1	SSE	152				3
11/26/2024 0:30	35.1	0	SSE	148				3
11/26/2024 1:00	35.3	1	SSE	148				3
11/26/2024 1:30	36.2	1	SSE	148				3
11/26/2024 2:00	37	1	SSE	148				3
11/26/2024 2:30	35.9	1	SSE	148				3
11/26/2024 3:00	35.3	1	SSE	148				3
11/26/2024 3:30	36.8	0	SSE	148				3
11/26/2024 4:00	36.1	0	SSE	148				3
11/26/2024 4:30	37.7	0	SSE	148				3
11/26/2024 5:00	37.7	0	SSE	148				3
11/26/2024 5:30	38.6	3	SSE	147				3
11/26/2024 6:00	38.7	2	SE	146				3
11/26/2024 6:30	39.3	0	SE	146				3
11/26/2024 7:00	39.7	0	SE	146				3
11/26/2024 7:30	39.8	0	SE	146				3
11/26/2024 8:00	40.1	0	SE	146				3
11/26/2024 8:30	40.5	0	SE	146				3
11/26/2024 9:00	41.1	2	SE	146				3
11/26/2024 9:30	41.6	0	SE	146				3
11/26/2024 10:00	42.4	0	SE	146				3
11/26/2024 10:30	43	2	SE	146				3
11/26/2024 11:00	43.4	2	SE	146				3
11/26/2024 11:30	44.3	2	SE	143	67	11/26/2024	11:30 AM	3
11/26/2024 12:00	45	3	SE	138				3
11/26/2024 12:30	46.7	0	NNE	28				3
11/26/2024 13:00	46.9	5	SSE	169				3
11/26/2024 13:30	48.5	6	SSE	165				3
11/26/2024 14:00	48.8	7	SSE	165				3
11/26/2024 14:30	49	0	SSE	167				3
11/26/2024 15:00	50.1	0	SSE	169				3
11/26/2024 15:30	49.3	5	S	171				3
11/26/2024 16:00	48.3	0	S	171				3
11/26/2024 16:30	46.6	0	S	171				3
11/26/2024 17:00	45.4	0	S	171				3
11/26/2024 17:30	44.5	0	S	171				3
11/26/2024 18:00	44.4	0	S	171				3
11/26/2024 18:30	44.3	0	S	171				3
11/26/2024 19:00	43.8	0	S	171				3
11/26/2024 19:30	43.6	0	S	171				3
11/26/2024 20:00	43.5	0	S	171				3
11/26/2024 20:30	43.2	0	S	171				3
11/26/2024 21:00	43.7	0	S	171				3
11/26/2024 21:30	43.9	1	S	171				3
11/26/2024 22:00	43.6	0	S	171				3
11/26/2024 22:30	43.3	0	S	171				3
11/26/2024 23:00	43.3	2	S	171				3
11/26/2024 23:30	42.9	0	S	171				3
11/27/2024 0:00	42.9	0	S	171				4
11/27/2024 0:30	42.4	0	S	171				4
11/27/2024 1:00	41.7	0	S	171				4
11/27/2024 1:30	41.1	0	S	171				4
11/27/2024 2:00	40.9	0	S	171				4
11/27/2024 2:30	40.8	0	S	171				4
11/27/2024 3:00	41	1	S	171				4
11/27/2024 3:30	41.5	1	S	171				4
11/27/2024 4:00	41.2	0	S	171				4
11/27/2024 4:30	41.2	0	S	171				4
11/27/2024 5:00	41.4	0	S	171				4

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/27/2024 5:30	41.4	0	S	171				4
11/27/2024 6:00	41.4	0	S	171				4
11/27/2024 6:30	41.2	0	S	171				4
11/27/2024 7:00	41	1	S	171	68	11/27/2024	7:15 AM	4
11/27/2024 7:30	40.8	0	S	171				4
11/27/2024 8:00	41.1	1	S	173				4
11/27/2024 8:30	40.6	4	S	179				4
11/27/2024 9:00	40.3	0	S	180				4
11/27/2024 9:30	40.3	2	S	180				4
11/27/2024 10:00	40.3	1	S	181				4
11/27/2024 10:30	40.1	1	SSE	164				4
11/27/2024 11:00	41.3	0	SSE	164				4
11/27/2024 11:30	41.5	4	SSE	165				4
11/27/2024 12:00	41.7	1	SSE	168				4
11/27/2024 12:30	41.4	1	NNW	342				4
11/27/2024 13:00	41.4	1	NNW	331				4
11/27/2024 13:30	41.7	0	NNW	336				4
11/27/2024 14:00	41.8	0	NNW	333				4
11/27/2024 14:30	42	2	NNW	336				4
11/27/2024 15:00	42.4	1	NNE	34				4
11/27/2024 15:30	42.1	2	WSW	252				4
11/27/2024 16:00	41.7	2	WSW	252				4
11/27/2024 16:30	41.6	0	WSW	252				4
11/27/2024 17:00	41.1	0	WSW	252				4
11/27/2024 17:30	40.2	0	WSW	252				4
11/27/2024 18:00	39.3	0	WSW	252				4
11/27/2024 18:30	36.6	0	WSW	252				4
11/27/2024 19:00	35.5	1	WSW	252				4
11/27/2024 19:30	35	1	WSW	252				4
11/27/2024 20:00	34.8	1	WSW	252				4
11/27/2024 20:30	33.5	0	WSW	252				4
11/27/2024 21:00	34.1	0	WSW	252				4
11/27/2024 21:30	34.5	0	WSW	252				4
11/27/2024 22:00	34.3	1	WSW	252				4
11/27/2024 22:30	33.9	0	WSW	252				4
11/27/2024 23:00	33.4	0	WSW	252				4
11/27/2024 23:30	32.3	0	WSW	252				4
11/30/2024 0:00	37.7	3	NNE	26				7
11/30/2024 0:30	37.6	4	NE	36				7
11/30/2024 1:00	37.5	1	NNE	29				7
11/30/2024 1:30	37.5	5	NE	37				7
11/30/2024 2:00	37.6	4	NE	38				7
11/30/2024 2:30	37.4	3	NE	36				7
11/30/2024 3:00	37.4	4	NE	41				7
11/30/2024 3:30	37.4	5	NE	42				7
11/30/2024 4:00	37.4	3	NNE	32				7
11/30/2024 4:30	37.3	5	NNE	31				7
11/30/2024 5:00	37.2	2	NE	44				7
11/30/2024 5:30	37.1	0	NE	44				7
11/30/2024 6:00	37.1	3	NE	40				7
11/30/2024 6:30	37.1	1	NE	42				7
11/30/2024 7:00	37.1	0	NE	43				7
11/30/2024 7:30	37.1	2	N	355				7
11/30/2024 8:00	37.1	6	NE	38				7
11/30/2024 8:30	37.1	0	NNE	32				7
11/30/2024 9:00	37.2	2	NE	40				7
11/30/2024 9:30	37.1	2	NNE	23				7
11/30/2024 10:00	37.2	1	NNE	22	69	11/30/2024	10:00 AM	7
11/30/2024 10:30	37.5	4	NNE	19				7
11/30/2024 11:00	37.5	4	NE	48				7
11/30/2024 11:30	37.7	2	NE	37				7
11/30/2024 12:00	38	1	ENE	61	70	11/30/2024	12:00 PM	7
11/30/2024 12:30	38.3	0	NNW	336				7
11/30/2024 13:00	38.6	5	NNE	26				7
11/30/2024 13:30	38.7	1	WSW	258				7
11/30/2024 14:00	38.9	3	WSW	258				7
11/30/2024 14:30	39.5	2	SE	128				7
11/30/2024 15:00	39.8	2	WSW	255				7
11/30/2024 15:30	40.5	1	WSW	239				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
11/30/2024 16:00	40.3	1	WSW	239				7
11/30/2024 16:30	38.5	0	WSW	239				7
11/30/2024 17:00	36	0	WSW	239				7
11/30/2024 17:30	33.7	0	WSW	239				7
11/30/2024 18:00	33.2	1	WSW	239				7
11/30/2024 18:30	32.2	0	WSW	239				7
11/30/2024 19:00	31.9	0	SSW	205				7
11/30/2024 19:30	31.1	0	SSW	205				7
11/30/2024 20:00	31.1	0	SSW	205				7
11/30/2024 20:30	30.9	0	SSW	205				7
11/30/2024 21:00	30.3	0	SSW	205				7
11/30/2024 21:30	31	0	SSW	205				7
11/30/2024 22:00	29	0	SSW	205				7
11/30/2024 22:30	29.8	0	SSW	205				7
11/30/2024 23:00	28.3	0	SSW	205				7
11/30/2024 23:30	27.8	0	SSW	205				7
12/1/2024 0:00	27.9	0	SSW	205				1
12/1/2024 0:30	27.5	0	SSW	205				1
12/1/2024 1:00	28.2	3	SSW	205				1
12/1/2024 1:30	28.4	3	SSW	205				1
12/1/2024 2:00	28.6	0	SSW	205				1
12/1/2024 2:30	28.7	0	SSW	205				1
12/1/2024 3:00	28.5	0	SSW	205				1
12/1/2024 3:30	28.4	0	SSW	205				1
12/1/2024 4:00	28.1	0	SSW	205				1
12/1/2024 4:30	28.1	0	SSW	205				1
12/1/2024 5:00	27.9	0	SSW	205				1
12/1/2024 5:30	27.9	0	SSW	205				1
12/1/2024 6:00	27.6	0	SSW	205				1
12/1/2024 6:30	27.2	0	SSW	205				1
12/1/2024 7:00	27.5	0	SSW	205				1
12/1/2024 7:30	27.6	0	SSW	205				1
12/1/2024 8:00	27.7	0	SSW	205				1
12/1/2024 8:30	28.2	0	SSW	205	71	12/1/2024	8:30 AM	1
12/1/2024 9:00	29.4	0	SSW	205				1
12/1/2024 9:30	30.3	0	SSW	205				1
12/1/2024 10:00	30.3	1	SSW	205	72 & 73	12/1/2024	10:00 AM	1
12/1/2024 10:30	31	0	SSW	205				1
12/1/2024 11:00	31.9	2	SSW	207				1
12/1/2024 11:30	32.7	0	SSW	209				1
12/1/2024 12:00	33.2	3	N	5	74	12/1/2024	11:52 AM	1
12/1/2024 12:30	34.6	3	N	5				1
12/1/2024 13:00	34.9	3	NNE	26				1
12/1/2024 13:30	35.6	3	NNE	24				1
12/1/2024 14:00	35.9	0	NNE	20				1
12/1/2024 14:30	36.1	3	NNE	21				1
12/1/2024 15:00	36.4	0	NNE	30				1
12/1/2024 15:30	35.8	0	NNE	30				1
12/1/2024 16:00	35.4	0	NNE	30				1
12/1/2024 16:30	34.2	0	NNE	30				1
12/1/2024 17:00	33.2	0	NNE	30				1
12/1/2024 17:30	32.7	0	NE	49				1
12/1/2024 18:00	32.6	0	NE	48				1
12/1/2024 18:30	32.6	0	NE	48				1
12/1/2024 19:00	32.6	0	NE	49				1
12/1/2024 19:30	31.9	0	NE	49				1
12/1/2024 20:00	31.9	0	NE	49				1
12/1/2024 20:30	32.2	0	NE	49				1
12/1/2024 21:00	31.3	0	NE	49				1
12/1/2024 21:30	31.1	0	NE	50				1
12/1/2024 22:00	31.1	0	NE	50				1
12/1/2024 22:30	31.3	0	NE	50				1
12/1/2024 23:00	31.3	0	NE	50				1
12/1/2024 23:30	31.3	0	NE	50				1
12/6/2024 0:00	30.1	0	SSE	161				6
12/6/2024 0:30	29.3	0	SSE	161				6
12/6/2024 1:00	30.7	1	NE	40				6
12/6/2024 1:30	30.6	0	NE	43				6
12/6/2024 2:00	31.1	0	NE	43				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/6/2024 2:30	30.3	0	NE	43				6
12/6/2024 3:00	29.8	0	NE	43				6
12/6/2024 3:30	28.7	0	NE	44				6
12/6/2024 4:00	28.5	3	S	184				6
12/6/2024 4:30	27.9	0	S	184				6
12/6/2024 5:00	29.1	3	NE	35				6
12/6/2024 5:30	29.1	0	NNE	34				6
12/6/2024 6:00	29.2	0	NNE	34				6
12/6/2024 6:30	28.9	0	NNE	34				6
12/6/2024 7:00	28.7	0	NNE	34				6
12/6/2024 7:30	28.3	2	NNE	34				6
12/6/2024 8:00	27.9	0	NE	35				6
12/6/2024 8:30	29.3	4	NNE	32				6
12/6/2024 9:00	29.7	1	NNE	32				6
12/6/2024 9:30	29.7	0	NNE	32	75	12/6/2024	9:45 AM	6
12/6/2024 10:00	30	0	NNE	33				6
12/6/2024 10:30	31.6	0	NNE	33				6
12/6/2024 11:00	34	2	NNE	33				6
12/6/2024 11:30	34.2	0	NNE	33				6
12/6/2024 12:00	35.7	3	NNE	33				6
12/6/2024 12:30	36.1	0	NNE	33				6
12/6/2024 13:00	37	2	NNE	33				6
12/6/2024 13:30	37.2	3	NNE	32				6
12/6/2024 14:00	38	1	NNE	32				6
12/6/2024 14:30	39.2	3	NNE	31				6
12/6/2024 15:00	38.5	0	NNE	31				6
12/6/2024 15:30	38.4	0	NNE	31				6
12/6/2024 16:00	37.5	1	NNE	31				6
12/6/2024 16:30	36.8	0	NNE	31				6
12/6/2024 17:00	36.4	0	NNE	31				6
12/6/2024 17:30	35.7	0	NNE	31				6
12/6/2024 18:00	34	0	NNE	31				6
12/6/2024 18:30	34.9	0	NNE	32				6
12/6/2024 19:00	35	0	NNE	32				6
12/6/2024 19:30	35.2	0	NNE	32				6
12/6/2024 20:00	34.6	0	NNE	32				6
12/6/2024 20:30	34.4	0	NNE	32				6
12/6/2024 21:00	34.2	0	NE	39				6
12/6/2024 21:30	33.1	0	NE	39				6
12/6/2024 22:00	33	3	NE	38				6
12/6/2024 22:30	33.5	0	N	5				6
12/6/2024 23:00	33.2	0	NNE	34				6
12/6/2024 23:30	33.2	0	NNE	15				6
12/14/2024 0:00	46.5	6	S	188				7
12/14/2024 0:30	46.4	5	S	188				7
12/14/2024 1:00	46.3	9	S	191				7
12/14/2024 1:30	46.4	2	NW	311				7
12/14/2024 2:00	46.1	9	S	176				7
12/14/2024 2:30	45.6	2	SSE	169				7
12/14/2024 3:00	45.7	2	SSW	202				7
12/14/2024 3:30	45.5	9	SW	236				7
12/14/2024 4:00	45.4	6	SW	220				7
12/14/2024 4:30	45.4	7	SW	233				7
12/14/2024 5:00	45.4	6	SW	225				7
12/14/2024 5:30	45.2	9	SSW	212				7
12/14/2024 6:00	45	8	SSW	192				7
12/14/2024 6:30	45.2	7	SE	126				7
12/14/2024 7:00	45.4	12	SSE	167				7
12/14/2024 7:30	45.1	9	SSE	152				7
12/14/2024 8:00	45	3	S	186				7
12/14/2024 8:30	45.1	4	S	188				7
12/14/2024 9:00	45.1	0	S	185				7
12/14/2024 9:30	45.5	8	S	175				7
12/14/2024 10:00	45.7	3	S	182				7
12/14/2024 10:30	45.8	0	SSW	193				7
12/14/2024 11:00	46	3	SSW	194				7
12/14/2024 11:30	46.3	3	SSW	198				7
12/14/2024 12:00	45.6	0	SSW	198				7
12/14/2024 12:30	46.5	0	SSW	198				7

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/14/2024 13:00	47.2	0	SSW	198				7
12/14/2024 13:30	47	3	SSW	198	76	12/14/2024	1:30 PM	7
12/14/2024 14:00	47.1	2	SSW	196				7
12/14/2024 14:30	48	4	SSW	196				7
12/14/2024 15:00	47.1	3	S	181				7
12/14/2024 15:30	47.2	2	SSW	200				7
12/14/2024 16:00	46.9	1	SSE	159				7
12/14/2024 16:30	44.9	0	SSE	159				7
12/14/2024 17:00	43.2	0	SSE	159				7
12/14/2024 17:30	42.7	0	SSE	159				7
12/14/2024 18:00	42.4	4	SSE	159				7
12/14/2024 18:30	41.4	5	SSE	159				7
12/14/2024 19:00	42.5	5	SSW	205				7
12/14/2024 19:30	42.3	4	SSW	205				7
12/14/2024 20:00	41.2	2	SSW	192				7
12/14/2024 20:30	41.4	5	SSW	200				7
12/14/2024 21:00	41.3	4	S	184				7
12/14/2024 21:30	41.2	2	S	184				7
12/14/2024 22:00	41	3	S	181				7
12/14/2024 22:30	41.4	3	S	178				7
12/14/2024 23:00	41	5	SSW	214				7
12/14/2024 23:30	40.7	3	SSW	201				7
12/20/2024 0:00	45.5	0	NE	43				6
12/20/2024 0:30	46.9	0	SE	129				6
12/20/2024 1:00	45.2	1	SE	129				6
12/20/2024 1:30	45.4	0	SE	131				6
12/20/2024 2:00	45.2	0	SE	131				6
12/20/2024 2:30	44.6	0	SE	131				6
12/20/2024 3:00	44.8	0	SE	131				6
12/20/2024 3:30	45.8	0	SE	131				6
12/20/2024 4:00	45.9	0	SE	131				6
12/20/2024 4:30	46.2	0	SE	131				6
12/20/2024 5:00	46	0	SE	131				6
12/20/2024 5:30	45.2	0	SE	131				6
12/20/2024 6:00	46.1	2	ESE	106				6
12/20/2024 6:30	45.7	0	ESE	106				6
12/20/2024 7:00	45.6	2	ESE	106				6
12/20/2024 7:30	45.4	0	ESE	106				6
12/20/2024 8:00	45	0	ESE	106				6
12/20/2024 8:30	44.9	0	ESE	106				6
12/20/2024 9:00	45.5	0	ESE	106				6
12/20/2024 9:30	46.3	0	ESE	102				6
12/20/2024 10:00	46.6	1	E	95				6
12/20/2024 10:30	47.1	0	E	87				6
12/20/2024 11:00	47.5	0	E	88				6
12/20/2024 11:30	47.7	0	E	88				6
12/20/2024 12:00	47	1	ENE	63				6
12/20/2024 12:30	47.4	2	NE	50				6
12/20/2024 13:00	48.5	0	NE	41				6
12/20/2024 13:30	48.9	4	W	269				6
12/20/2024 14:00	49	1	W	267				6
12/20/2024 14:30	49.7	0	W	267				6
12/20/2024 15:00	50.2	0	W	267	77	12/20/2024	3:00 PM	6
12/20/2024 15:30	49.8	1	W	271				6
12/20/2024 16:00	49.6	2	W	271				6
12/20/2024 16:30	49	0	W	271				6
12/20/2024 17:00	48.1	0	W	271				6
12/20/2024 17:30	47.6	2	W	269				6
12/20/2024 18:00	46	2	W	267				6
12/20/2024 18:30	43.8	2	W	267				6
12/20/2024 19:00	45.3	1	W	267				6
12/20/2024 19:30	45.7	0	W	267				6
12/20/2024 20:00	45.7	3	W	267				6
12/20/2024 20:30	46	2	SSE	163				6
12/20/2024 21:00	45.5	0	SSE	165				6
12/20/2024 21:30	46.2	0	SSE	165				6
12/20/2024 22:00	45	2	SE	132				6
12/20/2024 22:30	44.9	0	SE	132				6
12/20/2024 23:00	45	2	SE	132				6

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/20/2024 23:30	45	0	SE	132				6
12/23/2024 0:00	46.3	0	SSW	193				2
12/23/2024 0:30	44.8	2	SSW	193				2
12/23/2024 1:00	45.9	5	NE	39				2
12/23/2024 1:30	45.6	0	NE	41				2
12/23/2024 2:00	44	2	NE	41				2
12/23/2024 2:30	44	0	NE	43				2
12/23/2024 3:00	43	1	NE	43				2
12/23/2024 3:30	43.1	0	N	5				2
12/23/2024 4:00	42.4	0	NE	41				2
12/23/2024 4:30	42.9	0	NE	40				2
12/23/2024 5:00	41.3	0	NE	40				2
12/23/2024 5:30	41.1	0	NE	40				2
12/23/2024 6:00	39.3	0	NE	40				2
12/23/2024 6:30	38.3	0	NE	40				2
12/23/2024 7:00	38.5	0	NE	42				2
12/23/2024 7:30	36.6	0	NE	42				2
12/23/2024 8:00	36.3	0	NE	42				2
12/23/2024 8:30	36.9	0	NE	42				2
12/23/2024 9:00	38.1	0	NE	42				2
12/23/2024 9:30	40.1	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 10:00	41.4	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 10:30	42.2	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 11:00	43.2	2	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 11:30	43.6	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 12:00	44.3	4	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 12:30	44.8	0	NE	42	78	12/23/2024	9:30 AM - 12:30 PM	2
12/23/2024 13:00	45.1	0	NE	42				2
12/23/2024 13:30	45.1	0	NE	42				2
12/23/2024 14:00	44.9	0	NE	42	79	12/23/2024	2:00 PM	2
12/23/2024 14:30	44.5	1	NE	42				2
12/23/2024 15:00	44.5	0	S	184				2
12/23/2024 15:30	44.7	0	S	184				2
12/23/2024 16:00	44.6	5	SW	219				2
12/23/2024 16:30	44.5	1	SW	215				2
12/23/2024 17:00	44.5	0	SW	215				2
12/23/2024 17:30	44.7	1	NNE	25				2
12/23/2024 18:00	44.6	1	NNE	29				2
12/23/2024 18:30	44.7	0	W	269				2
12/23/2024 19:00	44.6	0	W	269				2
12/23/2024 19:30	44.8	0	SSE	161				2
12/23/2024 20:00	46	0	SSE	157				2
12/23/2024 20:30	46	0	SE	131				2
12/23/2024 21:00	45.8	0	E	94				2
12/23/2024 21:30	47.6	6	SSW	211				2
12/23/2024 22:00	48.8	5	WSW	238				2
12/23/2024 22:30	49.7	4	SW	215				2
12/23/2024 23:00	49	0	WSW	256				2
12/23/2024 23:30	48.7	0	SW	231				2
12/29/2024 0:00	44.9	2	W	274				1
12/29/2024 0:30	44.9	1	W	273				1
12/29/2024 1:00	44.8	0	W	273				1
12/29/2024 1:30	44.8	0	W	272				1
12/29/2024 2:00	44.7	2	W	271				1
12/29/2024 2:30	44.6	0	W	271				1
12/29/2024 3:00	44.5	1	W	271				1
12/29/2024 3:30	44.6	4	SSE	167				1
12/29/2024 4:00	44.6	0	SSE	167				1
12/29/2024 4:30	44.6	0	SSE	167				1
12/29/2024 5:00	44.8	2	S	184				1
12/29/2024 5:30	44.8	1	S	181				1
12/29/2024 6:00	44.9	6	S	163				1
12/29/2024 6:30	45	6	SSE	161				1
12/29/2024 7:00	45	0	SSE	161				1
12/29/2024 7:30	45	0	SSE	159				1
12/29/2024 8:00	45	0	SSE	159				1
12/29/2024 8:30	45.2	0	SSE	159				1
12/29/2024 9:00	45.5	0	SSE	159				1

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/29/2024 9:30	46.4	2	SSE	161	80 & 81	12/29/2024	9:29 AM	1
12/29/2024 10:00	46.5	1	SSE	161				1
12/29/2024 10:30	47.8	6	SSE	165				1
12/29/2024 11:00	47.7	7	SW	216				1
12/29/2024 11:30	48.1	14	WSW	241				1
12/29/2024 12:00	48.8	4	SSW	199				1
12/29/2024 12:30	49	7	S	185				1
12/29/2024 13:00	47.9	7	SW	234				1
12/29/2024 13:30	49	7	S	186				1
12/29/2024 14:00	50	9	SSW	200				1
12/29/2024 14:30	49.4	6	SSW	200				1
12/29/2024 15:00	48.9	4	SSW	207				1
12/29/2024 15:30	46.4	7	SSW	199				1
12/29/2024 16:00	44.8	2	S	182				1
12/29/2024 16:30	44.1	2	S	182	82	12/29/2024	4:45 PM	1
12/29/2024 17:00	44.1	2	S	182				1
12/29/2024 17:30	44.3	1	S	182				1
12/29/2024 18:00	44	2	S	182				1
12/29/2024 18:30	44.3	2	S	184	81	12/29/2024	6:30 PM	1
12/29/2024 19:00	44	7	SSE	165				1
12/29/2024 19:30	43.6	2	SSW	192				1
12/29/2024 20:00	43.8	5	S	178				1
12/29/2024 20:30	43.2	4	SSW	193				1
12/29/2024 21:00	43	4	SSW	193				1
12/29/2024 21:30	42.4	0	SSW	210				1
12/29/2024 22:00	42.4	0	S	188				1
12/29/2024 22:30	42.2	2	S	185				1
12/29/2024 23:00	41.7	4	E	95				1
12/29/2024 23:30	41.5	0	NE	36				1
12/31/2024 0:00	35.7	0	SSE	169				3
12/31/2024 0:30	35.9	0	SSE	169				3
12/31/2024 1:00	37.2	0	SSE	169				3
12/31/2024 1:30	36	1	NE	51				3
12/31/2024 2:00	35.3	0	NE	51				3
12/31/2024 2:30	36.4	2	NE	51				3
12/31/2024 3:00	36.6	0	NE	51				3
12/31/2024 3:30	36.9	0	NE	51				3
12/31/2024 4:00	37	0	NE	51				3
12/31/2024 4:30	37.2	0	NE	51				3
12/31/2024 5:00	37.5	0	NE	51				3
12/31/2024 5:30	37.6	0	NE	51				3
12/31/2024 6:00	37.8	2	NE	51				3
12/31/2024 6:30	37.8	0	NE	51				3
12/31/2024 7:00	37.9	0	NE	51				3
12/31/2024 7:30	37.7	0	NE	51				3
12/31/2024 8:00	37.5	0	NE	51				3
12/31/2024 8:30	37.2	0	SE	139				3
12/31/2024 9:00	36.8	0	SE	142				3
12/31/2024 9:30	37.1	0	SE	142				3
12/31/2024 10:00	37.2	0	SE	142				3
12/31/2024 10:30	37.3	2	SSE	161				3
12/31/2024 11:00	36.7	2	S	175				3
12/31/2024 11:30	36.4	2	S	175				3
12/31/2024 12:00	36.4	5	S	173				3
12/31/2024 12:30	36.7	5	ENE	62				3
12/31/2024 13:00	37.4	0	S	174				3
12/31/2024 13:30	38.3	3	S	174				3
12/31/2024 14:00	38.5	0	S	174				3
12/31/2024 14:30	38.7	1	S	175				3
12/31/2024 15:00	38.7	2	S	175				3
12/31/2024 15:30	38.3	2	S	175	83	12/31/2024	3:45 PM	3
12/31/2024 16:00	37.9	3	S	174				3
12/31/2024 16:30	37.7	1	NE	42				3
12/31/2024 17:00	37.7	3	NNE	19				3
12/31/2024 17:30	37.7	0	NNE	25				3
12/31/2024 18:00	38	0	NNE	32				3
12/31/2024 18:30	38.1	2	NNE	32				3
12/31/2024 19:00	38.4	0	NE	35				3
12/31/2024 19:30	39.4	4	S	171				3

Coffin Butte Landfill On-site Meteorological Data for Recent Odor Complaints (2022 to 2024)

Time Stamp	Temperature (F)	Wind Speed (mph)	Wind Direction	Wind Direction (deg)	Odor Event ID	Odor Event Date	Odor Event Time	Odor Event Day of Week
12/31/2024 20:00	40.3	8	SSW	207				3
12/31/2024 20:30	40.7	6	S	190				3
12/31/2024 21:00	40.8	12	SW	235				3
12/31/2024 21:30	41	4	S	181				3
12/31/2024 22:00	40.8	6	S	188				3
12/31/2024 22:30	40.6	4	SW	215				3
12/31/2024 23:00	40.4	3	SW	227				3
12/31/2024 23:30	40.4	0	SSW	211				3
1/1/2025 0:00	40.4	1	SW	234	84	1/1/2025	12:00 AM	4
1/1/2025 0:30	40.4	2	SW	232				
1/1/2025 1:00	40.1	0	SW	232				
1/1/2025 1:30	39.6	0	SW	232				
1/1/2025 2:00	39.7	0	SW	232				
1/1/2025 2:30	39.7	0	SW	232				
1/1/2025 3:00	39.8	0	SW	232				
1/1/2025 3:30	40.1	0	SW	232				
1/1/2025 4:00	40.2	0	SW	232				
1/1/2025 4:30	40.4	0	SW	232				
1/1/2025 5:00	40.4	0	SW	232				
1/1/2025 5:30	40.5	0	SW	232				
1/1/2025 6:00	39.9	0	SW	232				
1/1/2025 6:30	40.2	0	SW	232				
1/1/2025 7:00	39.8	0	SW	232				
1/1/2025 7:30	39.1	0	SW	232				
1/1/2025 8:00	39	0	SW	232				
1/1/2025 8:30	40.2	0	SW	232				
1/1/2025 9:00	41	0	SW	232				
1/1/2025 9:30	41.7	0	SW	232				
1/1/2025 10:00	42.4	0	SW	232				
1/1/2025 10:30	43	0	SW	232				
1/1/2025 11:00	43.2	0	SW	232				
1/1/2025 11:30	43.4	2	SW	231				
1/1/2025 12:00	43.7	0	SW	232				
1/1/2025 12:30	44.1	0	SW	232				
1/1/2025 13:00	44.3	0	SW	232				
1/1/2025 13:30	44.4	2	SW	232				
1/1/2025 14:00	44.5	0	SW	232				
1/1/2025 14:30	44.5	2	SW	235				
1/1/2025 15:00	44.5	0	SW	236				
1/1/2025 15:30	44.8	1	NE	48				
1/1/2025 16:00	44.7	0	NE	47				
1/1/2025 16:30	44.5	1	NE	45				
1/1/2025 17:00	44.3	0	NE	45				
1/1/2025 17:30	44.3	3	NE	45				
1/1/2025 18:00	44.3	0	NE	44				
1/1/2025 18:30	44.2	0	NE	44				
1/1/2025 19:00	44.2	1	NE	43				
1/1/2025 19:30	44	0	NE	43				
1/1/2025 20:00	43.8	0	NE	43				
1/1/2025 20:30	43.8	0	NE	43				
1/1/2025 21:00	43.7	0	NE	43				
1/1/2025 21:30	43.6	0	NE	43				
1/1/2025 22:00	43.6	0	NE	43				
1/1/2025 22:30	43.6	0	NE	43				
1/1/2025 23:00	43.7	0	NE	43				
1/1/2025 23:30	43.6	0	NE	43				

Appendix B

Odor Pollutant Screening

Odor Pollutant Screening Based on 2023 Emission Inventory

CAS No.	Pollutant	2023 Emissions (lb/yr)	2023 Emissions (g/s)	Odor Threshold (g/m3)	Odor Emission Rate (m3/s)	Odor Emission Rate Percent (%)
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	9.866E+01	1.419E-03	5.293E-03	2.681E-01	0.0%
79-34-5	1,1,2,2-Tetrachloroethane	2.871E+02	4.129E-03	1.600E-03	2.581E+00	0.0%
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.583E+02	5.154E-03	4.857E-01	1.061E-02	0.0%
78-87-5	1,2-Dichloropropane (propylene dichloride)	3.134E+01	4.507E-04	1.155E-03	3.901E-01	0.0%
106-99-0	1,3-Butadiene	3.630E-01	1.374E-05	2.190E-04	6.275E-02	0.0%
78-93-3	2-Butanone (methyl ethyl ketone)	7.877E+02	1.133E-02	2.064E-04	5.489E+01	0.4%
83-32-9	Acenaphthene	1.318E-02	4.991E-07	0.000E+00	0.000E+00	0.0%
208-96-8	Acenaphthylene	4.698E-02	1.778E-06	0.000E+00	0.000E+00	0.0%
75-07-0	Acetaldehyde	7.122E+00	2.696E-04	2.703E-06	9.973E+01	0.7%
67-64-1	Acetone	6.273E+02	9.023E-03	9.502E-04	9.496E+00	0.1%
107-02-8	Acrolein	8.589E-01	3.251E-05	6.191E-06	5.252E+00	0.0%
107-13-1	Acrylonitrile	5.175E+02	7.443E-03	3.472E-03	2.144E+00	0.0%
120-12-7	Anthracene	1.736E-02	6.573E-07	0.000E+00	0.000E+00	0.0%
56-55-3	Benz[a]anthracene	1.560E-02	5.905E-07	0.000E+00	0.000E+00	0.0%
71-43-2	Benzene	2.385E+02	3.634E-03	1.502E-03	2.420E+00	0.0%
50-32-8	Benzo[a]pyrene	1.746E-03	6.608E-08	0.000E+00	0.000E+00	0.0%
205-99-2	Benzo[b]fluoranthene	9.201E-04	3.483E-08	0.000E+00	0.000E+00	0.0%
191-24-2	Benzo[g,h,i]perylene	4.540E-03	1.719E-07	0.000E+00	0.000E+00	0.0%
75-27-4	Bromodichloromethane	7.901E+02	1.136E-02	0.000E+00	0.000E+00	0.0%
106-97-8	Butane	4.274E+02	6.147E-03	1.001E-03	6.143E+00	0.0%
124-38-9	Carbon dioxide	3.040E+07	4.373E+02	7.020E+01	6.229E+00	0.0%
75-15-0	Carbon disulfide	6.803E+01	9.786E-04	4.983E-05	1.964E+01	0.1%
630-08-0	Carbon monoxide	1.135E+05	1.841E+00	0.000E+00	0.000E+00	0.0%
56-23-5	Carbon tetrachloride	9.481E-01	1.364E-05	1.057E-02	1.290E-03	0.0%
463-58-1	Carbonyl sulfide	4.535E+01	6.523E-04	1.401E-04	4.657E+00	0.0%
108-90-7	Chlorobenzene	4.336E+01	6.236E-04	4.005E-04	1.557E+00	0.0%
75-45-6	Chlorodifluoromethane (Freon 22)	1.732E+02	2.491E-03	7.080E+02	3.519E-06	0.0%
75-00-3	Chloroethane (ethyl chloride)	1.243E+02	1.787E-03	1.003E-02	1.782E-01	0.0%
67-66-3	Chloroform	5.519E+00	7.938E-05	4.980E-04	1.594E-01	0.0%
74-87-3	Chloromethane (methyl chloride)	9.413E+01	1.354E-03	2.065E-02	6.556E-02	0.0%
218-01-9	Chrysene	3.278E-03	1.241E-07	0.000E+00	0.000E+00	0.0%
53-70-3	Dibenz[a,h]anthracene	5.413E-03	2.049E-07	0.000E+00	0.000E+00	0.0%
75-71-8	Dichlorodifluoromethane (Freon 12)	2.925E+03	4.207E-02	9.880E+02	4.258E-05	0.0%
75-43-4	Dichlorofluoromethane (Freon 21)	4.155E+02	5.976E-03	0.000E+00	0.000E+00	0.0%
75-09-2	Dichloromethane (methylene chloride)	1.871E+03	2.692E-02	4.168E-03	6.458E+00	0.0%
75-18-3	Dimethyl sulfide (methyl sulfide)	7.127E+02	1.025E-02	2.541E-06	4.034E+03	28.4%
74-84-0	Ethane	3.936E+04	5.661E-01	0.000E+00	0.000E+00	0.0%
64-17-5	Ethanol	1.830E+03	2.632E-02	1.696E-04	1.552E+02	1.1%
100-41-4	Ethyl benzene	7.540E+02	1.085E-02	8.684E-06	1.249E+03	8.8%
75-08-1	Ethyl mercaptan (ethanethiol)	2.102E+02	3.023E-03	2.541E-06	1.189E+03	8.4%
106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	2.895E-01	4.164E-06	7.683E-02	5.419E-05	0.0%
107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	6.251E+01	8.992E-04	1.740E-02	5.166E-02	0.0%
206-44-0	Fluoranthene	7.066E-02	2.675E-06	0.000E+00	0.000E+00	0.0%
86-73-7	Fluorene	2.711E-01	1.026E-05	0.000E+00	0.000E+00	0.0%
50-00-0	Formaldehyde	1.096E+01	4.147E-04	3.316E-05	1.251E+01	0.1%
110-54-3	Hexane	8.724E+02	1.255E-02	5.287E-03	2.374E+00	0.0%
7783-06-4	Hydrogen sulfide	1.864E+03	2.681E-02	6.551E-06	4.093E+03	28.8%
193-39-5	Indeno[1,2,3-cd]pyrene	3.482E-03	1.318E-07	0.000E+00	0.000E+00	0.0%
67-63-0	Isopropyl alcohol	4.640E+03	6.674E-02	2.458E-03	2.715E+01	0.2%
7439-97-6	Mercury and compounds	9.025E-02	1.298E-06	0.000E+00	0.000E+00	0.0%
74-82-8	Methane	1.251E+07	1.799E+02	0.000E+00	0.000E+00	0.0%
108-10-1	Methyl isobutyl ketone (MIBK, hexone)	2.886E+02	4.151E-03	1.229E-04	3.378E+01	0.2%
74-93-1	Methyl mercaptan	1.769E+02	2.544E-03	4.132E-06	6.157E+02	4.3%
91-20-3	Naphthalene	7.874E-01	2.981E-05	6.816E-06	4.373E+00	0.0%
N/A	NMOC	8.602E+04	1.316E+00	0.000E+00	0.000E+00	0.0%
10102-44-0	NOx (as NO2)	6.138E+04	1.848E+00	1.882E-03	9.821E+02	6.9%
106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	4.756E+01	6.841E-04	7.276E-04	9.403E-01	0.0%
109-66-0	Pentane	3.502E+02	5.037E-03	3.807E-03	1.323E+00	0.0%
85-01-8	Phenanthrene	2.730E-01	1.033E-05	0.000E+00	0.000E+00	0.0%
N/A	PM	3.908E+04	6.306E-01	0.000E+00	0.000E+00	0.0%
N/A	PM10	1.656E+04	3.067E-01	0.000E+00	0.000E+00	0.0%
74-98-6	Propane	7.133E+02	1.026E-02	2.700E+00	3.800E-03	0.0%
7446-09-5	Sulfur dioxide	9.380E+03	1.988E-01	8.646E-04	2.299E+02	1.6%
127-18-4	Tetrachloroethene (perchloroethylene)	9.530E+02	1.371E-02	5.202E-03	2.635E+00	0.0%
108-88-3	Toluene	5.582E+03	8.038E-02	9.799E-05	8.203E+02	5.8%
N/A	Total landfill gas	4.291E+07	6.172E+02	0.000E+00	0.000E+00	0.0%
156-60-5	trans-1,2-Dichloroethene	4.242E+02	6.101E-03	1.098E+00	5.555E-03	0.0%
79-01-6	Trichloroethene (TCE, trichloroethylene)	5.709E+02	8.212E-03	2.687E-03	3.056E+00	0.0%
75-69-4	Trichlorofluoromethane (Freon 11)	1.609E+02	2.314E-03	2.809E-02	8.237E-02	0.0%
75-01-4	Vinyl chloride	7.068E+02	1.017E-02	5.189E-01	1.959E-02	0.0%

Odor Pollutant Screening Based on 2023 Emission Inventory

CAS No.	Pollutant	2023 Emissions (lb/yr)	2023 Emissions (g/s)	Odor Threshold (g/m3)	Odor Emission Rate (m3/s)	Odor Emission Rate Percent (%)
75-35-4	Vinylidene chloride	2.155E+01	3.100E-04	1.983E-01	1.564E-03	0.0%
N/A	VOC	3.698E+04	6.103E-01	0.000E+00	0.000E+00	0.0%
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.982E+03	2.857E-02	5.210E-05	5.483E+02	3.9%
				Total:	1.423E+04	100.0%

Appendix C

Scenario #1 Emission Rates

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
ATEI	F-LFG1	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	3.483E+00	8760	5.009E-05
ATEI	F-LFG2	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	9.320E+01	8760	1.340E-03
ATEI	OPEN FLARE-1	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	9.464E-01	8760	1.361E-05
ATEI	OPEN FLARE-2	71-55-6	1,1,1-Trichloroethane (methyl chloroform)	1.039E+00	8760	1.495E-05
ATEI	F-LFG1	79-34-5	1,1,2,2-Tetrachloroethane	1.013E+01	8760	1.457E-04
ATEI	F-LFG2	79-34-5	1,1,2,2-Tetrachloroethane	2.712E+02	8760	3.900E-03
ATEI	OPEN FLARE-1	79-34-5	1,1,2,2-Tetrachloroethane	2.753E+00	8760	3.960E-05
ATEI	OPEN FLARE-2	79-34-5	1,1,2,2-Tetrachloroethane	3.024E+00	8760	4.350E-05
ATEI	F-LFG1	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	1.265E+01	8760	1.819E-04
ATEI	F-LFG2	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.385E+02	8760	4.869E-03
ATEI	OPEN FLARE-1	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.437E+00	8760	4.944E-05
ATEI	OPEN FLARE-2	75-34-3	1,1-Dichloroethane (ethylidene dichloride)	3.775E+00	8760	5.430E-05
ATEI	F-LFG1	78-87-5	1,2-Dichloropropane (propylene dichloride)	1.106E+00	8760	1.591E-05
ATEI	F-LFG2	78-87-5	1,2-Dichloropropane (propylene dichloride)	2.960E+01	8760	4.257E-04
ATEI	OPEN FLARE-1	78-87-5	1,2-Dichloropropane (propylene dichloride)	3.006E-01	8760	4.323E-06
ATEI	OPEN FLARE-2	78-87-5	1,2-Dichloropropane (propylene dichloride)	3.301E-01	8760	4.748E-06
ATEI	TIP-2	106-99-0	1,3-Butadiene	2.046E-01	3322	7.759E-06
ATEI	TIP-3	106-99-0	1,3-Butadiene	1.585E-01	3337	5.983E-06
ATEI	F-LFG1	78-93-3	2-Butanone (methyl ethyl ketone)	2.780E+01	8760	3.999E-04
ATEI	F-LFG2	78-93-3	2-Butanone (methyl ethyl ketone)	7.441E+02	8760	1.070E-02
ATEI	OPEN FLARE-1	78-93-3	2-Butanone (methyl ethyl ketone)	7.556E+00	8760	1.087E-04
ATEI	OPEN FLARE-2	78-93-3	2-Butanone (methyl ethyl ketone)	8.299E+00	8760	1.194E-04
ATEI	TIP-2	83-32-9	Acenaphthene	7.430E-03	3322	2.818E-07
ATEI	TIP-3	83-32-9	Acenaphthene	5.755E-03	3337	2.173E-07
ATEI	TIP-2	208-96-8	Acenaphthylene	2.647E-02	3322	1.004E-06
ATEI	TIP-3	208-96-8	Acenaphthylene	2.051E-02	3337	7.743E-07
ATEI	TIP-2	75-07-0	Acetaldehyde	4.013E+00	3322	1.522E-04
ATEI	TIP-3	75-07-0	Acetaldehyde	3.108E+00	3337	1.174E-04
ATEI	F-LFG1	67-64-1	Acetone	2.214E+01	8760	3.185E-04
ATEI	F-LFG2	67-64-1	Acetone	5.925E+02	8760	8.523E-03
ATEI	OPEN FLARE-1	67-64-1	Acetone	6.017E+00	8760	8.654E-05
ATEI	OPEN FLARE-2	67-64-1	Acetone	6.609E+00	8760	9.506E-05
ATEI	TIP-2	107-02-8	Acrolein	4.840E-01	3322	1.836E-05
ATEI	TIP-3	107-02-8	Acrolein	3.749E-01	3337	1.415E-05
ATEI	F-LFG1	107-13-1	Acrylonitrile	1.827E+01	8760	2.627E-04
ATEI	F-LFG2	107-13-1	Acrylonitrile	4.888E+02	8760	7.031E-03
ATEI	OPEN FLARE-1	107-13-1	Acrylonitrile	4.964E+00	8760	7.139E-05
ATEI	OPEN FLARE-2	107-13-1	Acrylonitrile	5.452E+00	8760	7.842E-05
ATEI	TIP-2	120-12-7	Anthracene	9.784E-03	3322	3.711E-07
ATEI	TIP-3	120-12-7	Anthracene	7.579E-03	3337	2.862E-07
ATEI	TIP-2	56-55-3	Benz[a]anthracene	8.790E-03	3322	3.334E-07
ATEI	TIP-3	56-55-3	Benz[a]anthracene	6.809E-03	3337	2.571E-07
ATEI	F-LFG1	71-43-2	Benzene	8.114E+00	8760	1.167E-04
ATEI	F-LFG2	71-43-2	Benzene	2.171E+02	8760	3.123E-03
ATEI	OPEN FLARE-1	71-43-2	Benzene	2.205E+00	8760	3.171E-05
ATEI	OPEN FLARE-2	71-43-2	Benzene	2.422E+00	8760	3.483E-05
ATEI	TIP-2	71-43-2	Benzene	4.882E+00	3322	1.852E-04
ATEI	TIP-3	71-43-2	Benzene	3.781E+00	3337	1.428E-04
ATEI	TIP-2	50-32-8	Benzo[a]pyrene	9.836E-04	3322	3.731E-08
ATEI	TIP-3	50-32-8	Benzo[a]pyrene	7.619E-04	3337	2.877E-08
ATEI	TIP-2	205-99-2	Benzo[b]fluoranthene	5.185E-04	3322	1.967E-08
ATEI	TIP-3	205-99-2	Benzo[b]fluoranthene	4.016E-04	3337	1.516E-08
ATEI	TIP-2	191-24-2	Benzo[g,h,i]perylene	2.559E-03	3322	9.704E-08
ATEI	TIP-3	191-24-2	Benzo[g,h,i]perylene	1.982E-03	3337	7.483E-08
ATEI	F-LFG1	75-27-4	Bromodichloromethane	2.789E+01	8760	4.011E-04
ATEI	F-LFG2	75-27-4	Bromodichloromethane	7.463E+02	8760	1.073E-02
ATEI	OPEN FLARE-1	75-27-4	Bromodichloromethane	7.578E+00	8760	1.090E-04
ATEI	OPEN FLARE-2	75-27-4	Bromodichloromethane	8.324E+00	8760	1.197E-04
LandGem	F-LFG (FUG)	106-97-8	Butane	4.032E+02	8760	5.799E-03
LandGem	OPEN FLARE-1	106-97-8	Butane	1.210E+01	8760	1.740E-04
LandGem	OPEN FLARE-2	106-97-8	Butane	1.210E+01	8760	1.740E-04
LandGem	F-LFG (FUG)	124-38-9	Carbon dioxide	2.868E+07	8760	4.125E+02
LandGem	OPEN FLARE-1	124-38-9	Carbon dioxide	8.604E+05	8760	1.238E+01
LandGem	OPEN FLARE-2	124-38-9	Carbon dioxide	8.604E+05	8760	1.238E+01
ATEI	F-LFG1	75-15-0	Carbon disulfide	2.401E+00	8760	3.454E-05
ATEI	F-LFG2	75-15-0	Carbon disulfide	6.426E+01	8760	9.243E-04
ATEI	OPEN FLARE-1	75-15-0	Carbon disulfide	6.525E-01	8760	9.386E-06
ATEI	OPEN FLARE-2	75-15-0	Carbon disulfide	7.167E-01	8760	1.031E-05
Annual TV	AIA	630-08-0	Carbon monoxide	2.000E+03	8760	2.877E-02
Annual TV	F-LFG1	630-08-0	Carbon monoxide	2.200E+02	8760	3.164E-03
Annual TV	F-LFG2	630-08-0	Carbon monoxide	5.880E+03	8760	8.458E-02

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
Annual TV	OPEN FLARE-1	630-08-0	Carbon monoxide	3.184E+04	8760	4.580E-01
Annual TV	OPEN FLARE-2	630-08-0	Carbon monoxide	6.472E+04	8760	9.309E-01
Annual TV	TIP-2	630-08-0	Carbon monoxide	5.000E+03	3322	1.896E-01
Annual TV	TIP-3	630-08-0	Carbon monoxide	3.860E+03	3337	1.457E-01
ATEI	F-LFG1	56-23-5	Carbon tetrachloride	3.347E-02	8760	4.814E-07
ATEI	F-LFG2	56-23-5	Carbon tetrachloride	8.956E-01	8760	1.288E-05
ATEI	OPEN FLARE-1	56-23-5	Carbon tetrachloride	9.094E-03	8760	1.308E-07
ATEI	OPEN FLARE-2	56-23-5	Carbon tetrachloride	9.989E-03	8760	1.437E-07
ATEI	F-LFG1	463-58-1	Carbonyl sulfide	1.601E+00	8760	2.302E-05
ATEI	F-LFG2	463-58-1	Carbonyl sulfide	4.284E+01	8760	6.162E-04
ATEI	OPEN FLARE-1	463-58-1	Carbonyl sulfide	4.350E-01	8760	6.257E-06
ATEI	OPEN FLARE-2	463-58-1	Carbonyl sulfide	4.778E-01	8760	6.872E-06
ATEI	F-LFG1	108-90-7	Chlorobenzene	1.530E+00	8760	2.201E-05
ATEI	F-LFG2	108-90-7	Chlorobenzene	4.095E+01	8760	5.891E-04
ATEI	OPEN FLARE-1	108-90-7	Chlorobenzene	4.159E-01	8760	5.982E-06
ATEI	OPEN FLARE-2	108-90-7	Chlorobenzene	4.568E-01	8760	6.570E-06
ATEI	F-LFG1	75-45-6	Chlorodifluoromethane (Freon 22)	6.113E+00	8760	8.793E-05
ATEI	F-LFG2	75-45-6	Chlorodifluoromethane (Freon 22)	1.636E+02	8760	2.353E-03
ATEI	OPEN FLARE-1	75-45-6	Chlorodifluoromethane (Freon 22)	1.661E+00	8760	2.389E-05
ATEI	OPEN FLARE-2	75-45-6	Chlorodifluoromethane (Freon 22)	1.825E+00	8760	2.625E-05
ATEI	F-LFG1	75-00-3	Chloroethane (ethyl chloride)	4.386E+00	8760	6.309E-05
ATEI	F-LFG2	75-00-3	Chloroethane (ethyl chloride)	1.174E+02	8760	1.688E-03
ATEI	OPEN FLARE-1	75-00-3	Chloroethane (ethyl chloride)	1.192E+00	8760	1.714E-05
ATEI	OPEN FLARE-2	75-00-3	Chloroethane (ethyl chloride)	1.309E+00	8760	1.883E-05
ATEI	F-LFG1	67-66-3	Chloroform	1.948E-01	8760	2.802E-06
ATEI	F-LFG2	67-66-3	Chloroform	5.213E+00	8760	7.498E-05
ATEI	OPEN FLARE-1	67-66-3	Chloroform	5.293E-02	8760	7.613E-07
ATEI	OPEN FLARE-2	67-66-3	Chloroform	5.814E-02	8760	8.362E-07
ATEI	F-LFG1	74-87-3	Chloromethane (methyl chloride)	3.322E+00	8760	4.779E-05
ATEI	F-LFG2	74-87-3	Chloromethane (methyl chloride)	8.891E+01	8760	1.279E-03
ATEI	OPEN FLARE-1	74-87-3	Chloromethane (methyl chloride)	9.029E-01	8760	1.299E-05
ATEI	OPEN FLARE-2	74-87-3	Chloromethane (methyl chloride)	9.917E-01	8760	1.426E-05
ATEI	TIP-2	218-01-9	Chrysene	1.847E-03	3322	7.005E-08
ATEI	TIP-3	218-01-9	Chrysene	1.431E-03	3337	5.402E-08
ATEI	TIP-2	53-70-3	Dibenz[a,h]anthracene	3.050E-03	3322	1.157E-07
ATEI	TIP-3	53-70-3	Dibenz[a,h]anthracene	2.363E-03	3337	8.921E-08
ATEI	F-LFG1	75-71-8	Dichlorodifluoromethane (Freon 12)	1.032E+02	8760	1.485E-03
ATEI	F-LFG2	75-71-8	Dichlorodifluoromethane (Freon 12)	2.763E+03	8760	3.974E-02
ATEI	OPEN FLARE-1	75-71-8	Dichlorodifluoromethane (Freon 12)	2.805E+01	8760	4.035E-04
ATEI	OPEN FLARE-2	75-71-8	Dichlorodifluoromethane (Freon 12)	3.081E+01	8760	4.432E-04
ATEI	F-LFG1	75-43-4	Dichlorofluoromethane (Freon 21)	1.466E+01	8760	2.109E-04
ATEI	F-LFG2	75-43-4	Dichlorofluoromethane (Freon 21)	3.924E+02	8760	5.645E-03
ATEI	OPEN FLARE-1	75-43-4	Dichlorofluoromethane (Freon 21)	3.985E+00	8760	5.732E-05
ATEI	OPEN FLARE-2	75-43-4	Dichlorofluoromethane (Freon 21)	4.377E+00	8760	6.296E-05
ATEI	F-LFG1	75-09-2	Dichloromethane (methylene chloride)	6.606E+01	8760	9.501E-04
ATEI	F-LFG2	75-09-2	Dichloromethane (methylene chloride)	1.768E+03	8760	2.543E-02
ATEI	OPEN FLARE-1	75-09-2	Dichloromethane (methylene chloride)	1.795E+01	8760	2.582E-04
ATEI	OPEN FLARE-2	75-09-2	Dichloromethane (methylene chloride)	1.972E+01	8760	2.836E-04
LandGem	F-LFG (FUG)	75-18-3	Dimethyl sulfide (methyl sulfide)	6.724E+02	8760	9.671E-03
LandGem	OPEN FLARE-1	75-18-3	Dimethyl sulfide (methyl sulfide)	2.017E+01	8760	2.901E-04
LandGem	OPEN FLARE-2	75-18-3	Dimethyl sulfide (methyl sulfide)	2.017E+01	8760	2.901E-04
LandGem	F-LFG (FUG)	74-84-0	Ethane	3.713E+04	8760	5.341E-01
LandGem	OPEN FLARE-1	74-84-0	Ethane	1.114E+03	8760	1.602E-02
LandGem	OPEN FLARE-2	74-84-0	Ethane	1.114E+03	8760	1.602E-02
LandGem	F-LFG (FUG)	64-17-5	Ethanol	1.726E+03	8760	2.483E-02
LandGem	OPEN FLARE-1	64-17-5	Ethanol	5.179E+01	8760	7.449E-04
LandGem	OPEN FLARE-2	64-17-5	Ethanol	5.179E+01	8760	7.449E-04
ATEI	F-LFG1	100-41-4	Ethyl benzene	2.662E+01	8760	3.828E-04
ATEI	F-LFG2	100-41-4	Ethyl benzene	7.122E+02	8760	1.024E-02
ATEI	OPEN FLARE-1	100-41-4	Ethyl benzene	7.233E+00	8760	1.040E-04
ATEI	OPEN FLARE-2	100-41-4	Ethyl benzene	7.944E+00	8760	1.143E-04
LandGem	F-LFG (FUG)	75-08-1	Ethyl mercaptan (ethanethiol)	1.983E+02	8760	2.852E-03
LandGem	OPEN FLARE-1	75-08-1	Ethyl mercaptan (ethanethiol)	5.948E+00	8760	8.555E-05
LandGem	OPEN FLARE-2	75-08-1	Ethyl mercaptan (ethanethiol)	5.948E+00	8760	8.555E-05
ATEI	F-LFG1	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	1.022E-02	8760	1.470E-07
ATEI	F-LFG2	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	2.734E-01	8760	3.933E-06
ATEI	OPEN FLARE-1	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	2.777E-03	8760	3.994E-08
ATEI	OPEN FLARE-2	106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	3.050E-03	8760	4.387E-08
ATEI	F-LFG1	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	2.207E+00	8760	3.174E-05
ATEI	F-LFG2	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	5.905E+01	8760	8.493E-04
ATEI	OPEN FLARE-1	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	5.996E-01	8760	8.625E-06

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
ATEI	OPEN FLARE-2	107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	6.586E-01	8760	9.473E-06
ATEI	TIP-2	206-44-0	Fluoranthene	3.982E-02	3322	1.510E-06
ATEI	TIP-3	206-44-0	Fluoranthene	3.084E-02	3337	1.165E-06
ATEI	TIP-2	86-73-7	Fluorene	1.528E-01	3322	5.795E-06
ATEI	TIP-3	86-73-7	Fluorene	1.183E-01	3337	4.468E-06
ATEI	TIP-2	50-00-0	Formaldehyde	6.174E+00	3322	2.342E-04
ATEI	TIP-3	50-00-0	Formaldehyde	4.782E+00	3337	1.806E-04
ATEI	F-LFG1	110-54-3	Hexane	3.079E+01	8760	4.429E-04
ATEI	F-LFG2	110-54-3	Hexane	8.240E+02	8760	1.185E-02
ATEI	OPEN FLARE-1	110-54-3	Hexane	8.368E+00	8760	1.204E-04
ATEI	OPEN FLARE-2	110-54-3	Hexane	9.191E+00	8760	1.322E-04
ATEI	F-LFG1	7783-06-4	Hydrogen sulfide	6.580E+01	8760	9.464E-04
ATEI	F-LFG2	7783-06-4	Hydrogen sulfide	1.761E+03	8760	2.533E-02
ATEI	OPEN FLARE-1	7783-06-4	Hydrogen sulfide	1.788E+01	8760	2.572E-04
ATEI	OPEN FLARE-2	7783-06-4	Hydrogen sulfide	1.964E+01	8760	2.825E-04
ATEI	TIP-2	193-39-5	Indeno[1,2,3-cd]pyrene	1.962E-03	3322	7.442E-08
ATEI	TIP-3	193-39-5	Indeno[1,2,3-cd]pyrene	1.520E-03	3337	5.739E-08
ATEI	F-LFG1	67-63-0	Isopropyl alcohol	1.638E+02	8760	2.356E-03
ATEI	F-LFG2	67-63-0	Isopropyl alcohol	4.383E+03	8760	6.304E-02
ATEI	OPEN FLARE-1	67-63-0	Isopropyl alcohol	4.451E+01	8760	6.401E-04
ATEI	OPEN FLARE-2	67-63-0	Isopropyl alcohol	4.888E+01	8760	7.031E-04
ATEI	F-LFG1	7439-97-6	Mercury and compounds	3.186E-03	8760	4.582E-08
ATEI	F-LFG2	7439-97-6	Mercury and compounds	8.525E-02	8760	1.226E-06
ATEI	OPEN FLARE-1	7439-97-6	Mercury and compounds	8.657E-04	8760	1.245E-08
ATEI	OPEN FLARE-2	7439-97-6	Mercury and compounds	9.508E-04	8760	1.368E-08
LandGem	F-LFG (FUG)	74-82-8	Methane	1.180E+07	8760	1.697E+02
LandGem	OPEN FLARE-1	74-82-8	Methane	3.540E+05	8760	5.092E+00
LandGem	OPEN FLARE-2	74-82-8	Methane	3.540E+05	8760	5.092E+00
ATEI	F-LFG1	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	1.019E+01	8760	1.465E-04
ATEI	F-LFG2	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	2.726E+02	8760	3.921E-03
ATEI	OPEN FLARE-1	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	2.768E+00	8760	3.981E-05
ATEI	OPEN FLARE-2	108-10-1	Methyl isobutyl ketone (MIBK, hexone)	3.040E+00	8760	4.373E-05
LandGem	F-LFG (FUG)	74-93-1	Methyl mercaptan	1.669E+02	8760	2.400E-03
LandGem	OPEN FLARE-1	74-93-1	Methyl mercaptan	5.006E+00	8760	7.201E-05
LandGem	OPEN FLARE-2	74-93-1	Methyl mercaptan	5.006E+00	8760	7.201E-05
ATEI	TIP-2	91-20-3	Naphthalene	4.437E-01	3322	1.683E-05
ATEI	TIP-3	91-20-3	Naphthalene	3.437E-01	3337	1.298E-05
Annual TV	AIA	N/A	NMOC	2.000E+03	8760	2.877E-02
Annual TV	F-LFG1	N/A	NMOC	2.840E+03	8760	4.085E-02
Annual TV	F-LFG2	N/A	NMOC	7.596E+04	8760	1.093E+00
Annual TV	OPEN FLARE-1	N/A	NMOC	7.800E+02	8760	1.122E-02
Annual TV	OPEN FLARE-2	N/A	NMOC	8.600E+02	8760	1.237E-02
Annual TV	PCS	N/A	NMOC	2.400E+02	8760	3.452E-03
Annual TV	TIP-2	N/A	NMOC	1.880E+03	3322	7.131E-02
Annual TV	TIP-3	N/A	NMOC	1.460E+03	3337	5.513E-02
Annual TV	AIA	10102-44-0	NOx (as NO2)	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	10102-44-0	NOx (as NO2)	6.360E+03	8760	9.148E-02
Annual TV	OPEN FLARE-2	10102-44-0	NOx (as NO2)	1.190E+04	8760	1.712E-01
Annual TV	TIP-2	10102-44-0	NOx (as NO2)	2.318E+04	3322	8.792E-01
Annual TV	TIP-3	10102-44-0	NOx (as NO2)	1.794E+04	3337	6.774E-01
ATEI	F-LFG1	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	1.679E+00	8760	2.415E-05
ATEI	F-LFG2	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	4.493E+01	8760	6.462E-04
ATEI	OPEN FLARE-1	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	4.562E-01	8760	6.562E-06
ATEI	OPEN FLARE-2	106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	5.011E-01	8760	7.207E-06
LandGem	F-LFG (FUG)	109-66-0	Pentane	3.303E+02	8760	4.751E-03
LandGem	OPEN FLARE-1	109-66-0	Pentane	9.910E+00	8760	1.425E-04
LandGem	OPEN FLARE-2	109-66-0	Pentane	9.910E+00	8760	1.425E-04
ATEI	TIP-2	85-01-8	Phenanthrene	1.538E-01	3322	5.834E-06
ATEI	TIP-3	85-01-8	Phenanthrene	1.192E-01	3337	4.499E-06
Annual TV	AIA	N/A	PM	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	N/A	PM	2.700E+03	8760	3.884E-02
Annual TV	OPEN FLARE-2	N/A	PM	2.980E+03	8760	4.286E-02
Annual TV	PIR	N/A	PM	1.768E+04	8760	2.543E-01
Annual TV	TIP-2	N/A	PM	1.640E+03	3322	6.220E-02
Annual TV	TIP-3	N/A	PM	1.280E+03	3337	4.833E-02
Annual TV	UPR-1	N/A	PM	1.260E+03	8760	1.812E-02
Annual TV	UPR-2	N/A	PM	9.540E+03	8760	1.372E-01
Annual TV	AIA	N/A	PM10	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	N/A	PM10	2.700E+03	8760	3.884E-02
Annual TV	OPEN FLARE-2	N/A	PM10	2.980E+03	8760	4.286E-02
Annual TV	PIR	N/A	PM10	3.420E+03	8760	4.919E-02

2023 Emission Inventory

2023 Data	Source Name	CAS No.	Pollutant Name	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
Annual TV	TIP-2	N/A	PM10	1.640E+03	3322	6.220E-02
Annual TV	TIP-3	N/A	PM10	1.280E+03	3337	4.833E-02
Annual TV	UPR-1	N/A	PM10	5.000E+02	8760	7.192E-03
Annual TV	UPR-2	N/A	PM10	2.040E+03	8760	2.934E-02
LandGem	F-LFG (FUG)	74-98-6	Propane	6.729E+02	8760	9.679E-03
LandGem	OPEN FLARE-1	74-98-6	Propane	2.019E+01	8760	2.904E-04
LandGem	OPEN FLARE-2	74-98-6	Propane	2.019E+01	8760	2.904E-04
Annual TV	AIA	7446-09-5	Sulfur dioxide	2.000E+03	8760	2.877E-02
Annual TV	OPEN FLARE-1	7446-09-5	Sulfur dioxide	2.220E+03	8760	3.193E-02
Annual TV	OPEN FLARE-2	7446-09-5	Sulfur dioxide	2.440E+03	8760	3.510E-02
Annual TV	TIP-2	7446-09-5	Sulfur dioxide	1.540E+03	3322	5.841E-02
Annual TV	TIP-3	7446-09-5	Sulfur dioxide	1.180E+03	3337	4.455E-02
ATEI	F-LFG1	127-18-4	Tetrachloroethene (perchloroethylene)	3.364E+01	8760	4.839E-04
ATEI	F-LFG2	127-18-4	Tetrachloroethene (perchloroethylene)	9.002E+02	8760	1.295E-02
ATEI	OPEN FLARE-1	127-18-4	Tetrachloroethene (perchloroethylene)	9.141E+00	8760	1.315E-04
ATEI	OPEN FLARE-2	127-18-4	Tetrachloroethene (perchloroethylene)	1.004E+01	8760	1.444E-04
ATEI	F-LFG1	108-88-3	Toluene	1.969E+02	8760	2.832E-03
ATEI	F-LFG2	108-88-3	Toluene	5.269E+03	8760	7.579E-02
ATEI	OPEN FLARE-1	108-88-3	Toluene	5.351E+01	8760	7.696E-04
ATEI	OPEN FLARE-2	108-88-3	Toluene	5.877E+01	8760	8.453E-04
ATEI	TIP-2	108-88-3	Toluene	2.140E+00	3322	8.117E-05
ATEI	TIP-3	108-88-3	Toluene	1.658E+00	3337	6.259E-05
LandGem	F-LFG (FUG)	N/A	Total landfill gas	4.048E+07	8760	5.823E+02
LandGem	OPEN FLARE-1	N/A	Total landfill gas	1.214E+06	8760	1.747E+01
LandGem	OPEN FLARE-2	N/A	Total landfill gas	1.214E+06	8760	1.747E+01
ATEI	F-LFG1	156-60-5	trans-1,2-Dichloroethene	1.497E+01	8760	2.154E-04
ATEI	F-LFG2	156-60-5	trans-1,2-Dichloroethene	4.007E+02	8760	5.763E-03
ATEI	OPEN FLARE-1	156-60-5	trans-1,2-Dichloroethene	4.069E+00	8760	5.852E-05
ATEI	OPEN FLARE-2	156-60-5	trans-1,2-Dichloroethene	4.469E+00	8760	6.428E-05
ATEI	F-LFG1	79-01-6	Trichloroethene (TCE, trichloroethylene)	2.015E+01	8760	2.899E-04
ATEI	F-LFG2	79-01-6	Trichloroethene (TCE, trichloroethylene)	5.393E+02	8760	7.757E-03
ATEI	OPEN FLARE-1	79-01-6	Trichloroethene (TCE, trichloroethylene)	5.476E+00	8760	7.877E-05
ATEI	OPEN FLARE-2	79-01-6	Trichloroethene (TCE, trichloroethylene)	6.015E+00	8760	8.651E-05
ATEI	F-LFG1	75-69-4	Trichlorofluoromethane (Freon 11)	5.678E+00	8760	8.167E-05
ATEI	F-LFG2	75-69-4	Trichlorofluoromethane (Freon 11)	1.520E+02	8760	2.186E-03
ATEI	OPEN FLARE-1	75-69-4	Trichlorofluoromethane (Freon 11)	1.543E+00	8760	2.219E-05
ATEI	OPEN FLARE-2	75-69-4	Trichlorofluoromethane (Freon 11)	1.695E+00	8760	2.438E-05
ATEI	F-LFG1	75-01-4	Vinyl chloride	2.495E+01	8760	3.589E-04
ATEI	F-LFG2	75-01-4	Vinyl chloride	6.676E+02	8760	9.603E-03
ATEI	OPEN FLARE-1	75-01-4	Vinyl chloride	6.780E+00	8760	9.751E-05
ATEI	OPEN FLARE-2	75-01-4	Vinyl chloride	7.446E+00	8760	1.071E-04
ATEI	F-LFG1	75-35-4	Vinylidene chloride	7.607E-01	8760	1.094E-05
ATEI	F-LFG2	75-35-4	Vinylidene chloride	2.036E+01	8760	2.928E-04
ATEI	OPEN FLARE-1	75-35-4	Vinylidene chloride	2.067E-01	8760	2.973E-06
ATEI	OPEN FLARE-2	75-35-4	Vinylidene chloride	2.271E-01	8760	3.266E-06
Annual TV	AIA	N/A	VOC	2.000E+03	8760	2.877E-02
Annual TV	F-LFG1	N/A	VOC	1.100E+03	8760	1.582E-02
Annual TV	F-LFG2	N/A	VOC	2.960E+04	8760	4.258E-01
Annual TV	OPEN FLARE-1	N/A	VOC	3.400E+02	8760	4.890E-03
Annual TV	OPEN FLARE-2	N/A	VOC	3.600E+02	8760	5.178E-03
Annual TV	PCS	N/A	VOC	2.400E+02	8760	3.452E-03
Annual TV	TIP-2	N/A	VOC	1.880E+03	3322	7.131E-02
Annual TV	TIP-3	N/A	VOC	1.460E+03	3337	5.513E-02
ATEI	F-LFG1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	6.986E+01	8760	1.005E-03
ATEI	F-LFG2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.869E+03	8760	2.689E-02
ATEI	OPEN FLARE-1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.898E+01	8760	2.730E-04
ATEI	OPEN FLARE-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	2.085E+01	8760	2.999E-04
ATEI	TIP-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.491E+00	3322	5.656E-05
ATEI	TIP-3	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	1.155E+00	3337	4.361E-05

Pollutants Added from 2023 LandGem Inventory

Pollutant	2023 LandGem Gas Generated (tons/yr)	2023 LandGem Gas Generated (lb/yr)	2023 LandGem Fugitives (lb/yr) *	2023 LandGem Open Flare 1 (lb/yr) **	2023 LandGem Open Flare 2 (lb/yr) **
Total landfill gas	8.10E+04	1.62E+08	4.05E+07	1.21E+06	1.21E+06
Methane	2.36E+04	4.72E+07	1.18E+07	3.54E+05	3.54E+05
Carbon dioxide	5.74E+04	1.15E+08	2.87E+07	8.60E+05	8.60E+05
Butane - VOC	8.06E-01	1.61E+03	4.03E+02	1.21E+01	1.21E+01
Dimethyl sulfide (methyl sulfide) - VOC	1.34E+00	2.69E+03	6.72E+02	2.02E+01	2.02E+01
Ethane	7.43E+01	1.49E+05	3.71E+04	1.11E+03	1.11E+03
Ethanol - VOC	3.45E+00	6.90E+03	1.73E+03	5.18E+01	5.18E+01
Ethyl mercaptan (ethanethiol) - VOC	3.97E-01	7.93E+02	1.98E+02	5.95E+00	5.95E+00
Methyl mercaptan - VOC	3.34E-01	6.67E+02	1.67E+02	5.01E+00	5.01E+00
Pentane - VOC	6.61E-01	1.32E+03	3.30E+02	9.91E+00	9.91E+00
Propane - VOC	1.35E+00	2.69E+03	6.73E+02	2.02E+01	2.02E+01

Notes:

* Fugitive emissions assumed 75% gas collection and 25% fugitive loss.

** Flare emissions assumed 98% destruction of the 75% gas collection, then a 50% / 50% split for Open Flare 1 and Open Flare 2.

Appendix D

Scenario #2 Emission Rates

2052 Emission Inventory

2052 Data	Source Name	CAS No.	Pollutant Name	Emission Factor Reference	Emissions (lb/yr)	Hours (hr/yr)	Emissions (g/s)
LandGEM	FUG	75-18-3	Dimethyl sulfide (methyl sulfide)	LandGEM	1,153.66	8760	1.66E-02
LandGEM	FUG_EXP	75-18-3	Dimethyl sulfide (methyl sulfide)	LandGEM	271.94	8760	3.91E-03
LandGEM	EFLARE-1	75-18-3	Dimethyl sulfide (methyl sulfide)	LandGEM	85.54	8760	1.23E-03
LandGEM	FUG	100-41-4	Ethyl benzene	AP-42	1,145.09	8760	1.65E-02
LandGEM	FUG_EXP	100-41-4	Ethyl benzene	AP-42	269.92	8760	3.88E-03
LandGEM	EFLARE-1	100-41-4	Ethyl benzene	AP-42	84.90	8760	1.22E-03
LandGEM	FUG	75-08-1	Ethyl mercaptan (ethanethiol)	LandGEM	340.18	8760	4.89E-03
LandGEM	FUG_EXP	75-08-1	Ethyl mercaptan (ethanethiol)	LandGEM	80.19	8760	1.15E-03
LandGEM	EFLARE-1	75-08-1	Ethyl mercaptan (ethanethiol)	LandGEM	25.22	8760	3.63E-04
LandGEM	FUG	7783-06-4	Hydrogen sulfide	AP-42	2,830.78	8760	4.07E-02
LandGEM	FUG_EXP	7783-06-4	Hydrogen sulfide	AP-42	667.27	8760	9.60E-03
LandGEM	EFLARE-1	7783-06-4	Hydrogen sulfide	AP-42	209.88	8760	3.02E-03
LandGEM	FUG	74-93-1	Methyl mercaptan	LandGEM	286.32	8760	4.12E-03
LandGEM	FUG_EXP	74-93-1	Methyl mercaptan	LandGEM	67.49	8760	9.71E-04
LandGEM	EFLARE-1	74-93-1	Methyl mercaptan	LandGEM	21.23	8760	3.05E-04
LandGEM	AIA	10102-44-0	NOx (as NO2)	Title V Permit	2,000.00	8760	2.88E-02
LandGEM	TIP-2	10102-44-0	NOx (as NO2)	Title V Permit	23,180.00	3322	8.79E-01
LandGEM	TIP-3	10102-44-0	NOx (as NO2)	Title V Permit	17,940.00	3337	6.77E-01
LandGEM	EFLARE-1	10102-44-0	NOx (as NO2)	Title V Permit	92,958.10	8760	1.34E+00
LandGEM	FUG	108-88-3	Toluene	AP-42	8,471.72	8760	1.22E-01
LandGEM	FUG_EXP	108-88-3	Toluene	AP-42	1,996.96	8760	2.87E-02
LandGEM	EFLARE-1	108-88-3	Toluene	AP-42	628.12	8760	9.03E-03
LandGEM	TIP-2	108-88-3	Toluene	AP-42 3.3-2	2.14	3322	8.12E-05
LandGEM	TIP-3	108-88-3	Toluene	AP-42 3.3-2	1.66	3337	6.26E-05
LandGEM	FUG	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42	3,005.55	8760	4.32E-02
LandGEM	FUG_EXP	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42	708.47	8760	1.02E-02
LandGEM	EFLARE-1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42	222.84	8760	3.21E-03
LandGEM	TIP-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42 3.3-2	1.49	3322	5.66E-05
LandGEM	TIP-3	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	AP-42 3.3-2	1.16	3337	4.36E-05

Pollutants Added from 2052 LandGem Inventory

Pollutant	2052 LandGem Gas Generated (tons/yr)	2052 LandGem Gas Generated (lb/yr)	2052 LandGEM Fugitives (lb/yr) *	2052 LandGEM FUG (lb/yr) **	2052 LandGEM FUG_EXP (lb/yr) **	2052 LandGem Enclosed Flare (lb/yr) ***
Total landfill gas	1.71E+05	3.43E+08	8.57E+07	6.93E+07	1.63E+07	5.14E+06
Methane	4.99E+04	9.99E+07	2.50E+07	2.02E+07	4.76E+06	7.49E+05
Carbon dioxide	1.21E+05	2.43E+08	6.07E+07	4.91E+07	1.16E+07	1.82E+06
Butane - VOC	1.71E+00	3.41E+03	8.53E+02	6.90E+02	1.63E+02	2.56E+01
Dimethyl sulfide (methyl sulfide) - VOC	2.85E+00	5.69E+03	1.42E+03	1.15E+03	2.71E+02	4.27E+01
Ethane	1.57E+02	3.14E+05	7.86E+04	6.36E+04	1.50E+04	2.36E+03
Ethanol - VOC	7.30E+00	1.46E+04	3.65E+03	2.96E+03	6.97E+02	1.10E+02
Ethyl mercaptan (ethanethiol) - VOC	8.39E-01	1.68E+03	4.19E+02	3.39E+02	8.00E+01	1.26E+01
Methyl mercaptan - VOC	7.06E-01	1.41E+03	3.53E+02	2.86E+02	6.74E+01	1.06E+01
Pentane - VOC	1.40E+00	2.80E+03	6.99E+02	5.66E+02	1.33E+02	2.10E+01
Propane - VOC	2.85E+00	5.69E+03	1.42E+03	1.15E+03	2.72E+02	4.27E+01

Notes:

* Fugitive emissions assumed 75% gas collection and 25% fugitive loss.

** Fugitive emissions split 81% to FUG and 19% to FUG_EXP sources based on area size

*** Flare emissions assumed 98% destruction of the 75% gas collection

Appendix E

Odor Thresholds

Odor Thresholds

CAS No.	Pollutant	Molecular Weight (g/mole)	Odor Threshold Reference	Odor Threshold (ppm)	Odor Threshold (ug/m3)	Odor Threshold (mg/m3)	Odor Threshold (g/m3)
71-55-6	1,1,1-Trichloroethane (methyl chloroform)	133.42	AIHA	0.97	5.293E+03	5.293E+00	5.293E-03
79-34-5	1,1,2,2-Tetrachloroethane	167.85	AIHA	0.233	1.600E+03	1.600E+00	1.600E-03
75-34-3	1,1-Dichloroethane (ethylidene dichloride)	98.97	EPA HAPs	120	4.857E+05	4.857E+02	4.857E-01
95-50-1	1,2-Dichlorobenzene	147.00	AIHA	0.02	1.202E+02	1.202E-01	1.202E-04
78-87-5	1,2-Dichloropropane (propylene dichloride)	112.99	EPA HAPs	0.25	1.155E+03	1.155E+00	1.155E-03
106-99-0	1,3-Butadiene	54.09	AIHA	0.099	2.190E+02	2.190E-01	2.190E-04
78-93-3	2-Butanone (methyl ethyl ketone)	72.10	AIHA	0.07	2.064E+02	2.064E-01	2.064E-04
83-32-9	Acenaphthene	154.21	N/A	0	0.000E+00	0.000E+00	0.000E+00
208-96-8	Acenaphthylene	152.19	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-07-0	Acetaldehyde	44.06	AIHA	0.0015	2.703E+00	2.703E-03	2.703E-06
67-64-1	Acetone	58.08	AIHA	0.4	9.502E+02	9.502E-01	9.502E-04
107-02-8	Acrolein	56.06	AIHA	0.0027	6.191E+00	6.191E-03	6.191E-06
107-13-1	Acrylonitrile	53.06	AIHA	1.6	3.472E+03	3.472E+00	3.472E-03
120-12-7	Anthracene	178.23	N/A	0	0.000E+00	0.000E+00	0.000E+00
56-55-3	Benz[a]anthracene	228.29	N/A	0	0.000E+00	0.000E+00	0.000E+00
71-43-2	Benzene	78.11	AIHA	0.47	1.502E+03	1.502E+00	1.502E-03
50-32-8	Benzo[a]pyrene	252.31	N/A	0	0.000E+00	0.000E+00	0.000E+00
205-99-2	Benzo[b]fluoranthene	252.31	N/A	0	0.000E+00	0.000E+00	0.000E+00
191-24-2	Benzo[g,h,i]perylene	276.33	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-27-4	Bromodichloromethane	163.83	N/A	0	0.000E+00	0.000E+00	0.000E+00
106-97-8	Butane	58.12	AIHA	0.421	1.001E+03	1.001E+00	1.001E-03
124-38-9	Carbon dioxide	44.01	AIHA	39000	7.020E+07	7.020E+04	7.020E+01
75-15-0	Carbon disulfide	76.14	AIHA	0.016	4.983E+01	4.983E-02	4.983E-05
630-08-0	Carbon monoxide	28.01	N/A	0	0.000E+00	0.000E+00	0.000E+00
56-23-5	Carbon tetrachloride	153.80	AIHA	1.68	1.057E+04	1.057E+01	1.057E-02
463-58-1	Carbonyl sulfide	60.08	AIHA	0.057	1.401E+02	1.401E-01	1.401E-04
108-90-7	Chlorobenzene	112.56	AIHA	0.087	4.005E+02	4.005E-01	4.005E-04
75-45-6	Chlorodifluoromethane (Freon 22)	86.47	AIHA	200192	7.080E+08	7.080E+05	7.080E+02
75-00-3	Chloroethane (ethyl chloride)	64.52	AIHA	3.8	1.003E+04	1.003E+01	1.003E-02
67-66-3	Chloroform	119.38	AIHA	0.102	4.980E+02	4.980E-01	4.980E-04
74-87-3	Chloromethane (methyl chloride)	50.49	AIHA	10	2.065E+04	2.065E+01	2.065E-02
218-01-9	Chrysene	228.29	N/A	0	0.000E+00	0.000E+00	0.000E+00
53-70-3	Dibenz[a,h]anthracene	278.35	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-71-8	Dichlorodifluoromethane (Freon 12)	120.91	AIHA	199790	9.880E+08	9.880E+05	9.880E+02
75-43-4	Dichlorofluoromethane (Freon 21)	102.92	N/A	0	0.000E+00	0.000E+00	0.000E+00
75-09-2	Dichloromethane (methylene chloride)	84.93	AIHA	1.2	4.168E+03	4.168E+00	4.168E-03
75-18-3	Dimethyl sulfide (methyl sulfide)	62.14	CAMEO	0.001	2.541E+00	2.541E-03	2.541E-06
74-84-0	Ethane	30.07	N/A	0	0.000E+00	0.000E+00	0.000E+00
64-17-5	Ethanol	46.07	AIHA	0.09	1.696E+02	1.696E-01	1.696E-04
100-41-4	Ethyl benzene	106.16	AIHA	0.002	8.684E+00	8.684E-03	8.684E-06
75-08-1	Ethyl mercaptan (ethanethiol)	62.13	CAMEO	0.001	2.541E+00	2.541E-03	2.541E-06
106-93-4	Ethylene dibromide (EDB, 1,2-dibromoethane)	187.86	AIHA	10	7.683E+04	7.683E+01	7.683E-02
107-06-2	Ethylene dichloride (EDC, 1,2-dichloroethane)	98.96	AIHA	4.3	1.740E+04	1.740E+01	1.740E-02
206-44-0	Fluoranthene	202.25	N/A	0	0.000E+00	0.000E+00	0.000E+00
86-73-7	Fluorene	166.22	N/A	0	0.000E+00	0.000E+00	0.000E+00
50-00-0	Formaldehyde	30.03	AIHA	0.027	3.316E+01	3.316E-02	3.316E-05
110-54-3	Hexane	86.17	AIHA	1.5	5.287E+03	5.287E+00	5.287E-03
7783-06-4	Hydrogen sulfide	34.08	CAMEO	0.0047	6.551E+00	6.551E-03	6.551E-06
193-39-5	Indeno[1,2,3-cd]pyrene	276.33	N/A	0	0.000E+00	0.000E+00	0.000E+00
67-63-0	Isopropyl alcohol	60.11	AIHA	1	2.458E+03	2.458E+00	2.458E-03
7439-97-6	Mercury and compounds	200.59	N/A	0	0.000E+00	0.000E+00	0.000E+00
74-82-8	Methane	16.04	N/A	0	0.000E+00	0.000E+00	0.000E+00
108-10-1	Methyl isobutyl ketone (MIBK, hexone)	100.16	AIHA	0.03	1.229E+02	1.229E-01	1.229E-04
74-93-1	Methyl mercaptan	48.11	CAMEO	0.0021	4.132E+00	4.132E-03	4.132E-06
91-20-3	Naphthalene	128.19	AIHA	0.0013	6.816E+00	6.816E-03	6.816E-06
N/A	NMOC	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
10102-44-0	NOx (as NO2)	46.01	CAMEO	1	1.882E+03	1.882E+00	1.882E-03
106-46-7	p-Dichlorobenzene (1,4-dichlorobenzene)	147.02	AIHA	0.121	7.276E+02	7.276E-01	7.276E-04
109-66-0	Pentane	72.15	AIHA	1.29	3.807E+03	3.807E+00	3.807E-03
85-01-8	Phenanthrene	178.23	N/A	0	0.000E+00	0.000E+00	0.000E+00
N/A	PM	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
N/A	PM10	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
74-98-6	Propane	44.10	AIHA	1497	2.700E+06	2.700E+03	2.700E+00
7446-09-5	Sulfur dioxide	64.06	AIHA	0.33	8.646E+02	8.646E-01	8.646E-04
127-18-4	Tetrachloroethene (perchloroethylene)	165.83	AIHA	0.767	5.202E+03	5.202E+00	5.202E-03
108-88-3	Toluene	92.15	AIHA	0.026	9.799E+01	9.799E-02	9.799E-05
N/A	Total landfill gas	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
156-60-5	trans-1,2-Dichloroethene	96.94	AIHA	277	1.098E+06	1.098E+03	1.098E+00
79-01-6	Trichloroethene (TCE, trichloroethylene)	131.40	AIHA	0.5	2.687E+03	2.687E+00	2.687E-03
75-69-4	Trichlorofluoromethane (Freon 11)	137.37	AIHA	5	2.809E+04	2.809E+01	2.809E-02
75-01-4	Vinyl chloride	62.50	AIHA	203	5.189E+05	5.189E+02	5.189E-01
75-35-4	Vinylidene chloride	96.95	AIHA	50	1.983E+05	1.983E+02	1.983E-01
N/A	VOC	N/A	N/A	0	0.000E+00	0.000E+00	0.000E+00
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	106.16	AIHA	0.012	5.210E+01	5.210E-02	5.210E-05

N/A = not applicable

SCS ENGINEERS Environmental Consultants & Contractors

June 6, 2025
File No. 04225008.00

MEMORANDUM

TO: Jeffrey G. Condit– Miller Nash LLP

FROM: Jeff Leadford, P.E. – SCS Engineers

SUBJECT: Beyond Toxics Testimony Response at the Coffin Butte Landfill

The Coffin Butte Landfill (Coffin Butte, or Landfill) is currently in the application process of a proposed expansion. On May 6, 2025 Mason Leavitt with Beyond Toxics submitted testimony and documents in opposition to the proposed expansion effort. This memo serves as the SCS Engineers (SCS) response to his testimony regarding certain odor issues raised, including Mr. Leavitt's critiques of SCS's "Coffin Butte Landfill 2024 Expansion Application Odor Dispersion Modeling Study (Modeling Study).

In Paragraph 6 of his testimony, Mr. Leavitt claims that the Landfill asserts 99% of odor complaints were deemed "impossible" to be from the landfill. Ostensibly, Mr. Leavitt is referring to Section 2.7 (Odor Complaint History) and Section 5.2 (Odor Complaint Conclusions) of SCS's Modeling Study. Mr. Leavitt's testimony misstates the conclusions of the complaint data analysis that SCS completed. The Modeling Study did not determine that 99% of odor complaints were impossible to come from the landfill; the study only noted that 1% could be considered "likely", and 29% "not likely" to have the Landfill as their source. Most of the complaints lacked data to make a complete determination. Contrary to Mr. Leavitt's testimony, SCS properly contextualized and accounted for the complaints in the Modeling Study.

Paragraph 7 in Mr. Leavitt's testimony mentions that the weather (meteorological) data used in the Modeling Study was an "educated guess on how air has moved around the nearby area of the landfill". In fact, however, the meteorological data used in modeling was obtained from an Oregon Department of Environmental Quality (DEQ) certified dataset using an on-site meteorological tower that was in operation in 2004 through 2005. For site-specific modeling, a certified dataset of on-site meteorological data, which is accepted for use in regulatory modeling, is really the "gold standard". This is discussed in Section 3.6 of the Modeling Study.

Paragraph 10 in the testimony discusses the 75% control efficiency used in the Modeling Study (and thus the other 25% being emitted fugitively from the landfill surface). This standardized control efficiency is mentioned in the Oregon Landfill Methane Rule Commission Meeting Document from September 30 and October 1, 2021 (Table 3, citation 1) and was used as a standard benchmark.

Also in Paragraph 10, Mr. Leavitt mentions holes in the covers and tarps over landfill waste as a potential source of additional landfill gas emissions. The covers and tarps (which incidentally are not

required to be used by any applicable regulations) are not in place to keep landfill gas in, rather they are used to help reduce the amount of precipitation entering the Landfill. Cover soils are deposited over waste to control landfill gas migration, as well as the negative pressure applied in the waste by landfill gas collection wells. From the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart AAAA regulations, quarterly surface emission monitoring and compliance ensures that the standard of 75% control efficiency is being maintained.

In Paragraph 15 of the testimony, Mr. Leavitt alleges that hydrogen sulfide (H2S) concentrations of 250 to 500 parts per billion (ppb) were detected at residences near the Landfill. There are several issues with the presentation of these concentrations. First, SCS performs hydrogen sulfide (H2S) monitoring frequently on landfills throughout the nation and has never seen levels of 250 to 500 ppb at the property boundary or further away from a landfill. Typical levels at the property boundary can be in the 0 to 10 ppb range, and in serious cases up to 30 ppb. Below are links to publicly available monitoring at two landfills that have had public feedback and/or regulator requirements to perform routine monitoring:

https://bristolvalandfill.org/air-sampling-and-air-monitoring

https://chiquitacanyon.com/reports/community-air-monitoring-program/

SCS is able to provide additional documented studies to back up these typical concentrations upon request.

Second, AERMOD, the modeling software used in the Modeling Study, uses a Gaussian Plume Model to describe concentrations in air from a source. This model describes how concentrations are diluted over time with distance away from a source, and thus show that further out residences can expect much lower concentrations of the pollutant. Also from our site-specific modeling we have confirmed that concentrations do decrease with distance from the Landfill.

Third, the reported H2S monitoring data did not provide training certification for the operators of the Jerome gas analyzer (the device used to detect H2S concentrations). In addition, calibration documentation for the meter were not supplied. These pieces of information would be needed to back up such a significant claim of concentration. The Jerome gas analyzer must maintain a strict maintenance schedule, a sample of which is given in Table 1 below.

Table 1: Jerome Typical Calibration Schedule

PART/COMPONENT	MAINTENANCE CYCLE
Charge battery	Depends on usage. See **Battery Management** section for guidelines.
Change .25 inch fritware	Weekly or as needed
Change internal filters and tubing	After 6 months of use or as needed
Replace Zero Air Filter	Annually
Factory calibration	Annually
Functional check	Monthly or as needed
Replace battery	Annually or as needed. The battery pack contains NiMH batteries. Please dispose of properly.

Finally, the air dispersion model, revised as the County's consultant (Maul Foster and Alongi) requested, indicates that even at final buildout, the maximum impact of H2S would be 9.52 micrograms per meter cubed, or 6.24 ppb, at the fence line. Please see the Modeling Study revised in June 2025. In addition, other sources of H2S in the region were not accounted for in the Beyond Toxics study.

If you have any questions, please contact Jeff Leadford at jleadford@scsengineers.com or 720-272-0172.

Sincerely,

Jeff Leadford, PE
Senior Project Professional
SCS ENGINEERS

Pat Sullivan, REPA, CPP, BCES
Senior Vice President
SCS ENGINEERS

THE GREENBUSCH GROUP, INC.

Memorandum

DATE: *June 6, 2025*

TO: *Jeff Shepherd, P.E. – Civil & Environmental Consultants, Inc.*

FROM: *Adam C. Jenkins, PE, INCE Bd. Cert., CTS-D*
Justin Morgan, INCE

RE: *Republic Services Coffin Butte Landfill – Additional Noise Mitigation*

This memorandum summarizes updated predicted sound levels from additional noise mitigation measures for the Republic Services Coffin Butte Landfill. These measures were developed to reduce predicted sound levels at nearby noise sensitive properties from proposed operations within the expansion area. We recommend the following condition of approval to address noise concerns raised in the staff report dated April 22, 2025. This condition is expected to limit increases to existing ambient conditions to not more than 6 dB at the nearest noise-sensitive receptor during the quietest operating hour.

> *Prior to the start of commercial operations in the expansion area, the Applicant shall verify by field measurement that sound levels of on-site equipment have been reduced by at least 10 dB compared to levels in Table 5.3 of the Noise Study dated September 25, 2023. Mitigation measures could include but would not be limited to upgraded engine mufflers, quieter equipment, and local noise barriers around stationary equipment. This condition shall not apply to commercial or residential haul vehicles. To verify equipment sound levels remain 10 dB below the levels shown in the Noise Study, sound levels from equipment will be measured at least once each week using a sound level meter or application installed on a mobile device. Additional measurements will be made every three years using a Type 1 sound level meter and will be overseen by a licensed engineer in the State of Oregon. These triennial measurements will be used to prepare updated noise studies.*

Noise Mitigation Implementation

The intent of including multiple mitigation options is that on-site equipment used in the expansion will be different than what was used in the study due to regular maintenance and replacement intervals. Most of the on-site equipment measured in the noise study was near the end of its maintenance cycle, providing a “worst case” emission level. Therefore, the most appropriate noise control measure for a particular piece of equipment will depend on the equipment fleet in use near the time operations in the expansion area begin. For example, a new dozer will likely be fitted with a muffler that has a higher performance level than what was in use during the Noise Study and may not require additional upgrades to achieve a 10 dB reduction.

Replacing stock engine exhaust mufflers with upgraded mufflers has been demonstrated to achieve 10 dB of noise reduction and are commonly installed on diesel engines. Aftermarket mufflers are available from several manufacturers and if necessary custom mufflers would be available from equipment manufactures or third-party vendors. In addition to mufflers, many equipment manufactures offer accessories that can help reduce sound levels from equipment, such as engine shrouds and baffles. The appropriate make and model of muffler would

206-378-0569
greenbusch.com
Seattle | Vancouver | Spokane

need to be identified prior to operations in the expansion area, since any muffler selections made for current equipment would likely not apply when the operations begin approximately 10 years in the future.

Downsizing mobile equipment, such as dozers, would also reduce sound levels. For example, product data from CAT shows that downsizing from a CAT D9 dozer to a D8 is 2 dB quieter and a D6 dozer is 4 dB quieter. Evolution of other technologies with lower noise emissions such as propane, diesel-hybrid, and fully electric will also influence future equipment procurement options.

Constructing noise barriers around stationary equipment or operations, such as the tippers, would provide further noise reduction. The noise reduction from noise barriers is typically 5 dB near the barrier. Barriers would be constructed to achieve a minimum surface weight of 4 pounds per foot^2. Noise barriers at the site perimeter were investigated but found to be relatively ineffective and come with a host of other site complications (visual impacts, side grading, etc.).

To verify noise emissions from on-site equipment remains 10 dB below the sound levels shown in Table 5.3 of the Noise Study issued on September 25, 2023, and to quickly identify potential issues, sound levels from on-site equipment will be measured at least once a week using a sound level meter or application installed on a mobile device. In addition to these weekly measurements, sound levels will also be measured every three years and used to prepare the updated noise studies. These triennial measurements would be made with a Type 1 sound level meter and overseen by a licensed engineer in the State of Oregon.

Verification measurements may need to be made outside of normal operating hours to reduce noise contributions from other sources. Mitigation measures found to not provide at least 10 dB of noise reduction would be replaced or additional measures would be implemented and measurements would be repeated.

Noise Mitigation Performance

Predicted sound levels with and without additional mitigation measures are compared to the median existing sound levels measured during the landfill's operating hours in Table 1. A comparison against the quietest hour measured during the landfill's operating hours is shown in Table 2. As shown in Table 1, predicted sound levels from the site are anticipated to remain below median existing sound levels without the inclusion of additional noise mitigation. Table 2 shows increases to the quietest existing sound level are predicted to be limited to 6 dB at Location 4 with the inclusion of additional noise mitigation, all other locations would be below the quietest existing sound level.

It should also be noted that while Oregon Administrative Rules (OAR) also limit increases to the existing L_{10}, these existing conditions are higher than the L_{50} metric by a greater margin than L_{10} site emissions will be above L_{50} site emissions, therefore L_{50} is the constraining metric that is most critical to addressing noise effects from the site.

Table 1. Mitigated Sound Levels Compared to Existing Conditions, dBA

Measurement Location	Median Ambient Sound Level (L_{50})		Predicted Sound Levels (L_{50})		Increase to Existing Sound Levels	
	Daytime	Nighttime	No Mitigation	Additional Mitigation	No Mitigation	Additional Mitigation
Location 1	34	34	27	23	**0**	**0**
Location 2	38	37	35	33	**0**	**0**
Location 3	54	51	39	38	**0**	**0**
Location 4	41	40	39	34	**0**	**0**

206-378-0569
greenbusch.com
Seattle | Vancouver | Spokane

Table 2. Mitigated Sound Levels Compared to Existing Quietest Hour, dBA

Measurement Location	Quietest Ambient Sound Level (L_{50})		Predicted Sound Levels (L_{50})		Increase to Existing Sound Levels	
	Daytime	Nighttime	No Mitigation	Additional Mitigation	No Mitigation	Additional Mitigation
Location 1	27	30	27	23	**0**	**0**
Location 2	33	34	35	33	**2**	**0**
Location 3	47	47	39	38	**0**	**0**
Location 4	28	34	39	34	**11**	**6**

To further reduce the potential noise effects at nearby properties audio files recorded during the measurements of on-site equipment and at the ambient measurement locations were reviewed to identify short term events that may not have been captured by the hourly L_{50} noise metric. The only transient events identified during this review were tonal backup alarms used by on-site equipment. Although noise from backup alarms is exempt from OAR sound limits; to address the potential effects within the community, backup alarms will be replaced with ambient sensing broadband backup alarms. Ambient sensing broadband backup alarms are typically quieter than standard alarms, adjust their volume based on the surrounding noise environment, and replace tonal alarm noises with broadband noise. During times when the surround sound levels are low, the alarms are quiet and if sound levels in the area increase the alarm also increases to maintain audibility and comply with safety standards. For example, the Street SMART bbs-tek alarm automatically adjusts to be 5-10 dB above the ambient noise level, ensuring reliable audibility while limiting overall sound level.

Sincerely,

Adam C. Jenkins, PE, INCE Bd. Cert., CTS-D
Vice President – Acoustical

206-378-0569
greenbusch.com

State of Oregon Department of Environmental Quality

Cleaner Air Oregon Facility Prioritization Results

March 1, 2019

About Cleaner Air Oregon

The Cleaner Air Oregon program and rules add public health-based protection from emissions of toxic air contaminants to the state's existing air permitting regulatory framework. The goal of the Cleaner Air Oregon program is to evaluate potential health risks to people near commercial and industrial facilities that emit regulated toxic air contaminants, communicate those results to affected communities, and reduce those risks to below health-based standards.

Purpose of this report

This report documents the results of DEQ's prioritization process for identifying existing permitted facilities for beginning further analysis as part of the Cleaner Air Oregon risk assessment process. The process followed DEQ's 2018 draft prioritization memo, which proposed a method that considers numerical prioritization values, as well as certain qualitative factors. Based on these factors, facilities are placed in priority groups or tiers. As facilities are called in, they will perform air toxics risk assessments that will determine the actual risk associated with facility emissions.

Limitations of the evaluation

The described prioritization process was established as a method to initiate the call in process for existing permitted sources. Consistent with OAR 340-245-0050, DEQ may at its discretion call in any facility at any time, regardless of the groups established in this memo. Sources applying for a modification to their facility that triggers major New Source Review/Prevention of Significant Deterioration or a Type A State New Source Review will also be required to perform a CAO risk assessment. Other types of permit modifications do not trigger mandatory call in.

This prioritization process is not a risk assessment, and the results should not be interpreted as a health assessment or statement of potential health risks from any of the facilities evaluated. This process was undertaken to determine a priority for facilities in each DEQ region for entry into the program. Health risks associated with emissions of toxic air contaminants from prioritized facilities can only be determined after that facility has completed an approved health risk assessment after being called into the CAO program.

Prioritization is based upon information DEQ had at the time of this evaluation. Any new information not previously considered may affect call in priorities in the future.

Facilities with Title V, Standard ACDP, Simple ACDP, and some General ACDP permits were evaluated for prioritization.

Summary of Results

Consistent with the 2018 memo, DEQ calculated a prioritization score for each facility. DEQ then considered additional qualitative criteria, such as sufficiency of the emissions data,

distance to the nearest exposure location, and whether or not emissions are controlled, among other criteria. Using the results of these evaluations, DEQ has established the following groups for call in to the CAO program.

Names of facilities included in Groups 1 and 2 are shown below. Names and data for all facilities included in the prioritization can be found on the Cleaner Air Oregon website and in the prioritization details spreadsheet.

Group 1 (20 facilities): These facilities will likely be called in during the first 12 months. Six members of Group 1, two from each DEQ region, are being called in to Cleaner Air Oregon now. From DEQ Northwest Region, Columbia Steel Casting and Owens-Brockway Glass Container. From DEQ Western Region, Entek International and Roseburg Forest Products' Medford facility. From DEQ Eastern Region, AmeriTies West and Chemical Waste Management of the Northwest.

- AmeriTies West, LLC (The Dalles)
- Boise Packaging & Newsprint, L.L.C. (Salem)
- Cascade Steel Rolling Mills, Inc. (McMinnville)
- Chemical Waste Management of the Northwest, Inc. (Arlington)
- Collins Pine Company (Lakeview)
- Columbia Steel Casting Co Inc. (Portland)
- Covanta Marion, Inc. (Brooks)
- Eagle Foundry Co. (Eagle Creek)
- Ecolube Recovery LLC (Portland)
- Entek International LLC (Lebanon)
- Georgia-Pacific Toledo LLC (Toledo)
- Hollingsworth & Vose Fiber Company (Corvallis)
- Oil Re-Refining Company (Klamath Falls)
- Owens-Brockway Glass Container Inc. (Portland)
- PCC Structurals, Inc. (Portland)
- PCC Structurals, Inc. (Clackamas)
- Roseburg Forest Products Co (Medford)
- Hydro Extrusion Portland, Inc. (Portland)
- Stimson Lumber Company (Gaston)
- Wolf Steel Foundry, Inc. (Hubbard)

Group 2 (20 facilities): These facilities may be called in during the next 2-3 years.

- Biomass One, L.P. (White City)
- Boeing Company (Gresham)
- Boise Cascade Wood Products, L.L.C. (Medford)
- Cornerstone Industrial Minerals Corporation U.S.A. (Lakeview)
- East Side Plating, Inc. (Portland)
- Elkay Wood Products Company (Independence)
- Freres Lumber Co. Inc. (Lyons)
- Hampton Lumber Mills, Inc. dba Tillamook Lumber Company (Tillamook)
- Intel Corporation (Hillsboro)
- Interfor U.S. Inc. (Gilchrist)
- Microchip Technology, Inc. (Gresham)
- Murphy Company dba Murphy Plywood (Rogue River)

- Mutual Materials Company (Gresham)
- Oil Re-Refining Company Inc. (Portland)
- Orchid Orthopedic Solutions Oregon, Inc (Oregon City)
- Pacific Wood Laminates, Inc. (Brookings)
- Roseburg Forest Products Co (Dillard)
- Swanson Group Mfg. LLC (Roseburg)
- TDY Industries, LLC dba ATI Wah Chang (Albany)
- VADATA, Inc. (Boardman)

Group 3 (315 facilities): These facilities have a lower priority for call into the CAO process. Actual call in date will depend on regional and program priorities and available resources, and/or other new information about a source in this group.

Group 4 (8 facilities): These facilities are closed, closing, or have no air toxics emissions. These facilities will not be called in to CAO unless new information is received.

For a full list, including Group 3 and Group 4 facilities, please see the prioritization details spreadsheet.

Facilities with Basic and General ACDP permits that were not included in the prioritization scoring will be treated like those in Group 3. DEQ will evaluate each of these permits over time to assess whether additional conditions are needed to assess or meet health risk benchmarks.

How the Prioritization Process was completed

In June 2018, during the CAO rulemaking, DEQ in consultation with the Oregon Health Authority published a Draft Cleaner Air Oregon Initial Facility Call-in Prioritization Protocol detailing the agencies' plan for deciding how existing facilities would be prioritized for call in.

Consistent with the above protocol, DEQ performed the prioritization using a two-step process. A total of 363 facilities were included in the prioritization, including all facilities that have Title V, Standard ACDP, or Simple ACDP permits. General ACDP permit holders were also included if emissions data were available in the emissions database.

1. **Prioritization Score**

   The first step was to calculate a prioritization score for each facility. DEQ used emissions inventory data for the reported actual emissions from each facility, together with the Risk-based Concentrations and Lookup Table from the CAO rules, to perform a Level 1 risk screening. The Level 1 risk screening estimates for cancer, chronic noncancer, and acute noncancer risk for each facility were combined to calculate a screening value as follows:

   Equation 1:

$$\boldsymbol{Risk\ Screening\ Value} = (\boldsymbol{Cancer\ screening\ value})/\mathbf{25} + (\boldsymbol{Chronic\ non - cancer\ screening\ value}) + (\boldsymbol{Acute\ non - cancer\ screening\ value})$$

A note about Level 1 risk screening and screening values

Level 1 risk screens do not represent actual risk. These screens use very conservative assumptions (5 meter stack height, 50 meter distance from a residence, and others) to estimate a *worst-case scenario* of possible risk. In most cases, actual risk will be tens or hundreds of times lower than what is estimated by a Level 1 screening. Why does DEQ use a Level 1 screening? These screenings are relatively simple to perform, and can be useful in calculating relative risks between many facilities (such as this prioritization process). Also, if a facility screens below benchmarks in a Level 1 assessment, it can be reasonably assumed that the site does not pose a significant risk.

In addition to the risk screening value for each facility, DEQ considered demographic data for the area around each facility. DEQ used Geographic Information System software and census data to calculate the percent of low-income residents, the percent of minority residents, the percent of residents under 5 years old, and the total number of residents within a one-kilometer radius of the source.

DEQ converted the demographic statistics for each facility to a percentile, relative to the demographic statistics for the other facilities in the prioritization. The risk screening value was converted into a percentile in the same way.

DEQ then used Equation 2 to calculate a prioritization score for each facility. The formula puts ¾ of the weight on the risk score, and ¼ of the weight on demographic factors.

Equation 2:

$$Prioritization\ Score = RSVP^{0.75} * \left(\frac{low\ income + minority + residents < 5 + population}{4}\right)^{0.25}$$

Where:

- RSVP means the percentile ranking of the risk screening value calculated in Equation 1
- Low income means the percentile ranking of the percent of low-income residents within a 1 km radius
- Minority means the percentile ranking of the percent of minority residents within a 1 km radius
- Residents < 5 means the percentile ranking of the percent of residents under 5 years old within a 1 km radius
- Population means the percentile ranking of the total number of residents within a 1 km radius

2. Qualitative Factors

Once a prioritization score had been calculated for each facility, DEQ also considered qualitative information about each facility, and moved some facilities up or down in the prioritization as a result. DEQ considered these qualitative factors:

- The sufficiency of current information about emissions from this facility
- Whether or not the source has existing control devices to reduce its toxic air contaminant emissions
- The approximate distance from the facility to the nearest residential and non-residential receptors
- The efficient allocation of DEQ resources, including distribution of work between DEQ regions.

EMPLOYEE EXPOSURE REPORT OF FINDINGS

Coffin Butte Landfill

28972 Coffin Butte Road
Corvallis, OR 97330

Prepared for:
Bret Davis
General Manager
Coffin Butte Landfill
BDavis220203@republicservices.com

February, 2025
2024-377C

GuziWest
INSPECTION & CONSULTING

Table of Contents

I. Introduction....1
II. Executive Summary....2
III. Employee Personal Air Monitoring Results and Methodology....3
IV. Conclusions and Recommendations....14
V. References....15

Appendix 1 Figures
Appendix 2 Employee Exposure Assessment Plan
Appendix 3 Technical Letter Report dated 7-1-24
Appendix 4 Laboratory Reports and Field Measurement Data
Appendix 5 Future Monitoring Records

I. Introduction

Coffin Butte Landfill (CBL) is located at 28972 Coffin Butte Rd, Corvallis, OR 97330 (see Figure 1, Appendix 1). CBL is owned and operated by Valley Landfills, Inc. (VLI). Guzi-West Inspection and Consulting, LLC (Guzi-West) was retained in May 2024 to provide environmental consulting services for the subject facility following issuance of two citations from the Oregon Occupational Safety & Health Division (OR-OSHA). OR-OSHA specifically issued two citations based upon inspections of the facility completed between October 24, 2023, and March 15, 2024. Citation 1, Item 1 was issued due to CBL not identifying and evaluating respiratory hazards in the workplace; meanwhile, Citation 2, Item 2 was issued for a person conducting the bloodborne pathogen program not being knowledgeable in certain subject matter covered by elements in the training. CBL appealed the citations with OR-OSHA office based upon their belief that workers were not being exposed to hazardous air pollutants as demonstrated by area air monitoring performed at the site. Guzi-West was engaged by CBL in early May 2024 following OR-OSHA requesting CBL develop and implement a formal employee exposure assessment program. Guzi-West was instructed to begin work immediately and our office subsequently developed a multi-phase approach to both address the OR-OSHA citations, as well as to review and audit site environmental compliance programs specific to air quality. A description of each phase is presented below:

- Phase 1: Review existing site permitting, operation plans, monitoring programs, regulatory reports, as well as to consult with OR-OSHA on the specific site observations, requests, etc. identified in their citations. Guzi-West produced an Employee Exposure Assessment Plan, dated May 31, 2024, which described site operations, wastes accepted at the site, waste management practices, engineering controls, and a plan for obtaining employee participation in development of the Employee Exposure Assessment Plan. Please refer to Appendix 2 for a complete copy of the Employee Exposure Assessment Plan.
- Phase 2: Guzi-West divided employees into similar exposure groups (SEGs) based upon groups of workers having the same general exposure profile because of the similarities and frequency of the tasks they perform, the materials and processes in which they work, and the similarity of the way they perform the tasks. Guzi-West personnel traveled to the facility on June 20, 2024, to interview at least two (2) workers from each of the following SEGs: Administration/Office Positions, Heavy Equipment Techs/Mechanics, Heavy Equipment Operators, and Spotters & Laborers. To interview employees at random, employees in each category were listed in alphabetical order by last name and the first two employees from each category were selected for interview. Each employee was asked the questions specified on the Employee Exposure Assessment Questionnaire developed in Phase 1.The employees were informed that there were no right or wrong answers, they may not and were not expected to remember certain items, and should they wish to report any concerns anonymously, all employees were given Guzi-West's contact information to do so. The results of the employee interviews along with facility information obtained during Phase 1 were utilized to create a list of potential airborne contaminants to monitor at the site, as well as to identify the work activities which could lead to the highest potential exposures of the airborne contaminants. The goal of monitoring the highest potential exposures is to effectively capture the highest exposure of each given contaminant and assess if workers in the highest likely exposure groups are being exposed above applicable

regulatory limits. A combination of personal monitoring assessments, including short term/excursion monitoring and/or 8-hour time weighted averages, were selected to ensure the periods of highest exposure were captured. A technical letter report was prepared and submitted to CBL personnel on July 1, 2024; please refer to Appendix 3 for additional details regarding Phase 2 work.

- Phase 3: Work in this phase consisted of performing on-site monitoring, submitting samples for laboratory analysis and/or performing analyses in real time, and comparing the site-specific data against regulatory limits and guidelines for exposure limits by contaminant. The subject report presented herein represents the findings of all work completed to date. This Final Report of Findings summarizes all results and provides conclusions and recommendations as necessary.

II. Executive Summary

Guzi-West's first priority on behalf of CBL was to engage with OR-OSHA in order to ensure their concerns were understood so that the citations could be addressed completely and as swiftly as possible. As mentioned above, Citation 1, Item 1 was issued due to CBL not identifying and evaluating respiratory hazards in the workplace (i.e. the citation was issued not necessarily due to employees being exposed to respiratory hazards above permissible exposure limits, but because CBL did not have data to demonstrate their belief that existing engineering controls and personal protective equipment (PPE) already in place were sufficient to protect their workers). The previously referenced Employee Exposure Assessment Plan, provided in Appendix 2, was submitted to OR-OSHA and their representatives accepted this submittal as demonstration that CBL was addressing Citation 1, Item 1. Citation 2, Item 2 was issued for the person conducting the bloodborne pathogen program not being knowledgeable in certain subject matter covered by elements in the training. To address this, CBL arranged for their Area Safety Team to provide the bloodborne pathogen training program to ensure site staff were thoroughly trained in bloodborne pathogens. Following the submittal of documentation of these two items, OR-OSHA reduced the fine to $100, and the two parties agreed to formally settle both citations in June 2024.

Section III below presents the methodology, analytical results, and corresponding regulatory limits for each airborne contaminant. The analytical results demonstrate that CBL employees are not being exposed above short term/excursion limits nor 8-hour time weighted average limits for asbestos, respirable crystalline silica, respirable dust, total inhalable dust, diesel particulate (elemental carbon), and the eleven metals under OSHA's METALSSG-2 sampling group. The engineering controls and personal protective equipment currently utilized in relation to these respiratory hazards appear to be adequate to protect employees from the airborne concentrations they might be exposed to on any given day. The landfill gas monitoring performed identified short term carbon monoxide exposure exceedances specific to a CBL work vehicle, and methane exposure exceedances during well shortening activities as well as during the heavy equipment operator's normal work shift. The remaining gases monitored, including carbon dioxide, hydrogen sulfide, and oxygen, remained below all regulatory thresholds, and/or stayed within acceptable ranges. Implementation of additional engineering controls and work practices subsequently reduced and/or eliminated methane and carbon monoxide exceedances. Engineering controls, respiratory protection, and further monitoring recommendations are explained in detail in the following sections.

III. Employee Personal Air Monitoring Results and Methodology

Guzi-West has identified potential airborne contaminants based upon a review of the facility's operations, waste stream, existing engineering controls, management practices, employee responsibilities, etc. Further, Guzi-West has discussed the operation with OSHA personnel who recently inspected the site, as well as CBL personnel with detailed knowledge of the site and its operation. The contaminants tested for are identified below along with sample collection and analytical methods. The results are provided in the included tables within this report. The Sample ID nomenclature was kept consistent with job classification between different sampling media for easy comparison, as shown in the table below. The DIES02 and DIES03 samples are an exception, which were ambient area air samples taken from the mechanic shop.

Table 1 – Sample Nomenclature

Sample ID	Job Classification	Employee/Area[1]
xxx01-xxxxxx	Heavy Equipment Tech/Mechanic	[redacted]
xxx02-xxxxxx	Heavy Equipment Operator	[redacted]
xxx03-xxxxxx	Laborer	[redacted]
xxx04-xxxxxx	Spotter	[redacted]
xxx05-xxxxxx	Lead Heavy Equipment Operator	[redacted]
xxx-EX-01	Heavy Equipment Operator	[redacted]
xxx-EX-02	Heavy Equipment Tech/Mechanic	[redacted]
xxx-EX-03	Lead Heavy Equipment Operator	[redacted]
DIES02-073024	NA	South Mechanic Shop
DIES03-073024	NA	North Mechanic Shop

[1]Employees listed more than once had multiple samples collected

All personal samples were collected from the breathing zone of potentially affected employees at several different job classifications. The contaminant of interest was sampled for the period of an entire working day and/or for short time periods (typically 30 minutes). Samples were intentionally collected during the period of expected highest exposure and compared against time weighted averages (TWAs), excursion limits (ELs), instantaneous/ceiling limits, or other applicable regulatory thresholds and guidelines. Diesel samples were taken solely from employees within the Heavy Equipment Technician/Mechanic classification, and from the ambient mechanic shop air; meanwhile, landfill gas samples were collected with handheld, instant reading instruments. All air samples submitted for laboratory analysis were sent under chain of custody, to SGS Galson of East Syracuse, New York; SGS Galson is an American Industrial Hygiene Association (AIHA) accredited laboratory. The sample collection and analytical methodology for each contaminant is presented immediately below along with a narrative description of the subject analyte, sample results compared to their respective exposure limits/recommended thresholds, and table/s depicting analytical results. The following section, Section IV. Conclusions and Recommendations, provides a discussion of the results and corresponding recommendations.

Asbestos Air Sampling

Asbestos is the name given to a group of naturally occurring minerals that are resistant to heat and corrosion. Asbestos has been used in a variety of building construction materials for insulation and as a fire retardant, as well as being used in a wide range of manufactured goods/building materials (roofing shingles, ceiling and floor tiles, paper products, and asbestos cement products), friction products (automobile clutch, brake, and transmission parts), heat-resistant fabrics, packaging, gaskets, and coatings. Asbestos is accepted at the landfill in accordance with special notification,

packaging, and labeling requirements and managed in a dedicated area of the landfill with trained personnel (see Operations and Waste Management information provided in Appendix 2). The health effects of breathing asbestos fibers can cause a buildup of scar-like tissue in the lungs called asbestosis and result in loss of lung function that often progresses to disability and death. Asbestos also causes cancer of the lung and other diseases such as mesothelioma of the pleura which is a fatal malignant tumor of the membrane lining the cavity of the lung or stomach. Asbestos samples were collected and analyzed in accordance with the NIOSH 7400 methodology. Asbestos air samples were collected with a personal air sampling pump running at 1.9-2.1 liters per minute (LPM), and a 25mm open faced cassette equipped with a 0.45-1.2-µm cellulose ester membrane filter. As shown in the table below and the laboratory report provided in Appendix 4, no asbestos samples analyzed exceeded the PEL or EL established by OSHA (29 CFR 1910.1001) and adopted by Oregon OSHA (OAR Chapter 437, Division 2, Subdivision Z, Rule 1910.1001).

Table 2 – Asbestos Air Sampling Results

Personal Samples (PEL: 0.1 fibers per cubic centimeter (f/cc))		Field Blanks	
Sample ID	Conc. (f/cc)	Sample ID	Total
ASB01-072924	0.021	ASB-FB-01	<7 f/mm^2
ASB02-072924	0.0055	ASB-FB-02	<7 f/mm^2
ASB03-072924	0.0065		
ASB04-073024	0.0034		
ASB05-072924	0.038		
EL: 1 fiber per cubic centimeter (f/cc)			
ASB-EX-01	0.056		
ASB-EX-02	0.096		
ASB-EX-03	0.076		

Respirable Crystaline Silica Sampling

Respirable Crystalline Silica is a common byproduct of common building materials, such as rocks, concrete, brick, sheetrock, etc. Crystalline Silica can be released into the air when these materials are disturbed. Alpha Quartz and Cristobalite are two forms of crystalline silica. Respirable Crystalline Silica (RCS) is a term used to describe very small particles of crystalline silica. These particles are typically smaller than ten microns (10µ) in diameter and are often referred to as "fine" or "ultrafine" particles. When inhaled, these particles can cause serious health problems, including lung cancer, silicosis, and other respiratory diseases. Respirable Crystaline Silica (RCS) samples were collected and analyzed in accordance with the NIOSH 7600/7500 methodology, Silica by XRD. Silica samples were collected with a personal air sampling pump running at 1.9-2.1 liters per minute (LPM), and a parallel particle impactor, containing a pre-weighted 37mm cassette equipped with a 5.0 µm, PVC, filter. As shown in the table below and the laboratory report provided in Appendix 4, no Respirable Crystalline Silica samples analyzed exceeded the PEL established by Oregon OSHA (OAR Chapter 437, Division 2, Subdivision Z, Rule 437-002-0382).

Table 3 - Respirable Silica (RCS) Air Sampling Results			
Personal Samples (PEL: 100 µg/m^3)		Field Blanks	
Sample ID	Conc. (µg/m^3)	Sample ID	Total
RESP01-073024	<19	RESP-FB-01	<5.0 µg
RESP02-073024	<4.5	RESP-FB-02	<5.0 µg
RESP03-073024	<5.1		
RESP04-073024	<5.2		
RESP05-073024	<5.6		

Respirable Dust Sampling

The operation of any landfill creates dust regardless of what engineering controls are utilized and therefore conducting personal air monitoring to assess respirable dust and total inhalable dust (further discussed immediately below) were key contaminants to monitor. Respirable dust refers to particles smaller than ten microns (10µ) in diameter. Their size allows them to travel deeply into the lungs, potentially reaching the gas exchange region. Respirable Dust samples were collected and analyzed in accordance with the NIOSH 0600 methodology. The respirable dust samples were collected with a personal air sampling pump running at 1.9-2.1 liters per minute (LPM), using a parallel particle impactor attachment, containing a pre-weighed 5.0 µm, PVC, filter. As shown in the table below and the laboratory report provided in Appendix 4, no Respirable Dust samples analyzed exceeded the PEL established by Oregon OSHA (OAR Chapter 437, Division 2, Subdivision Z, Rule 437-002-0382).

Table 4 - Respirable Particulate (Respirable Dust) Air Sampling Results			
Personal Samples (PEL: 5 mg/m^3)		Field Blanks	
Sample ID	Conc. (mg/m^3)	Sample ID	Total
RESP01-073024	0.53	RESP-FB-01	<0.050 mg
RESP02-073024	<0.045	RESP-FB-02	<0.050 mg
RESP03-073024	0.12		
RESP04-073024	<0.052		
RESP05-073024	<0.056		

Total Inhalable Dust Sampling

As opposed to respirable dust, inhalable dust particles can be much larger, up to 100 microns (100µ) in diameter. These particles do not penetrate as deeply as respirable particles but can cause irritation of the eyes, nose, mouth, and throat. The Ambient total inhalable dust samples were collected and analyzed in accordance with the NIOSH 0500 methodology. Samples were collected with a personal air sampling pump running at 1.9-2.1 liters per minute (LPM), and a 37mm cassette, equipped with a pre-weighed 5.0 µm, PVC, filter. As shown in the table below and the laboratory report provided in Appendix 4, no Total Inhalable Dust samples analyzed exceeded the PEL established by Oregon OSHA (OAR Chapter 437, Division 2, Subdivision Z, Rule 437-002-0382).

Table 5 - Total Inhalable Dust Air Sampling Results			
Personal Samples (PEL: 10mg/m^3)		Field Blanks	
Sample ID	Conc. (mg/m^3)	Sample ID	Total
TOTD01-072924	0.38	TOTD-FB-01	<50 mg
TOTD02-073024	0.15	TOTD-FB-02	<50 mg
TOTD03-072924	0.24		
TOTD04-073024	0.33		
TOTD05-072924	<0.056		

Diesel Particulate Sampling

Diesel particulates are a component of diesel exhaust that are primarily composed of an elemental carbon core, with sulfates, silicates, and other metallic compounds attached to the surface. Exposure to high concentrations of diesel particulates can cause short-term effects such as headaches, dizziness, and mucous membrane irritation, and long-term effects such as cardiovascular, cardiopulmonary, respiratory disease and lung cancer. Because diesel particulates contain a variety of different compounds, the analytical method used for this monitoring measures elemental carbon, which composes the core of diesel particulates. Diesel Particulate (Elemental Carbon) samples were collected and analyzed in accordance with the NIOSH 5040 methodology. Samples were collected with a personal air sampling pump running at 1.9-2.1 liters per minute (LPM), and a 37mm cassette, equipped with a pre-weighed 0.45µm quartz filter. As shown in the table below and the laboratory report provided in Appendix 4, no Diesel Particulate samples analyzed exceeded the PEL established by MSHA (CFR Title 30, Chapter I, Subchapter K, Part 57) and adopted by OSHA. It should be noted that the MSHA PEL is only intended to apply to employee exposure while working in underground metal/nonmetal mines, and as such is not applicable to the employees of Coffin Butte Landfill. It is used in this case as no PEL for non-mining industry has been established for diesel particulate.

Table 6 - Diesel Emission (Total Carbon) Air Sampling Results			
Personal Samples (PEL: 0.16 mg/m^3)		Field Blanks*	
Sample ID	Conc. (mg/m^3)	Sample ID	Total
DIES01-073024	0.1	DIES-FB-01	0.0093 mg
DIES02-073024	<0.0035	DIES-FB-02	0.039 mg
DIES03-073024	<0.0035		

*Sample values adjusted against average field blank concentration per NIOSH method 5040. Carbon can occur naturally in uncontaminated sampling media.

Airborne Lead, and Metals Sampling

A wide variety of metals are used for industrial and commercial applications and can often be found in the waste streams of generators with or without the knowledge of either the generator or receiver. The most well-known hazardous metal is lead, which can acutely damage the brain, nervous system and reproductive system, along with a variety of other health effects. Many other metals and metal compounds can have similar effects if exposure occurs at sufficient levels, so it is important to 'cast a wide net' when conducting monitoring. Eleven metals; Antimony, Cadmium, Lead, Chromium, Cobalt, Copper, Iron, Manganese, Nickle, Vanadium and Zinc, were chosen based off the METALSSG-2 metal sampling group provided by OSHA. These were

selected due to their occurrence in general waste streams, stability together on specific sampling media, and their ability to be digested in the same acid matrix for ease and cost effectiveness of analysis. Airborne Metals samples were collected and analyzed in accordance with the NIOSH Method 7300 methodology via Inductively Coupled Plasma Spectroscopy (ICP). The air samples were collected using a personal air sampling pump running at 1.9-2.1 liters per minute (LPM), and a 37mm cassette, equipped with a pre-weighed 0.8 µm, MCE, filter. As shown in the table provided on the following page and the laboratory report provided in Appendix 4, no Metals samples analyzed exceeded the PEL established by Oregon OSHA (OAR Chapter 437, Division 2, Subdivision Z, Rule 437-002-0382).

Table 7 - Metals Air Sampling Results											
	Antimony	Cadmium Dust	Chromium	Cobalt	Copper	Iron Oxide Fume	Lead Dust	Manganese	Nickel	Vanadium	Zinc
PEL:	0.5 mg/m^3	0.5 $\mu g/m^3$	0.5 mg/m^3	0.1 mg/m^3	1 mg/m^3	10 mg/m^3	0.05 mg/m^3	5 mg/m^3	1 mg/m^3	0.5 mg/m^3	10 mg/m^3
Sample ID	Conc. (mg/m^3)	Conc. ($\mu g/m^3$)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)	Conc. (mg/m^3)
MET01-072924	<0.00090	<0.15	<0.0075	<0.00045	<0.00030	0.013	<0.00038	0.00018	<0.00030	<0.00045	<0.0038
MET02-072924	<0.00088	<0.15	<0.0074	<0.00044	<0.00029	<0.0074	<0.00037	<0.00015	<0.00029	<0.00044	<0.0037
MET03-072924	<0.00094	<0.16	<0.0078	<0.00047	<0.00031	0.013	<0.00039	0.00018	<0.00031	<0.00047	<0.0039
MET04-073024	<0.00094	<0.16	<0.0078	<0.00047	<0.00031	0.022	<0.00039	0.00033	<0.00031	<0.00047	<0.0039
MET05-072925	<0.00097	<0.16	<0.0081	<0.00049	<0.00032	<0.0081	<0.00041	<0.00016	<0.00032	<0.00049	<0.0041
EL:	NA	NA	NA	NA	NA	NA	0.03 mg/m^3	0.2 mg/m^3	NA	NA	NA
MET-EX-01	<0.030	<0.0050	<0.25	<0.015	<0.010	<0.25	<0.013	<0.0050	<0.010	<0.015	<0.13
MET-EX-02	<0.030	<0.0050	<0.25	<0.015	<0.010	<0.25	<0.013	<0.0050	<0.010	<0.015	<0.13
MET-EX-03	<0.030	<0.0050	<0.25	<0.015	<0.010	<0.25	<0.013	<0.0050	<0.010	<0.015	<0.13

Landfill Gas Sampling

Gases from landfills occur as a result of biological degradation of organic wastes and potentially as a result of volatile buried waste. The predominant gases produced by a landfill are methane and carbon dioxide making up 99%, or greater, of gases typically produced. In addition to monitoring for methane (CH_4) and carbon dioxide (CO_2), hydrogen sulfide (H_2S), carbon monoxide (CO), and oxygen (abbreviated O in atom form, and O2 as a molecule) were monitored at the subject facility. Landfill gas exposure sampling was conducted on September 26, 2024, from environmental technicians performing gas extraction well shortening, as well as on a spotter and heavy equipment operator throughout the course of their normal work day. Well raising and/or well shortening were identified as the highest potential exposure activities to landfill gases, as the well has to be uncapped temporarily by the workers; see Appendix 3 for a detailed discussion. Gas measurements were specifically collected utilizing the following instant reading gas meters: two RKI GX-3Rs, an RKI GX-6000 Flame Ionization Detector (FID), and a LANDTEC GEM2000. A brief discussion for each gas is presented below, including the exposure limits specified/recommended by regulatory bodies, a summary table of exposure limits, and identification of exposure limit exceedances, where applicable.

Methane and Carbon Dioxide

Methane and carbon dioxide are both classified as simple asphyxiants meaning that, within enclosed areas, either gas can build up and displace oxygen creating an oxygen deficient atmosphere. The Occupational Safety and Health Administration (OSHA) defines an oxygen deficient atmosphere as an oxygen content below 19.5% by volume. Per the National Institute for Occupational Safety and Health (NIOSH), methane is considered a flammable gas with a lower explosive limit (LEL) of 5% by volume and an upper explosive limit (UEL) of 15% by volume; meanwhile, carbon dioxide is not classified as a flammable gas. OSHA has not established a Permissible Exposure Limit (PEL) for methane; however, OR-OSHA has an established methane PEL of 1,000 parts per million by volume (ppmv) when evaluated as an 8-hour time weighted average, a 30-minute excursion limit of 3,000 ppmv (3x the PEL), and a ceiling/instantaneous limit of 5,000 ppmv (5x the PEL) wherein no employee shall be exposed above that concentration at any time. Federal OSHA and OR-OSHA have established the same PEL for carbon dioxide at 5,000 ppmv (0.5% CO2 in air) averaged over an 8-hour workday, and OR-OSHA has further established 15,000 ppmv as a 30-minute excursion limit (3x the PEL), and a ceiling/instantaneous limit of 25,000 ppmv (5x the PEL) wherein no employee shall be exposed above that concentration at any time. NIOSH has established health-based immediately dangerous to life or health (IDLH) values which are set at 10% of the LEL for specific air contaminants, including methane, because the explosive hazards are deemed a greater risk; the IDLH for methane is 5,000 ppmv (10% of the LEL for methane, which is 50,000 ppmv). Carbon dioxide has an established IDLH of 40,000 ppmv.

Hydrogen Sulfide

Hydrogen sulfide is a colorless, flammable, highly toxic gas with a characteristic rotten egg odor. Although its strong odor is readily identified, olfactory fatigue occurs at high concentrations and at continuous low concentrations; thus, odor is not a reliable indicator of hydrogen sulfide's presence and may not provide adequate warning of hazardous concentrations. Federal OSHA and OR-OSHA have established the same ceiling limit concentration of 20 ppmv, and 8-hour TWA of 50 ppmv provided the exposure does not exceed 10 minutes and no other measurable exposures occur. Hydrogen sulfide has an established IDLH of 100 ppmv, LEL of 4.3%, and UEL of 45.0%.

Carbon Monoxide

Carbon monoxide is a colorless, odorless, flammable gas that can cause sudden illness and death if inhaled; it's considered especially dangerous as individuals are often unconscious before they realize they are being poisoned. Federal OSHA and OR-OSHA have established the same 8-hour TWA of 50 ppmv, OR-OSHA has further established 150 ppmv as a 30-minute excursion limit (3x the PEL), and a ceiling limit of 250 ppmv (5x the PEL) wherein no employee shall be exposed above that concentration at any time. NIOSH has a recommended exposure limit of 35 ppmv, an established IDLH of 1,200 ppmv, LEL of 12.5%, and UEL of 74%.

Oxygen

Oxygen is a colorless, odorless gas that typically only poses a hazard in oxygen deficient atmospheres (oxygen content below 19.5% by volume), or in oxygen enriched atmospheres (oxygen content greater than 23.5% by volume). Oxygen deficient atmospheres pose a threat as oxygen levels below 19.5% fall below levels for what is needed for humans to breathe safely, whereas oxygen enriched atmospheres significantly increases the risk of ignition and fire due to the reactivity of oxygen.

Table 8 - Exposure Limit Summary

	CH_4	CO_2	H_2S	CO	O_2
8-hour Time Weighted Average	1,000 ppmv	5,000 ppmv	50 ppmv*	50 ppmv	<19.5% or >23.5%
30-Minute Excursion Limit	3,000 ppmv	15,000 ppmv	NA	150 ppmv	
Instantaneous/Ceiling Limit	5,000 ppmv	25,000 ppmv	20 ppmv*	250 ppmv	
IDLH	5,000 ppmv	40,000 ppmv	100 ppmv	1,200 ppmv	
LEL	5.0%	NA	4.3%	12.5%	
UEL	15.0%	NA	45.0%	74.0%	

* 20 ppmv ceiling limit with one allowed peak exceedance up to 50ppmv for no longer than 10 minutes once in an 8-hr shift (no other exposures can occur in the same day)

Landfill Gas Sampling Events Summary

Two sampling events were performed to assess CBL employees' personal exposure to landfill gas. The initial sampling event was conducted on September 26, 2024, to document existing engineering controls, work practices, and exposures to landfill gases. Carbon monoxide exceedances were identified in the initial monitoring event but were quickly traced to a faulty vehicle exhaust; once the employees exchanged vehicles no further exceedances were observed. Methane exceedances were observed during shortening of a gas extraction well, as well as during completion of the heavy equipment operator's normal work tasks. Increased air movement and/or ventilation was recommended specific to the methane exposures, in addition to recommending staff wearing gas sensors capable of identifying and sounding an alarm if hazards for methane, oxygen, hydrogen sulfide, or carbon monoxide were present. The second sampling event, conducted on November 14, 2024, demonstrated the increased ventilation was effective in eliminating all methane exceedances for the heavy equipment operator. Instantaneous exceedances of methane were observed during well shortening activities again, but the number of exceedances was reduced by over 60%. Further, the instantaneous methane exceedances observed during well shortening were momentary exposures (seconds in most cases), and the use of the instant reading gas sensors further mitigates any exposure risks. A discussion of each monitoring event is presented below by date and is followed by a summary conclusion for all sampling events. Tables

9 and 10 present the landfill gas monitoring results for all events, and the field measurement data is provided in Appendix 4.

September 26, 2024 – Landfill Gas Field Measurements

A CBL spotter and heavy equipment operator were monitored during the course of a normal workday, and their exposures were calculated and respectively compared against the instantaneous/ceiling limit, 30-minute excursion limit, and permissible exposure limit (as an 8-hour time weighted average). As shown in Table 10 on the following page and the field measurement data provided in Appendix 4, the instantaneous/ceiling limit for carbon monoxide was exceeded for the spotter 9 times, and 18 times for the heavy equipment operator; these exceedances are all believed to be the result of a faulty exhaust on a CBL work vehicle. This issue was identified shortly after the two employees were outfitted with the field monitors and following transfer to another CBL vehicle, no additional carbon monoxide exceedances were observed. Guzi-West notified CBL personnel of the issue, with the recommendation that this vehicle be taken out of service and that it, along with all other CBL vehicles, be inspected to ensure their vehicle exhaust systems are free of holes, functioning properly, etc. During the heavy equipment operator's work shift, the methane instantaneous/ceiling and IDLH limit of 5,000 ppm was exceeded two times with a peak of 5,500 ppmv. Further, after calculation of the 8-hour time weighted average for the same monitoring period, the permissible exposure limit for methane was exceeded for the heavy equipment operator. Meanwhile, the spotter did not exceed any methane limits or thresholds during the course of their work shift. The carbon dioxide and hydrogen sulfide levels for both employees remained below all regulatory thresholds, and oxygen levels also stayed within acceptable ranges for both employees. The CBL and Guzi-West teams met shortly after completion of the September monitoring event to discuss the initial monitoring results and to identify where improvements could be made to reduce exposures. The heavy equipment operator's cab ventilation was recommended to be improved by simply cracking the windows of the cab to increase ventilation; meanwhile, an air mover and ducting was proposed to be deployed at the extraction well to pull air and methane away from the well during modification.

November 14, 2024 – Landfill Gas Field Measurements

Monitoring was conducted on one CBL environmental technician during a well shortening activity. The environmental technicians utilized an air mover and flex ducting in an attempt to capture the methane and other landfill gasses escaping the well during the shortening work. As shown in Table 9, four exceedances of the instantaneous limit were observed over the course of the activity; a reduction of over 60% from the September 26, 2024 monitoring event. The four exceedances also occurred within a narrow time frame, within three minutes. Although the instantaneous limit was exceeded, the 30-minute excursion limit for methane (3,000 ppmv) was not exceeded. The CBL and Guzi-West team met again following the November 14, 2024 sampling event to discuss additional/alternative work practices and engineering controls to further reduce short term exceedances of the methane instantaneous/ceiling limit during extraction well modification activities. It was collectively determined that utilizing an electric leaf blower to force fresh air across the extraction well during modification would likely be more effective than trying to pull air away from the well during modification. Guzi-West anticipates utilizing the leaf blower in combination with employees wearing the four gas sensors will demonstrate that even short-term exceedances of the methane instantaneous/ceiling limit will be eliminated.

Exposure data was again collected for a heavy equipment operator during the course of a normal workday. As shown in Table 10, the exposure data collected during this monitoring indicated no exceedances of the PEL for any landfill gas, and no measurable amount of methane was identified

in their workday. The corrective actions performed by CBL appear to have eliminated the heavy equipment operators' exposure to methane. Guzi-West recommends that continued monitoring be conducted annually, at minimum, to ensure exposures to all landfill potential airborne contaminants remain below all regulatory limits. Appendix 5 can serve as a placeholder for documentation of future monitoring records so that this Exposure Report of Findings remains current.

Table 9 - Well Shortening Personal Gas Monitoring									
	CH_4		H_2S	CO		CO_2		O_2	
	30-Minute EL	Instantaneous Limit	Instantaneous Limit	30-Minute EL	Instantaneous Limit	30-Minute EL	Instantaneous Limit	Minimum	Maximum
	3,000 ppmv	5,000 ppmv	20 ppmv	150 ppmv	250 ppmv	15,000 ppmv	25,000 ppmv	19.50%	23.50%
Env. Tech – Exceedances (9-26-24 Sampling Event)	0	11	0	0	0	0	0	0	0
Env. Tech – Exceedances (11-14-24 Sampling Event)	0	4	0	0	0	0	0	0	0

Table 10 - Spotter & Heavy Equipment Operator Personal Gas Monitoring												
	CH_4			H_2S	CO			CO_2			O_2	
	PEL	EL	I/C	I/C	PEL	EL	I/C	PEL	EL	I/C	Minimum	Maximum
	1,000 ppmv	3,000 ppmv	5,000 ppmv	20 ppmv	50 ppmv	150 ppmv	250 ppmv	50 ppmv	15,000 ppmv	25,000 ppmv	19.50%	23.50%
H. Equip. Op. Exceedances (9-26-24 Sampling Event)	1	0	2	0	0	0	18	0	0	0	0	0
Spotter Exceedances (9-26-24 Sampling Event)	0	0	0	0	0	0	9	0	0	0	0	0
H. Equip. Op. Exceedances (11-14-24 Sampling Event)	0	0	0	0	0	0	0	0	0	0	0	0

PEL - Permissible Exposure Limit based on an 8-hour Time Weighted Average
EL - 30-Minute Excursion Limit
I/C - Instantaneous/Ceiling Limit

IV. Conclusions and Recommendations

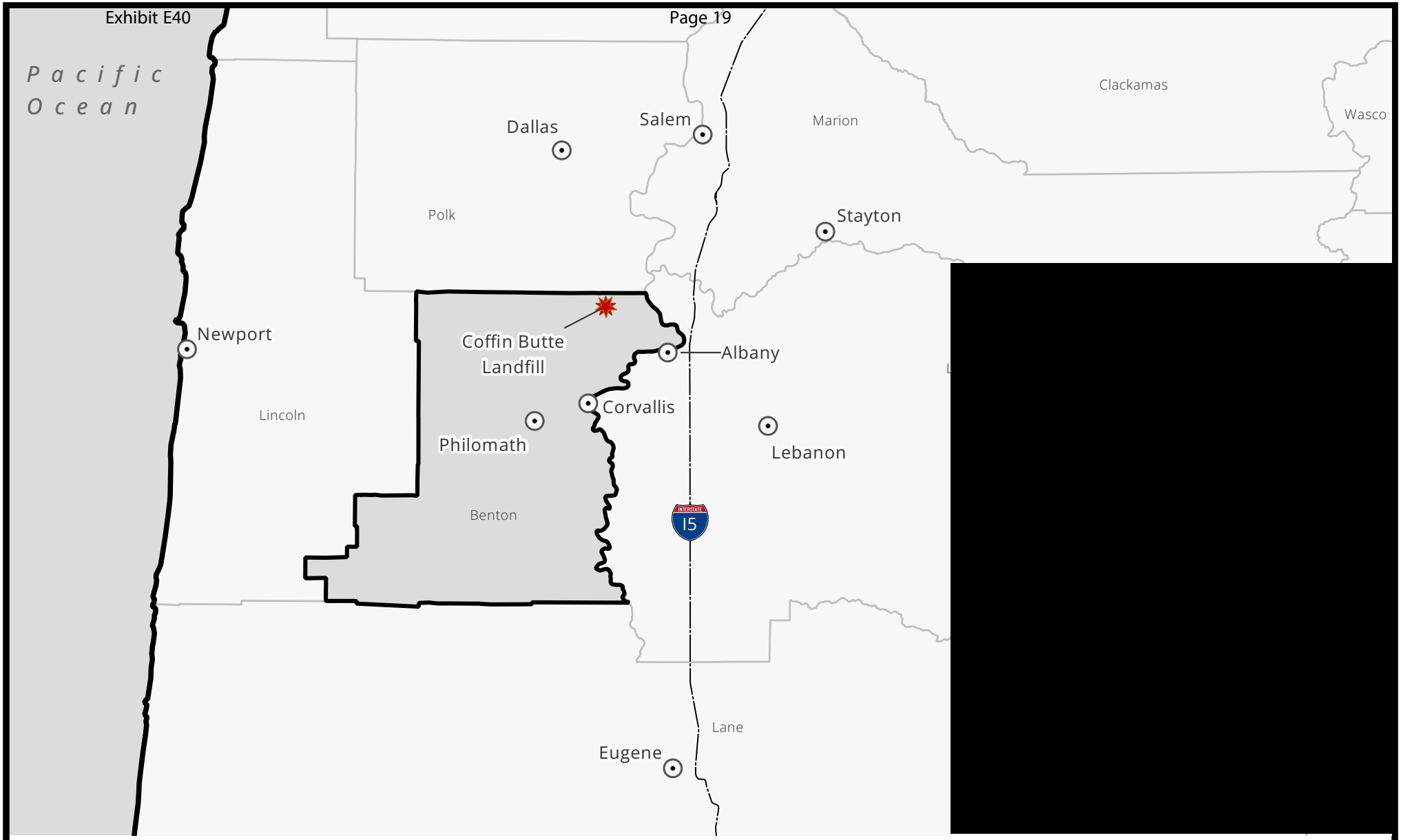
Excluding methane and carbon monoxide, the analytical results and field measurement data demonstrate CBL employees are not being exposed above short term/excursion nor 8-hour time weighted average limits for asbestos, respirable crystalline silica, respirable dust, total inhalable dust, diesel particulate (elemental carbon), and the eleven metals under OSHA's METALSSG-2 sampling group. The engineering controls and personal protective equipment currently utilized in relation to these respiratory hazards appear to be adequate to protect employees from the airborne concentrations they might be exposed to on any given day.

Field monitoring performed during the September 26, 2024, event identified carbon monoxide exceedances while employees were utilizing a given CBL work vehicle. Once the same employees switched company vehicles, no further carbon monoxide exceedances were observed. Regardless, this does demonstrate all CBL vehicles and their exhaust systems should be routinely inspected to ensure proper operation. During the heavy equipment operator's work shift, the methane instantaneous/ceiling and IDLH limit of 5,000 ppmv was exceeded two times with a peak of 5,500 ppmv. Further, after calculation of the 8-hour time weighted average for the same monitoring period, the permissible exposure limit for methane was exceeded for the heavy equipment operator. Except for where noted above, the remaining landfill gases monitored remained below all regulatory thresholds, and oxygen stayed within an acceptable range. Following the implementation of corrective actions by CBL, follow up monitoring performed on November 14, 2024 demonstrated that methane exposure to the heavy equipment operator had been eliminated. Further, the number of instantaneous methane exceedances observed for the environmental technicians performing well shortening was reduced by over 60% from eleven to four exceedances. The CBL and Guzi-West team met again following the November 14, 2024 sampling event and it was collectively determined that utilizing an electric leaf blower to force fresh air across the extraction well during modification would likely be more effective than trying to pull air away from the well during modification. Guzi-West anticipates utilizing the leaf blower in combination with employees wearing the four gas sensors will demonstrate that even short-term exceedances of the methane instantaneous/ceiling limit will be eliminated. Guzi-West recommends CBL regularly equip heavy equipment operators, spotters, and environmental technicians with four gas meters; alarms for the meters should be programmed based upon the lowest respective regulatory thresholds to alert workers in real time of any landfill gas hazards. Utilizing the four gas meters and documenting the presence or absence of any alarms being triggered will provide constant monitoring information to demonstrate whether any landfill gas hazards are present and/or if the updated engineering controls and work practices remain effective in eliminating exposure hazards. In the event four gas meter alarms are being triggered by exceedance of an IDLH limit, NIOSH states a self-contained breathing apparatus (SCBA), or combination supplied air/SCBA respirator, should be used. Guzi-West recommends that monitoring be conducted annually, at minimum, to ensure exposures to all landfill potential airborne contaminants remain below all regulatory limits. Appendix 5 can serve as a placeholder for documentation of future monitoring records so that this Exposure Report of Findings remains current.

V. References

1. The National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards, NIOSH website, U.S. Centers for Disease Control (CDC), U.S. Government, accessed 10/3/2024, https://www.cdc.gov/niosh/npg/default.html
2. K Mostafa, Oregon Occupational Safety and Health, personal communication, May 15, 2024
3. S Wescott, Oregon Occupational Safety and Health, personal communication, May 15, 2024
4. Oregon Administrative Rules, Oregon Rules for Air Contaminants, Oregon OSHA Website, accessed 10/3/2024, https://osha.oregon.gov/OSHARules/div2/div2Z-437-002-0382-air-cont.pdf
5. Occupational Safety and Health Administration, Permissible Exposure Limits – Annotated Tables, OSHA website, U.S. Department of Labor, accessed 10/3/2024, https://www.osha.gov/annotated-pels

APPENDIX 1
Figures
Exhibit 40
Page 18 of 211



0 6 12 18 24 30 mi

North

Datum: North American Datum 1983
Projection: UTM Zone 10 North
Cartographer: Seamus Begley
Credit: Wikipedia Commons, US Census Bureau

Disclaimer: Map is not intended to function as architectural or engineering plans.

Last Modified On: 5/23/2024
Job Number: 2024-377

Figure 1 Vicinity Map

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

0 400 800 1,200 Feet

NOT TO SCALE - FOR APPROXIMATION ONLY

Datum: North American Datum 1983
Projection: StatePlane California I
FIPS 0401 Feet
Cartographer: Taylor Bradley

North

GuziWest INSPECTION & CONSULTING

Last Modified On: 8/22/2024
Job Number: 2024-377B

Figure 2 - Sampling Map

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

Disclaimer: Sample locations on map are estimated. They do not represent all homogenous areas where this material may be found. Map is not intended to function as architectural or engineering plans.

Work Product

APPENDIX 2

[redacted]

Work Product

APPENDIX 3

[redacted]

APPENDIX 4

Laboratory Reports and Field Measurement Data

SGS GALSON

Mr. Clay Guzi
Guzi West Inspection and Consulting
5200 Industrial Way
Suite F
Anderson, CA 96007

August 14, 2024

Account# 37647

Login# L633639

Dear Clay Guzi:

Enclosed are the analytical results for the samples received by our laboratory on August 05, 2024. All samples on the chain of custody were received in good condition unless otherwise noted. Any additional observations will be noted on the chain of custody.

Please contact client services at (888) 432-5227 if you would like any additional information regarding this report. Thank you for using SGS Galson.

Sincerely,

SGS Galson

Lisa Swab

Lisa Swab
Laboratory Director

Enclosure(s)

SGS GALSON

ANALYTICAL REPORT

Terms and Conditions & General Disclaimers

- This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.
- Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Analytical Disclaimers

- Unless otherwise noted within the report, all quality control results associated with the samples were within established control limits or did not impact reported results.
- Note: The findings recorded within this report were drawn from analysis of the sample(s) provided to the laboratory by the Client (or a third party acting at the Client's direction). The laboratory does not have control over the sampling process, including but not limited to the use of field equipment and collection media, as well as the sampling duration, collection volume or any other collection parameter used by the Client. The findings herein constitute no warranty of the sample's representativeness of any sampled environment, and strictly relate to the samples as they were presented to the laboratory. For recommended sampling collection parameters, please refer to the Sampling and Analysis Guide at www.sgsgalson.com.
- Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceding the final result column may have been rounded and therefore, if carried through the calculations, may not yield an identical final result to the one reported.
- The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).
- Unless otherwise noted within the report, results have not been blank corrected for any field blank or method blank data.

Accreditations SGS Galson holds a variety of accreditations and recognitions. Our quality management system conforms with the requirements of ISO/IEC 17025. Where applicable, samples may also be analyzed in accordance with the requirements of ELAP, NELAC, or LELAP under one of the state accrediting bodies listed below. Current Scopes of Accreditation can be viewed at http://www.sgsgalson.com in the accreditations section of the "About" page. To determine if the analyte tested falls under our scope of accreditation, please visit our website or call Client Services at (888) 432-5227.

National/International	Accreditation/Recognition	Lab ID#	Program/Sector
AIHA-LAP, LLC - IHLAP, ELLAP, EMLAP	ISO/IEC 17025 and USEPA NLLAP	Lab ID 100324	Industrial Hygiene, Environmental Lead, Environmental Microbiology

State	Accreditation/Recognition	Lab ID#	Program/Sector
New York (NYSDOH)	ELAP and NELAC (TNI)	Lab ID: 11626	Air Analysis, Solid and Hazardous Waste
Louisiana (LDEQ)	LELAP	Lab ID: 04083	Air Analysis, Solid Chemical Materials

Legend

< - Less than	mg - Milligrams	MDL - Method Detection Limit	ppb - Parts per Billion
> - Greater than	ug - Micrograms	NA - Not Applicable	ppm - Parts per Million
l - Liters	m3 - Cubic Meters	NS - Not Specified	ppbv - ppb Volume
LOQ - Limit of Quantitation	kg - Kilograms	ND - Not Detected	ppmv - ppm Volume
ft2 - Square Feet	cm2 - Square Centimeters	in2 - Square Inches	ng - Nanograms

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET01-072924 **Lab ID : L633639-18** **Air Volume : 1000 L**
Date Sampled : 07/29/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.00090	mg/m3
Cadmium	0.15	<0.15	<0.00015	mg/m3
Chromium	7.5	<7.5	<0.0075	mg/m3
Cobalt	0.45	<0.45	<0.00045	mg/m3
Copper	0.30	<0.30	<0.00030	mg/m3
Iron	7.5	13	0.013	mg/m3
Lead	0.38	<0.38	<0.00038	mg/m3
Manganese	0.15	0.18	0.00018	mg/m3
Nickel	0.30	<0.30	<0.00030	mg/m3
Vanadium	0.45	<0.45	<0.00045	mg/m3
Zinc	3.8	<3.8	<0.0038	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET02-072924 **Lab ID : L633639-19** **Air Volume : 1020 L**
Date Sampled : 07/29/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.00088	mg/m3
Cadmium	0.15	<0.15	<0.00015	mg/m3
Chromium	7.5	<7.5	<0.0074	mg/m3
Cobalt	0.45	<0.45	<0.00044	mg/m3
Copper	0.30	<0.30	<0.00029	mg/m3
Iron	7.5	<7.5	<0.0074	mg/m3
Lead	0.38	<0.38	<0.00037	mg/m3
Manganese	0.15	<0.15	<0.00015	mg/m3
Nickel	0.30	<0.30	<0.00029	mg/m3
Vanadium	0.45	<0.45	<0.00044	mg/m3
Zinc	3.8	<3.8	<0.0037	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET03-072924 **Lab ID : L633639-20** **Air Volume : 960 L**
Date Sampled : 07/29/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.00094	mg/m3
Cadmium	0.15	<0.15	<0.00016	mg/m3
Chromium	7.5	<7.5	<0.0078	mg/m3
Cobalt	0.45	<0.45	<0.00047	mg/m3
Copper	0.30	<0.30	<0.00031	mg/m3
Iron	7.5	12	0.013	mg/m3
Lead	0.38	<0.38	<0.00039	mg/m3
Manganese	0.15	0.17	0.00018	mg/m3
Nickel	0.30	<0.30	<0.00031	mg/m3
Vanadium	0.45	<0.45	<0.00047	mg/m3
Zinc	3.8	<3.8	<0.0039	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET04-073024 **Lab ID : L633639-21** **Air Volume : 960 L**
Date Sampled : 07/30/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.00094	mg/m3
Cadmium	0.15	<0.15	<0.00016	mg/m3
Chromium	7.5	<7.5	<0.0078	mg/m3
Cobalt	0.45	<0.45	<0.00047	mg/m3
Copper	0.30	<0.30	<0.00031	mg/m3
Iron	7.5	21	0.022	mg/m3
Lead	0.38	<0.38	<0.00039	mg/m3
Manganese	0.15	0.32	0.00033	mg/m3
Nickel	0.30	<0.30	<0.00031	mg/m3
Vanadium	0.45	<0.45	<0.00047	mg/m3
Zinc	3.8	<3.8	<0.0039	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET05-072924 **Lab ID : L633639-22** **Air Volume : 924 L**
Date Sampled : 07/29/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.00097	mg/m3
Cadmium	0.15	<0.15	<0.00016	mg/m3
Chromium	7.5	<7.5	<0.0081	mg/m3
Cobalt	0.45	<0.45	<0.00049	mg/m3
Copper	0.30	<0.30	<0.00032	mg/m3
Iron	7.5	<7.5	<0.0081	mg/m3
Lead	0.38	<0.38	<0.00041	mg/m3
Manganese	0.15	<0.15	<0.00016	mg/m3
Nickel	0.30	<0.30	<0.00032	mg/m3
Vanadium	0.45	<0.45	<0.00049	mg/m3
Zinc	3.8	<3.8	<0.0041	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET-EX-01 **Lab ID : L633639-23** **Air Volume : 30 L**
Date Sampled : 07/30/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.030	mg/m3
Cadmium	0.15	<0.15	<0.0050	mg/m3
Chromium	7.5	<7.5	<0.25	mg/m3
Cobalt	0.45	<0.45	<0.015	mg/m3
Copper	0.30	<0.30	<0.010	mg/m3
Iron	7.5	<7.5	<0.25	mg/m3
Lead	0.38	<0.38	<0.013	mg/m3
Manganese	0.15	<0.15	<0.0050	mg/m3
Nickel	0.30	<0.30	<0.010	mg/m3
Vanadium	0.45	<0.45	<0.015	mg/m3
Zinc	3.8	<3.8	<0.13	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET-EX-02 **Lab ID : L633639-24** **Air Volume : 30 L**
Date Sampled : 07/30/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.030	mg/m3
Cadmium	0.15	<0.15	<0.0050	mg/m3
Chromium	7.5	<7.5	<0.25	mg/m3
Cobalt	0.45	<0.45	<0.015	mg/m3
Copper	0.30	<0.30	<0.010	mg/m3
Iron	7.5	<7.5	<0.25	mg/m3
Lead	0.38	<0.38	<0.013	mg/m3
Manganese	0.15	<0.15	<0.0050	mg/m3
Nickel	0.30	<0.30	<0.010	mg/m3
Vanadium	0.45	<0.45	<0.015	mg/m3
Zinc	3.8	<3.8	<0.13	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET-EX-03 **Lab ID : L633639-25** **Air Volume : 30 L**
Date Sampled : 07/30/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	<0.030	mg/m3
Cadmium	0.15	<0.15	<0.0050	mg/m3
Chromium	7.5	<7.5	<0.25	mg/m3
Cobalt	0.45	<0.45	<0.015	mg/m3
Copper	0.30	<0.30	<0.010	mg/m3
Iron	7.5	<7.5	<0.25	mg/m3
Lead	0.38	<0.38	<0.013	mg/m3
Manganese	0.15	<0.15	<0.0050	mg/m3
Nickel	0.30	<0.30	<0.010	mg/m3
Vanadium	0.45	<0.45	<0.015	mg/m3
Zinc	3.8	<3.8	<0.13	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET-FB-01 **Lab ID : L633639-26** **Air Volume : NA**
Date Sampled : 07/31/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	NA	mg/m3
Cadmium	0.15	<0.15	NA	mg/m3
Chromium	7.5	<7.5	NA	mg/m3
Cobalt	0.45	<0.45	NA	mg/m3
Copper	0.30	<0.30	NA	mg/m3
Iron	7.5	<7.5	NA	mg/m3
Lead	0.38	<0.38	NA	mg/m3
Manganese	0.15	<0.15	NA	mg/m3
Nickel	0.30	<0.30	NA	mg/m3
Vanadium	0.45	<0.45	NA	mg/m3
Zinc	3.8	<3.8	NA	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24

Submitted by: DPB/CAW/MSC
Supervisor : JJL

Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440460

Client ID : MET-FB-02 **Lab ID : L633639-27** **Air Volume : NA**
Date Sampled : 07/31/24 **Date Analyzed : 08/08/24**

Parameter	LOQ ug	Total ug	Conc	Units
Antimony	0.90	<0.90	NA	mg/m3
Cadmium	0.15	<0.15	NA	mg/m3
Chromium	7.5	<7.5	NA	mg/m3
Cobalt	0.45	<0.45	NA	mg/m3
Copper	0.30	<0.30	NA	mg/m3
Iron	7.5	<7.5	NA	mg/m3
Lead	0.38	<0.38	NA	mg/m3
Manganese	0.15	<0.15	NA	mg/m3
Nickel	0.30	<0.30	NA	mg/m3
Vanadium	0.45	<0.45	NA	mg/m3
Zinc	3.8	<3.8	NA	mg/m3

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Collection Media: MCE UW 37mm
Date : 09-AUG-24
Submitted by: DPB/CAW/MSC
Supervisor : JJL
Approved by: JJL

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 09-AUG-24
Report ID : 1440631

Asbestos Fiber Count (A Rules)

Sample ID	Lab ID	Fibers/ Fields	Fibers/ mm2	Fibers/ Filter	Air Volume (cc)	Fibers/ cc
ASB01-072924	L633639-1	38/100	48	19000	900,000	0.021
ASB02-072924	L633639-2	12/100	15	5800	1,040,000	0.0055
ASB03-072924	L633639-3	13/100	16	6300	966,000	0.0065
ASB04-073024	L633639-4	7/100	8.6	3300	960,000	0.0034
ASB05-072924	L633639-5	76/100	96	37000	968,000	0.038
ASB-EX-01	L633639-6	6/100	7.3	2800	50,000	0.056
ASB-EX-02	L633639-7	10/100	12	4800	50,000	0.096
ASB-EX-03	L633639-8	8/100	9.9	3800	50,000	0.076
ASB-FB-01	L633639-9	0/100	<7	<2700	NA	NA
ASB-FB-02	L633639-10	.5/100	<7	<2700	NA	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Sample Matrix : 25mm MCE PCM
Analytical Method : NIOSH 7400 "A" Rules; PCM
Limit of Detection : 7 Fibers/mm2
Microscope field area : 0.00785 mm2
Filter collection area: 385 mm2

Submitted by : SLS
Approved by : BDB
Date : 12-AUG-24

Supervisor: BDB

cc -Cubic Centimeters mm2 -Square Millimeters

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 30-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 09-AUG-24
Report ID : 1440492

Diesel Particulate Matter as Carbon

Sample ID	Lab ID	Air Vol liter	Analyte	Total ug	Conc ug/m3
DIES01-073024	L633639-35	840	Organic Carbon	81	96
			Elemental Carbon	5.9	7.0
			Total Carbon	87	100
DIES02-073024	L633639-36	720	Organic Carbon	<1.3	<1.8
			Elemental Carbon	[2.0]	[2.8]
			Total Carbon	<2.6	<3.5
DIES03-073024	L633639-37	720	Organic Carbon	<1.3	<1.8
			Elemental Carbon	<1.3	<1.8
			Total Carbon	<2.6	<3.5
DIES-FB-01	L633639-38	NA	Organic Carbon	9.3	NA
			Elemental Carbon	<1.3	NA
			Total Carbon	9.3	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of Quantitation: 4.5ug OC & EC; 8.9ug TC
Method Detection Limit: 1.3ug OC & EC; 2.6ug TC
Analytical Method : mod. NIOSH 5040; TOA
Submitted by: PMH/JGC
Approved by : JGC
Date : 09-AUG-24
Collection Media : 37mm Quartz
Supervisor: JGC

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 30-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 09-AUG-24
Report ID : 1440492

Diesel Particulate Matter as Carbon

Sample ID	Lab ID	Air Vol liter	Analyte	Total ug	Conc ug/m3
DIES-FB-02	L633639-39	NA	Organic Carbon	39	NA
			Elemental Carbon	<1.3	NA
			Total Carbon	39	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of Quantitation: 4.5ug OC & EC; 8.9ug TC
Method Detection Limit: 1.3ug OC & EC; 2.6ug TC
Analytical Method : mod. NIOSH 5040; TOA
Submitted by: PMH/JGC
Approved by : JGC
Date : 09-AUG-24
Collection Media : 37mm Quartz
Supervisor: JGC

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 30-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440341

Respirable Dust

Sample ID	Lab ID	Air Vol liter	Total mg	Conc mg/m3
RESP01-073024	L633639-28	860	0.46	0.53
RESP02-073024	L633639-29	1100	<0.050	<0.045
RESP03-073024	L633639-30	990	0.12	0.12
RESP04-073024	L633639-31	960	<0.050	<0.052
RESP05-073024	L633639-32	900	<0.050	<0.056
RESP-FB-01	L633639-33	NA	<0.050	NA
RESP-FB-02	L633639-34	NA	<0.050	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of Quantitation: 0.050 mg
Analytical Method : mod. NIOSH 0600; Gravimetric
Collection Media : PVC PW 37mm

Submitted by: HVN
Date : 12-AUG-24
Supervisor : HVN

Approved by: CMP

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 29-JUL-24 - 31-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639
Date Analyzed : 08-AUG-24
Report ID : 1440358

Total Dust

Sample ID	Lab ID	Air Vol liter	Total mg	Conc mg/m3
TOTD01-072924	L633639-11	900	0.34	0.38
TOTD02-073024	L633639-12	1040	0.16	0.15
TOTD03-072924	L633639-13	966	0.23	0.24
TOTD04-073024	L633639-14	960	0.31	0.33
TOTD05-072924	L633639-15	900	<0.050	<0.056
TOTD-FB-01	L633639-16	NA	<0.050	NA
TOTD-FB-02	L633639-17	NA	<0.050	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of Quantitation: 0.050 mg
Analytical Method : mod. NIOSH 0500; Gravimetric
Collection Media : PVC PW 37mm

Submitted by: PLP
Date : 12-AUG-24
Supervisor : HVN

Approved by: CMP

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 30-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639

Date Analyzed : 08-AUG-24 - 13-AUG-24
Report ID : 1441287

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
RESP01-073024	L633639-28	Quartz	860	<16	<19
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	860	<16	<19
RESP02-073024	L633639-29	Quartz	1100	<5.0	<4.5
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	1100	<5.0	<4.5
RESP03-073024	L633639-30	Quartz	990	<5.0	<5.1
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	990	<5.0	<5.1

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
Collection Media : PVC PW 37mm

Submitted by: CKB
Date : 14-AUG-24
Supervisor : AFB

Approved by: NLO

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 30-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639

Date Analyzed : 08-AUG-24 - 13-AUG-24
Report ID : 1441287

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
RESP04-073024	L633639-31	Quartz	960	<5.0	<5.2
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	960	<5.0	<5.2
RESP05-073024	L633639-32	Quartz	900	<5.0	<5.6
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	900	<5.0	<5.6
RESP-FB-01	L633639-33	Quartz	NA	<5.0	NA
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	NA	<5.0	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
Collection Media : PVC PW 37mm

Submitted by: CKB
Date : 14-AUG-24
Supervisor : AFB

Approved by: NLO

SGS GALSON

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Guzi West Inspection and Consu
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte
Date Sampled : 30-JUL-24
Date Received : 05-AUG-24

Account No.: 37647
Login No. : L633639

Date Analyzed : 08-AUG-24 - 13-AUG-24
Report ID : 1441287

Respirable Crystalline Silica (RCS): Quartz

Sample ID	Lab ID	Analyte	Air Vol l	ug	ug/m3
RESP-FB-02	L633639-34	Quartz	NA	<5.0	NA
		Cristobalite	NA	NA	NA
		Tridymite	NA	NA	NA
		RCS	NA	<5.0	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug
Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD
Collection Media : PVC PW 37mm

Submitted by: CKB
Date : 14-AUG-24
Supervisor : AFB

Approved by: NLO

LABORATORY FOOTNOTE REPORT

GALSON

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client Name : Guzi West Inspection and Consulting
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte

Date Sampled : 29-JUL-24 - 31-JUL-24 Account No.: 37647
Date Received: 05-AUG-24 Login No. : L633639
Date Analyzed: 08-AUG-24 - 13-AUG-24

L633639 (Report ID: 1440460):
For applicable NYS sampling events, laboratory accreditation through NYSDOH applies only to Lead results.
Reported results reflect elemental analysis of the requested metals. Certain compounds may not be solubilized during digestion, resulting in data that is biased low.
SOPs: MT-SOP-29(15), MT-SOP-27(22)
One out of eight blank spikes recovered below control limits (90.8 to 121%) at 90.3% for Cobalt.
One out of eight blank spikes recovered below control limits (89.9 to 122%) at 89.4% for Copper.

L633639 (Report ID: 1440460):
Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Antimony	+/-11.4%	101%
Cadmium	+/-9.7%	105%
Chromium	+/-9.6%	106%
Cobalt	+/-9.5%	106%
Copper	+/-10%	106%
Iron	+/-11.3%	107%
Lead	+/-10.4%	103%
Manganese	+/-11.1%	101%
Nickel	+/-11.6%	105%
Vanadium	+/-11%	104%
Zinc	+/-10.6%	104%

Parameter	Method
Antimony	mod. NIOSH 7303; ICP
Cadmium	mod. NIOSH 7303; ICP
Chromium	mod. NIOSH 7303; ICP
Cobalt	mod. NIOSH 7303; ICP
Copper	mod. NIOSH 7303; ICP
Iron	mod. NIOSH 7303; ICP
Lead	mod. NIOSH 7303; ICP
Manganese	mod. NIOSH 7303; ICP
Nickel	mod. NIOSH 7303; ICP
Vanadium	mod. NIOSH 7303; ICP
Zinc	mod. NIOSH 7303; ICP

LABORATORY FOOTNOTE REPORT

GALSON

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client Name : Guzi West Inspection and Consulting
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte

Date Sampled : 29-JUL-24 - 31-JUL-24 Account No.: 37647
Date Received: 05-AUG-24 Login No. : L633639
Date Analyzed: 08-AUG-24 - 13-AUG-24

L633639 (Report ID: 1440631):
SOPs: ia-pcm(35)
Per NIOSH 7400, fiber counts less than 100 f/mm2 or greater than 1300 f/mm2 have a
greater than optimal variability and are probably biased.
Fiber count samples will be discarded 60 days from the date of this report.
The current intra-laboratory coefficients of variation (CVs) for the applicable fiber ranges are as
follows:
0.157 (5-20 fibers/100 fields)
0.116 (>20-50 fibers/100 fields)
0.087 (>50-100 fibers/100 fields)
0.098 (>100 fibers/100 fields)
The current inter-laboratory relative standard deviation is 0.45
The stated CVs apply to the media, technology, and SOP(s) referenced in the report and do not take
into account any uncertainty associated with the sampling process.
Results are corrected for the average blank value when blanks are submitted.

L633639 (Report ID: 1440492):
SOPs: ic-n5040(33)
Reported sample results in brackets are considered estimated, as they are below the level of quantitation.
Actual values for field blank are reported. Sample results have been corrected for the average field blank.

L633639-35-37 (Report ID: 1440492):
Carbon results may not be representative of entire filter. Heavier dust deposit present in center of
filter. A subsample from the darkest portion was analyzed. Results may be biased high.

L633639 (Report ID: 1440492):
Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the
media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process.
The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient
data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Diesel Particulate Matter as Carbon	+/-10.8%	103%

L633639 (Report ID: 1440341):
SOPs: GRAV-SOP-6(28), GRAV-SOP-5(35)

L633639-31 (Report ID: 1440341):
Filter received torn at the laboratory. Results may be biased low.

LABORATORY FOOTNOTE REPORT

SGS GALSON

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client Name : Guzi West Inspection and Consulting
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte

Date Sampled : 29-JUL-24 - 31-JUL-24 Account No.: 37647
Date Received: 05-AUG-24 Login No. : L633639
Date Analyzed: 08-AUG-24 - 13-AUG-24

L633639 (Report ID: 1440341):
Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Respirable Dust	+/-7.1%	106%

L633639 (Report ID: 1440358):
SOPs: GRAV-SOP-6(28), GRAV-SOP-5(35)

L633639-14 (Report ID: 1440358):
Filter received torn at the laboratory. Results may be biased low.

L633639 (Report ID: 1440358):
Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Total Dust	+/-7.1%	106%

L633639 (Report ID: 1441287):
The reported RCS value is based on recoveries of silica polymorphs (Quartz, Cristobalite, and/or Tridymite) greater than the reporting level. The presence of silica below the reporting level cannot be ruled out. When all polymorph results are below the reporting level, RCS defaults to the lowest polymorph concentration. The calibration standard used for Tridymite analysis is not NIST traceable; however, when Tridymite is detected above the reporting level, it is included in the RCS calculation.
SOPs: ix-calibrate(19), ix-xrdreview(23), ix-xrdashprep(50), ix-xrdstdprep(39)
The Primary Quartz blank spike duplicate recovery was outside the control limits of 71.2% to 108% at 70.2%.
Where possible, control limits are statistically generated in-house. In the absence of statistical limits, guidance default limits of 75.0% to 125% are used.The Quartz blank spike recovery was within control limits.

L633639-28 (Report ID: 1441287):
Elevated Quartz reporting limit due to matrix interference.

L633639-31 (Report ID: 1441287):
Filters received torn at the laboratory. Results may be biased low.

GALSON

LABORATORY FOOTNOTE REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client Name : Guzi West Inspection and Consulting
Site : Coffin Butte Landfill
Project No. : 28972 Coffin Butte

Date Sampled : 29-JUL-24 - 31-JUL-24 Account No.: 37647
Date Received: 05-AUG-24 Login No. : L633639
Date Analyzed: 08-AUG-24 - 13-AUG-24

L633639 (Report ID: 1441287):

Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Quartz	+/-13.7%	89.7%

277828774701
Date:08/05/24
Shipper:FEDEX
Initials:BMC
Prep:UNKNOWN

L633639

CHAIN OF CUSTODY

130-131, 116, 112

Turn Around Time (TAT)	surcharge
☒ Standard	0%
☐ 4 Business Days	35%
☐ 3 Business Days	50%
☐ 2 Business Days	75%
☐ Next Day by 6pm	100%
☐ Next Day by Noon	150%
☐ Same Day	200%

Client Acct No.: 37647

Original Prep No.:

Online COC No.: 302793

Report To: Mr. Clay Guzi
Company Name: Guzi West Inspection and Consulting
Address 1: 5200 Industrial Way
Address 2: Suite F
City, State Zip: Anderson, CA 96007
Phone No.: 530-515-0922
Cell No.:
Email reports to: reporting@guziwest.com, reporting@guziwest.com
Email EDD to:
Comments:

Invoice To: Mr. Clay Guzi
Company Name: Guzi West Inspection and Consulting
Address 1: 5200 Industrial Way
Address 2: Suite F
Company Name: Anderson, CA 96007
Phone No.: 530-515-0922
Email Address: clay@guziwest.com
Comments:

P.O. No.:
Payment info.: ☒ I will call SGS to provide credit card info
☐ Card on File (enter the last five digits on the line below)

Comments:
Metals: Antimony, Cadmium, Lead, Chromium, Cobalt, Copper, Iron, Manganese, Nickle, Vanadium and Zinc

State Sampled: Oregon

☐ MSHA

Site Name: Coffin Butte Landfill

Project: 28972 Coffin Butte

Sampled By: Maceo Rizzo

List description of industry or Processes/Interfaces present in sampling area:

Sample ID (Maximum of 20 Characters)	Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area	Liters Minutes in², cm², ft²	Analysis Requested	Method Reference	Internal Notes
ASB01-072924	07/29/2024	25mm 0.8u MCE for PCM/TEM	900	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB02-072924	07/29/2024	25mm 0.8u MCE for PCM/TEM	1,040	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	

☐ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By:	Maceo Rizzo	SIGNED ELECTRONICALLY	08/02/2024	10:30	Received By:	Brian Caruso	Brian Caruso	8/3/24	1423
Relinquished By:					Received By:				

Samples received after 3pm will be considered as next day's business.

Online COC No. :302793
Prep No. :
Account No. :37647
Finalized :08/01/2024 23:34:32

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/en/Terms-and-Conditions.aspx

Page: 1 / 5

SGS

CHAIN OF CUSTODY

Comments:
Metals: Antimony, Cadmium, Lead, Chromium, Cobalt, Copper, Iron, Manganese, Nickle, Vanadium and Zinc

Sample ID (Maximum of 20 Characters)	Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area	Liters Minutes in², cm², ft²	Analysis Requested	Method Reference	Internal Notes
ASB03-072924	07/29/2024	25mm 0.8u MCE for PCM/TEM	966	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB04-073024	07/29/2024	25mm 0.8u MCE for PCM/TEM	960	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB05-072924	07/29/2024	25mm 0.8u MCE for PCM/TEM	968	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB-EX-01	07/29/2024	25mm 0.8u MCE for PCM/TEM	50	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB-EX-02	07/29/2024	25mm 0.8u MCE for PCM/TEM	50	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB-EX-03	07/29/2024	25mm 0.8u MCE for PCM/TEM	50	L	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB-FB-01	07/31/2024	25mm 0.8u MCE for PCM/TEM	N/A (BLANK)	N/A	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
ASB-FB-02	07/31/2024	25mm 0.8u MCE for PCM/TEM	N/A (BLANK)	N/A	Asbestos Fiber Count (A Rules)	NIOSH 7400 "A" Rules; PCM	
TOTD01-072924	07/29/2024	2pc 37mm PW PVC	900	L	Total Dust	mod. NIOSH 0500; Gravimetric	

☐ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By:	Maceo Rizzo	SIGNED ELECTRONICALLY	08/02/2024	10:30	Received By:	Brian Caruso	Brian Caruso	8/15/24	1423
Relinquished By:					Received By:				

Samples received after 3pm will be considered as next day's business.

Online COC No. :302793
Prep No. :
Account No. :37647
Finalized :08/01/2024 23:34:32

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/en/Terms-and-Conditions.aspx

SGS North America Inc. | 6601 Kirkville Road E. Syracuse, NY 13057, USA t +1 888 432 5227 | +1 315 432 5227 | www.galsonlabs.com | www.sgs.com

Member of the SGS Group (SGS SA)

SGS

CHAIN OF CUSTODY

Comments:
Metals: Antimony, Cadmium, Lead, Chromium, Cobalt, Copper, Iron, Manganese, Nickle, Vanadium and Zinc

Sample ID (Maximum of 20 Characters)	Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area	Liters Minutes in^2, cm^2, ft^2	Analysis Requested	Method Reference	Internal Notes
TOTD02-073024	07/30/2024	2pc 37mm PW PVC	1040	L	Total Dust	mod. NIOSH 0500; Gravimetric	
TOTD03-072924	07/29/2024	2pc 37mm PW PVC	966	L	Total Dust	mod. NIOSH 0500; Gravimetric	
TOTD04-073024	07/30/2024	2pc 37mm PW PVC	960	L	Total Dust	mod. NIOSH 0500; Gravimetric	
TOTD05-072924	07/29/2024	2pc 37mm PW PVC	900	ft2	Total Dust	mod. NIOSH 0500; Gravimetric	
TOTD-FB-01	07/31/2024	2pc 37mm PW PVC	N/A (BLANK)	N/A	Total Dust	mod. NIOSH 0500; Gravimetric	
TOTD-FB-02	07/31/2024	2pc 37mm PW PVC	N/A (BLANK)	N/A	Total Dust	mod. NIOSH 0500; Gravimetric	
MET01-072924	07/29/2024	37mm UW MCE, 3pc	1,000	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET02-072924	07/29/2024	37mm UW MCE, 3pc	1,020	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET03-072924	07/29/2024	37mm UW MCE, 3pc	960	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET04-073024	07/30/2024	37mm UW MCE, 3pc	960	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET05-072924	07/29/2024	37mm UW MCE, 3pc	924	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET-EX-01	07/30/2024	37mm UW MCE, 3pc	30	L	Metals (please specify)	mod. NIOSH 7303; ICP	

☐ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By:	Maceo Rizzo	SIGNED ELECTRONICALLY	08/02/2024	10:30	Received By:	Brian Caruso	Brian Caruso	8/5/24	1423
Relinquished By:					Received By:				

Samples received after 3pm will be considered as next day's business.

Online COC No. :302793
Prep No. :
Account No. :37647
Finalized :08/01/2024 23:34:32

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/en/Terms-and-Conditions.aspx

SGS North America Inc. 6601 Kirkville Road E. Syracuse, NY 13057, USA t +1 888 432 5227 | +1 315 432 5227 www.galsonlabs.com | www.sgs.com

Member of the SGS Group (SGS SA)

SGS

CHAIN OF CUSTODY

Comments:
Metals: Antimony, Cadmium, Lead, Chromium, Cobalt, Copper, Iron, Manganese, Nickle, Vanadium and Zinc

Sample ID (Maximum of 20 Characters)	Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area	Liters Minutes in^2, cm^2, ft^2	Analysis Requested	Method Reference	Internal Notes
MET-EX-02	07/30/2024	37mm UW MCE, 3pc	30	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET-EX-03	07/30/2024	37mm UW MCE, 3pc	30	L	Metals (please specify)	mod. NIOSH 7303; ICP	
MET-FB-01	07/31/2024	37mm UW MCE, 3pc	N/A (BLANK)	N/A	Metals (please specify)	mod. NIOSH 7303; ICP	
MET-FB-02	07/31/2024	37mm UW MCE, 3pc	N/A (BLANK)	N/A	Metals (please specify)	mod. NIOSH 7303; ICP	
RESP01-073024	07/30/2024	2 LPM PPI with PW PVC	860	L	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
RESP02-073024	07/30/2024	2 LPM PPI with PW PVC	1100	L	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
RESP03-073024	07/30/2024	2 LPM PPI with PW PVC	990	L	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
RESP04-073024	07/30/2024	2 LPM PPI with PW PVC	960	L	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
RESP05-073024	07/30/2024	2 LPM PPI with PW PVC	900	L	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	

☐ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature	Date	Time
Relinquished By:	Maceo Rizzo	SIGNED ELECTRONICALLY	08/02/2024	10:30	Received By:	Brian Caruso	8/5/24	1423
Relinquished By:					Received By:			

Samples received after 3pm will be considered as next day's business.

Online COC No. :302793
Prep No. :
Account No. :37647
Finalized :08/01/2024 23:34:32

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/en/Terms-and-Conditions.aspx

SGS North America Inc. 6601 Kirkville Road E. Syracuse, NY 13057, USA t +1 888 432 5227 | +1 315 432 5227 www.galsonlabs.com | www.sgs.com

Member of the SGS Group (SGS SA)

CHAIN OF CUSTODY

Comments:
Metals: Antimony, Cadmium, Lead, Chromium, Cobalt, Copper, Iron, Manganese, Nickle, Vanadium and Zinc

Sample ID (Maximum of 20 Characters)	Date Sampled	Collection Medium	Sample Volume Sample Time Sample Area	Liters Minutes in², cm², ft²	Analysis Requested	Method Reference	Internal Notes
RESP-FB-01	07/30/2024	2 LPM PPI with PW PVC	N/A (BLANK)	N/A	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
RESP-FB-02	07/30/2024	2 LPM PPI with PW PVC	N/A (BLANK)	N/A	Silica, crystalline quartz (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
DIES01-073024	07/30/2024	25mm QFF, 3pc (N5040)	840	L	Diesel Particulate	mod. NIOSH 5040; TOA	
DIES02-073024	07/30/2024	25mm QFF, 3pc (N5040)	720	L	Diesel Particulate	mod. NIOSH 5040; TOA	
DIES03-073024	07/30/2024	25mm QFF, 3pc (N5040)	720	L	Diesel Particulate	mod. NIOSH 5040; TOA	
DIES-FB-01	07/30/2024	25mm QFF, 3pc (N5040)	N/A (BLANK)	N/A	Diesel Particulate	mod. NIOSH 5040; TOA	
DIES-FB-02	07/30/2024	25mm QFF, 3pc (N5040)	N/A (BLANK)	N/A	Diesel Particulate	mod. NIOSH 5040; TOA	

37mm quartz ybr 8/9/24

☐ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature		Date	Time		Print Name / Signature		Date	Time
Relinquished By:	Maceo Rizzo	SIGNED ELECTRONICALLY	08/02/2024	10:30	Received By:	Brian Caruso	Brian Caruso	8/5/24	1423
Relinquished By:					Received By:				

Samples received after 3pm will be considered as next day's business.

Online COC No. :302793
Prep No. :
Account No. :37647
Finalized :08/01/2024 23:34:32

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: http://www.sgs.com/en/Terms-and-Conditions.aspx

SGS North America Inc. 6601 Kirkville Road E. Syracuse, NY 13057, USA I +1 888 432 5227 | +1 315 432 5227 www.galsonlabs.com | www.sgs.com

Member of the SGS Group (SGS SA)

GX-3R Data Sample

Name	al26130457_176023499RN
Date	9/26/2024
Serial No.	176023499RN
Interval Time (sec)	5

Gas(FullScale)	Warning	Alarm	AlarmH	STEL	TWA
CH4(100%LEL)	10 %LEL	25 %LEL	50 %LEL	*****	*****
O2(40.0%)	19.50%	18.00%	23.50%	*****	*****
H2S(200.0ppm)	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
CO(2000ppm)	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm

No	Time	CH4(100%LEL)	O2(40.0%)	H2S(200.0ppm)	CO(2000ppm)	Temperature
283	12:58:27 PM	0%	20.90%	0	0	21.2 °C
284	12:58:32 PM	0%	20.90%	0	0	21.3 °C
285	12:58:37 PM	0%	20.90%	0	0	21.3 °C
286	12:58:42 PM	0%	20.90%	0	0	21.3 °C
287	12:58:47 PM	0%	20.90%	0	0	21.3 °C
288	12:58:52 PM	1%	20.90%	0	0	21.3 °C
289	12:58:57 PM	1%	20.90%	0	0	21.4 °C
290	12:59:02 PM	0%	20.90%	0	0	21.4 °C
291	12:59:07 PM	0%	20.90%	0	0	21.4 °C
292	12:59:12 PM	0%	20.90%	0	0	21.4 °C
293	12:59:17 PM	0%	20.90%	0	0	21.4 °C
294	12:59:22 PM	0%	20.90%	0	0	21.4 °C
295	12:59:27 PM	0%	20.90%	0	0	21.5 °C
296	12:59:32 PM	1%	20.90%	0	0	21.5 °C
297	12:59:37 PM	1%	20.90%	0	0	21.5 °C
298	12:59:42 PM	0%	20.90%	0	0	21.5 °C
299	12:59:47 PM	1%	20.90%	0	0	21.5 °C
300	12:59:52 PM	1%	20.90%	0	0	21.5 °C
301	12:59:57 PM	1%	20.90%	0	0	21.6 °C
302	1:00:02 PM	1%	20.90%	0	0	21.6 °C
303	1:00:07 PM	1%	20.90%	0	0	21.6 °C
304	1:00:12 PM	0%	20.90%	0	0	21.6 °C
305	1:00:17 PM	1%	20.90%	0	0	21.6 °C
306	1:00:22 PM	1%	20.90%	0	0	21.6 °C
307	1:00:27 PM	0%	20.90%	0	0	21.7 °C
308	1:00:32 PM	0%	20.90%	0	0	21.7 °C
309	1:00:37 PM	0%	20.90%	0	0	21.7 °C
310	1:00:42 PM	1%	20.90%	0	0	21.7 °C
311	1:00:47 PM	1%	20.90%	0	0	21.7 °C
312	1:00:52 PM	1%	20.90%	0	0	21.7 °C
313	1:00:57 PM	1%	20.90%	0	0	21.7 °C
314	1:01:02 PM	1%	20.90%	0	0	21.7 °C
315	1:01:07 PM	1%	20.90%	0	0	21.8 °C
316	1:01:12 PM	1%	20.90%	0	0	21.8 °C
317	1:01:17 PM	1%	20.90%	0	0	21.8 °C

367	1:05:27 PM	0%	20.90%	0	32	22.8 °C
368	1:05:32 PM	0%	20.90%	0.4	73	22.9 °C
369	1:05:37 PM	0%	20.90%	0	55	22.9 °C
370	1:05:42 PM	0%	20.90%	0	27	22.9 °C
371	1:05:47 PM	0%	20.90%	0	18	22.9 °C
372	1:05:52 PM	0%	20.90%	0	11	22.9 °C
373	1:05:57 PM	0%	20.90%	0	8	22.9 °C
374	1:06:02 PM	0%	20.90%	0	9	23.0 °C
375	1:06:07 PM	0%	20.90%	0	7	23.0 °C
376	1:06:12 PM	0%	20.90%	0	6	23.0 °C
377	1:06:17 PM	0%	20.90%	0	5	23.0 °C
378	1:06:22 PM	0%	20.90%	0	4	23.1 °C
379	1:06:27 PM	0%	20.90%	0	5	23.1 °C
380	1:06:32 PM	0%	20.90%	0	4	23.1 °C
381	1:06:37 PM	0%	20.90%	0	3	23.1 °C
382	1:06:42 PM	0%	20.90%	0	3	23.1 °C
383	1:06:47 PM	0%	20.90%	0	3	23.2 °C
384	1:06:52 PM	0%	20.90%	0	3	23.2 °C
385	1:06:57 PM	0%	20.90%	0	2	23.2 °C
386	1:07:02 PM	0%	20.90%	0	2	23.2 °C
387	1:07:07 PM	0%	20.90%	0	13	23.2 °C
388	1:07:12 PM	0%	20.90%	0.7	87	23.3 °C
389	1:07:17 PM	0%	20.90%	0	44	23.3 °C
390	1:07:22 PM	0%	20.90%	0	6	23.3 °C
391	1:07:27 PM	0%	20.90%	0	4	23.3 °C
392	1:07:32 PM	0%	20.90%	0	4	23.4 °C
393	1:07:37 PM	0%	20.90%	0	2	23.4 °C
394	1:07:42 PM	0%	20.90%	0	0	23.4 °C
395	1:07:47 PM	0%	20.90%	0	0	23.4 °C
396	1:07:52 PM	0%	20.90%	0	0	23.5 °C
397	1:07:57 PM	0%	20.90%	0	0	23.5 °C
398	1:08:02 PM	0%	20.90%	0	0	23.5 °C
399	1:08:07 PM	0%	20.90%	0	0	23.5 °C
400	1:08:12 PM	0%	20.90%	0	0	23.5 °C
401	1:08:17 PM	0%	20.90%	0	0	23.5 °C
402	1:08:22 PM	0%	20.90%	0	0	23.6 °C
403	1:08:27 PM	0%	20.90%	0	0	23.6 °C
404	1:08:32 PM	0%	20.90%	0	0	23.6 °C
405	1:08:37 PM	0%	20.90%	0	0	23.6 °C
406	1:08:42 PM	0%	20.90%	0	0	23.6 °C
407	1:08:47 PM	0%	20.90%	0	0	23.6 °C
408	1:08:52 PM	0%	20.90%	0	0	23.6 °C
409	1:08:57 PM	0%	20.90%	0	0	23.6 °C
410	1:09:02 PM	0%	20.90%	0	10	23.6 °C
411	1:09:07 PM	0%	20.90%	0	24	23.6 °C
412	1:09:12 PM	0%	20.90%	0	16	23.6 °C
413	1:09:17 PM	0%	20.90%	0.8	96	23.6 °C
414	1:09:22 PM	0%	20.90%	1.1	140	23.6 °C
415	1:09:27 PM	0%	20.90%	0	36	23.6 °C

416	1:09:32 PM	0%	20.90%	0	38	23.6 °C
417	1:09:37 PM	0%	20.90%	0	48	23.6 °C
418	1:09:42 PM	0%	20.90%	0	51	23.6 °C
419	1:09:47 PM	0%	20.90%	0.3	63	23.6 °C
420	1:09:52 PM	0%	20.90%	0	32	23.6 °C
421	1:09:57 PM	0%	20.90%	0	5	23.6 °C
422	1:10:02 PM	0%	20.90%	0	2	23.6 °C
423	1:10:07 PM	0%	20.90%	0	0	23.6 °C
424	1:10:12 PM	0%	20.90%	0.7	68	23.6 °C
425	1:10:17 PM	0%	20.90%	0.5	71	23.5 °C
426	1:10:22 PM	0%	20.90%	0	28	23.5 °C
427	1:10:27 PM	0%	20.90%	0.5	76	23.5 °C
428	1:10:32 PM	0%	20.90%	1.7	302	23.5 °C
429	1:10:37 PM	1%	20.90%	1.4	340	23.5 °C
430	1:10:42 PM	1%	20.90%	0	253	23.5 °C
431	1:10:47 PM	0%	20.90%	0	98	23.5 °C
432	1:10:52 PM	0%	20.90%	0	29	23.5 °C
433	1:10:57 PM	0%	20.90%	0	29	23.5 °C
434	1:11:02 PM	0%	20.90%	0	8	23.4 °C
435	1:11:07 PM	0%	20.90%	0	3	23.4 °C
436	1:11:12 PM	0%	20.90%	0	2	23.4 °C
437	1:11:17 PM	0%	20.90%	0	0	23.4 °C
438	1:11:22 PM	0%	20.90%	0.9	88	23.4 °C
439	1:11:27 PM	1%	20.90%	1.2	218	23.4 °C
440	1:11:32 PM	1%	20.90%	0	182	23.4 °C
441	1:11:37 PM	0%	20.90%	0	37	23.3 °C
442	1:11:42 PM	0%	20.90%	2.6	277	23.3 °C
443	1:11:47 PM	4%	20.90%	5.7	944	23.3 °C
444	1:11:52 PM	5%	20.90%	2.6	1030	23.3 °C
445	1:11:57 PM	5%	20.90%	0	877	23.3 °C
446	1:12:02 PM	5%	20.90%	9.7	1809	23.3 °C
447	1:12:07 PM	11%	20.90%	10.7	2000	23.2 °C
448	1:12:12 PM	11%	20.90%	0	1345	23.2 °C
449	1:12:17 PM	5%	20.90%	3.1	1190	23.2 °C
450	1:12:22 PM	6%	20.90%	3.9	1468	23.2 °C
451	1:12:27 PM	6%	20.90%	-5.9	747	23.2 °C
452	1:12:32 PM	2%	20.90%	1.2	533	23.2 °C
453	1:12:37 PM	5%	20.90%	3.3	837	23.2 °C
454	1:12:42 PM	5%	20.90%	0	261	23.2 °C
455	1:12:47 PM	1%	20.90%	0	79	23.2 °C
456	1:12:52 PM	1%	20.90%	0	56	23.2 °C
457	1:12:57 PM	1%	20.90%	0	29	23.1 °C
458	1:13:02 PM	1%	20.90%	0.3	14	23.1 °C
459	1:13:07 PM	1%	20.90%	0.3	9	23.1 °C
460	1:13:12 PM	1%	20.90%	0.3	7	23.1 °C
461	1:13:17 PM	4%	20.90%	6	604	23.1 °C
462	1:13:22 PM	4%	20.90%	4.8	639	23.1 °C
463	1:13:27 PM	1%	20.90%	0	90	23.1 °C
464	1:13:32 PM	1%	20.90%	1.4	146	23.1 °C

465	1:13:37 PM	1%	20.90%	1.3	167	23.1 °C
466	1:13:42 PM	1%	20.90%	0.3	73	23.1 °C
467	1:13:47 PM	1%	20.90%	0.7	123	23.1 °C
468	1:13:52 PM	1%	20.90%	0.7	157	23.1 °C
469	1:13:57 PM	1%	20.90%	0.6	166	23.1 °C
470	1:14:02 PM	1%	20.90%	0.5	171	23.1 °C
471	1:14:07 PM	1%	20.90%	0.3	155	23.1 °C
472	1:14:12 PM	1%	20.90%	0.5	148	23.1 °C
473	1:14:17 PM	1%	20.90%	0.4	142	23.1 °C
474	1:14:22 PM	1%	20.90%	0	102	23.1 °C
475	1:14:27 PM	1%	20.90%	0	71	23.1 °C
476	1:14:32 PM	1%	20.90%	0.3	45	23.1 °C
477	1:14:37 PM	1%	20.90%	0.3	36	23.1 °C
478	1:14:42 PM	1%	20.90%	0.3	22	23.1 °C
479	1:14:47 PM	1%	20.90%	0.3	17	23.1 °C
480	1:14:52 PM	1%	20.90%	0.3	14	23.1 °C
481	1:14:57 PM	0%	20.90%	0.4	10	23.1 °C
482	1:15:02 PM	1%	20.90%	0.4	11	23.1 °C
483	1:15:07 PM	0%	20.90%	0.4	9	23.1 °C
484	1:15:12 PM	0%	20.90%	0.4	8	23.1 °C
485	1:15:17 PM	1%	20.90%	0.4	5	23.1 °C
486	1:15:22 PM	1%	20.90%	0.4	5	23.1 °C
487	1:15:27 PM	1%	20.90%	0.4	4	23.1 °C
488	1:15:32 PM	1%	20.90%	0.4	7	23.1 °C
489	1:15:37 PM	0%	20.90%	0.4	7	23.1 °C
490	1:15:42 PM	1%	20.90%	0.5	21	23.1 °C
491	1:15:47 PM	1%	20.90%	0.9	73	23.1 °C
492	1:15:52 PM	1%	20.90%	0	41	23.1 °C
493	1:15:57 PM	1%	20.90%	0.3	6	23.1 °C
494	1:16:02 PM	1%	20.90%	0.4	2	23.1 °C
495	1:16:07 PM	1%	20.90%	0.4	0	23.1 °C
496	1:16:12 PM	1%	20.90%	0.4	0	23.1 °C
497	1:16:17 PM	1%	20.90%	0.4	0	23.1 °C
498	1:16:22 PM	1%	20.90%	0.4	0	23.1 °C
499	1:16:27 PM	0%	20.90%	0.4	0	23.1 °C
500	1:16:32 PM	1%	20.90%	0.4	0	23.1 °C
501	1:16:37 PM	1%	20.90%	0.4	0	23.1 °C
502	1:16:42 PM	0%	20.90%	0.4	0	23.1 °C
503	1:16:47 PM	1%	20.90%	0.4	0	23.1 °C
504	1:16:52 PM	1%	20.90%	0.4	0	23.1 °C
505	1:16:57 PM	1%	20.90%	0.4	0	23.1 °C
506	1:17:02 PM	1%	20.90%	0.4	0	23.1 °C
507	1:17:07 PM	1%	20.90%	0.4	0	23.0 °C
508	1:17:12 PM	0%	20.90%	0.4	0	23.0 °C
509	1:17:17 PM	1%	20.90%	0.4	0	23.0 °C
510	1:17:22 PM	1%	20.90%	0.4	0	23.0 °C
511	1:17:27 PM	1%	20.90%	0.4	0	23.0 °C
512	1:17:32 PM	0%	20.90%	0.4	0	23.0 °C
513	1:17:37 PM	1%	20.90%	0.4	0	23.0 °C

514	1:17:42 PM	1%	20.90%	0.4	0	23.0 °C
515	1:17:47 PM	1%	20.90%	0.4	0	23.0 °C
516	1:17:52 PM	0%	20.90%	0.4	0	23.0 °C
517	1:17:57 PM	1%	20.90%	0.4	0	23.0 °C
518	1:18:02 PM	1%	20.90%	0.4	0	23.0 °C
519	1:18:07 PM	1%	20.90%	0.4	0	23.0 °C
520	1:18:12 PM	1%	20.90%	0.4	0	23.0 °C
521	1:18:17 PM	1%	20.90%	0.4	0	23.0 °C
522	1:18:22 PM	1%	20.90%	0.4	0	23.0 °C
523	1:18:27 PM	0%	20.90%	0.4	0	23.0 °C
524	1:18:32 PM	0%	20.90%	0.4	0	23.0 °C
525	1:18:37 PM	0%	20.90%	0.4	0	23.0 °C
526	1:18:42 PM	0%	20.90%	0.4	0	23.0 °C
527	1:18:47 PM	0%	20.90%	0.4	0	23.0 °C
528	1:18:52 PM	0%	20.90%	0.4	0	23.0 °C
529	1:18:57 PM	0%	20.90%	0.4	0	23.0 °C
530	1:19:02 PM	0%	20.90%	0.4	0	23.0 °C
531	1:19:07 PM	0%	20.90%	0.4	0	23.0 °C
532	1:19:12 PM	1%	20.90%	0.4	0	23.0 °C
533	1:19:17 PM	1%	20.90%	0.4	0	23.0 °C
534	1:19:22 PM	0%	20.90%	0.4	0	23.1 °C
535	1:19:27 PM	0%	20.90%	0.4	0	23.0 °C
536	1:19:32 PM	0%	20.90%	0.4	0	23.0 °C
537	1:19:37 PM	0%	20.90%	0.4	0	23.1 °C
538	1:19:42 PM	0%	20.90%	0.4	0	23.0 °C
539	1:19:47 PM	0%	20.90%	0.4	0	23.0 °C
540	1:19:52 PM	0%	20.90%	0.4	0	23.1 °C
541	1:19:57 PM	0%	20.90%	0.4	0	23.1 °C
542	1:20:02 PM	0%	20.90%	0.4	0	23.1 °C
543	1:20:07 PM	0%	20.90%	0.4	0	23.1 °C
544	1:20:12 PM	0%	20.90%	0.4	0	23.1 °C
545	1:20:17 PM	0%	20.90%	0.4	0	23.1 °C
546	1:20:22 PM	0%	20.90%	0.4	0	23.1 °C
547	1:20:27 PM	0%	20.90%	0.4	0	23.1 °C
548	1:20:32 PM	0%	20.90%	0.4	0	23.1 °C
549	1:20:37 PM	0%	20.90%	0.4	0	23.1 °C
550	1:20:42 PM	0%	20.90%	0.4	0	23.1 °C
551	1:20:47 PM	0%	20.90%	0.4	0	23.1 °C
552	1:20:52 PM	0%	20.90%	0.4	0	23.0 °C
553	1:20:57 PM	0%	20.90%	0.4	0	23.0 °C
554	1:21:02 PM	0%	20.90%	0.4	0	23.0 °C
555	1:21:07 PM	0%	20.90%	0.4	0	23.0 °C
556	1:21:12 PM	0%	20.90%	0.4	0	23.0 °C
557	1:21:17 PM	0%	20.90%	0.4	0	23.0 °C
558	1:21:22 PM	0%	20.90%	0.4	0	23.0 °C
559	1:21:27 PM	0%	20.90%	0.4	0	23.0 °C
560	1:21:32 PM	0%	20.90%	0.4	0	23.0 °C
561	1:21:37 PM	0%	20.90%	0.4	0	23.0 °C
562	1:21:42 PM	0%	20.90%	0.4	0	23.0 °C

563	1:21:47 PM	1%	20.90%	0.4	0	22.9 °C
564	1:21:52 PM	1%	20.90%	0.4	0	22.9 °C
565	1:21:57 PM	1%	20.90%	0.4	0	22.9 °C
566	1:22:02 PM	1%	20.90%	0.4	0	22.9 °C
567	1:22:07 PM	1%	20.90%	0.4	0	22.9 °C
568	1:22:12 PM	1%	20.90%	0.4	0	22.9 °C
569	1:22:17 PM	0%	20.90%	0.4	0	22.9 °C
570	1:22:22 PM	0%	20.90%	0.4	0	22.8 °C
571	1:22:27 PM	0%	20.90%	0.4	0	22.8 °C
572	1:22:32 PM	0%	20.90%	0.4	0	22.8 °C
573	1:22:37 PM	1%	20.90%	0.4	0	22.8 °C
574	1:22:42 PM	0%	20.90%	0.4	0	22.7 °C
575	1:22:47 PM	1%	20.90%	0.4	0	22.7 °C
576	1:22:52 PM	1%	20.90%	0.4	0	22.7 °C
577	1:22:57 PM	1%	20.90%	0.4	0	22.7 °C
578	1:23:02 PM	1%	20.90%	0.4	0	22.7 °C
579	1:23:07 PM	1%	20.90%	0.4	0	22.6 °C
580	1:23:12 PM	1%	20.90%	0.4	0	22.6 °C
581	1:23:17 PM	1%	20.90%	0.5	0	22.6 °C
582	1:23:22 PM	1%	20.90%	0.7	0	22.6 °C
583	1:23:27 PM	1%	20.90%	0.6	0	22.5 °C
584	1:23:32 PM	1%	20.90%	0.5	0	22.5 °C
585	1:23:37 PM	1%	20.90%	0.5	0	22.5 °C
586	1:23:42 PM	1%	20.90%	0.6	0	22.5 °C
587	1:23:47 PM	1%	20.90%	0.5	0	22.5 °C
588	1:23:52 PM	1%	20.90%	0.4	0	22.5 °C
589	1:23:57 PM	1%	20.90%	0.4	0	22.5 °C
590	1:24:02 PM	1%	20.90%	0.4	0	22.4 °C
591	1:24:07 PM	1%	20.90%	0.4	0	22.4 °C
592	1:24:12 PM	1%	20.90%	0.4	0	22.4 °C
593	1:24:17 PM	1%	20.90%	0.4	0	22.4 °C
594	1:24:22 PM	1%	20.90%	0.4	0	22.4 °C
595	1:24:27 PM	1%	20.90%	0.4	0	22.4 °C
596	1:24:32 PM	1%	20.90%	0.4	0	22.3 °C
597	1:24:37 PM	1%	20.90%	0.4	0	22.3 °C
598	1:24:42 PM	1%	20.90%	0.4	0	22.3 °C
599	1:24:47 PM	1%	20.90%	0.4	0	22.3 °C
600	1:24:52 PM	1%	20.90%	0.4	0	22.3 °C
601	1:24:57 PM	1%	20.90%	0.4	0	22.3 °C
602	1:25:02 PM	1%	20.90%	0.4	0	22.2 °C
603	1:25:07 PM	1%	20.90%	0.4	0	22.2 °C
604	1:25:12 PM	1%	20.90%	0.4	0	22.2 °C
605	1:25:17 PM	1%	20.90%	0.4	0	22.2 °C
606	1:25:22 PM	1%	20.90%	0.4	0	22.2 °C
607	1:25:27 PM	1%	20.90%	0.4	0	22.2 °C
608	1:25:32 PM	1%	20.90%	0.4	0	22.2 °C
609	1:25:37 PM	1%	20.90%	0.4	0	22.1 °C
610	1:25:42 PM	1%	20.90%	0.4	0	22.1 °C
611	1:25:47 PM	1%	20.90%	0.4	0	22.1 °C

612	1:25:52 PM	1%	20.90%	0.4	0	22.1 °C
613	1:25:57 PM	1%	20.90%	0.4	0	22.1 °C
614	1:26:02 PM	1%	20.90%	0.4	0	22.1 °C
615	1:26:07 PM	1%	20.90%	0.4	0	22.1 °C
616	1:26:12 PM	1%	20.90%	0.4	0	22.1 °C
617	1:26:17 PM	1%	20.90%	0.4	0	22.1 °C
618	1:26:22 PM	1%	20.90%	0.4	0	22.1 °C
619	1:26:27 PM	1%	20.90%	0.4	0	22.1 °C
620	1:26:32 PM	1%	20.90%	0.4	0	22.0 °C
621	1:26:37 PM	1%	20.90%	0.4	0	22.0 °C
622	1:26:42 PM	1%	20.90%	0.4	0	22.0 °C
623	1:26:47 PM	1%	20.90%	0.4	0	22.0 °C
624	1:26:52 PM	1%	20.90%	0.4	0	22.0 °C
625	1:26:57 PM	1%	20.90%	0.4	0	22.0 °C
626	1:27:02 PM	1%	20.90%	0.4	0	22.0 °C
627	1:27:07 PM	1%	20.90%	0.4	0	22.0 °C
628	1:27:12 PM	1%	20.90%	0.4	0	22.0 °C
629	1:27:17 PM	1%	20.90%	0.4	0	22.0 °C
630	1:27:22 PM	1%	20.90%	0.4	0	22.0 °C
631	1:27:27 PM	1%	20.90%	0.4	0	22.0 °C
632	1:27:32 PM	1%	20.90%	0.4	0	22.0 °C
633	1:27:37 PM	1%	20.90%	0.4	0	22.0 °C
634	1:27:42 PM	1%	20.90%	0.4	0	22.0 °C
635	1:27:47 PM	1%	20.90%	0.4	0	22.0 °C
636	1:27:52 PM	1%	20.90%	0.4	0	22.0 °C
637	1:27:57 PM	1%	20.90%	0.4	0	22.0 °C
638	1:28:02 PM	1%	20.90%	0.4	0	21.9 °C
639	1:28:07 PM	1%	20.90%	0.4	0	22.0 °C
640	1:28:12 PM	1%	20.90%	0.4	0	21.9 °C
641	1:28:17 PM	1%	20.90%	0.4	0	21.9 °C
642	1:28:22 PM	1%	20.90%	0.4	0	21.9 °C
643	1:28:27 PM	1%	20.90%	0.4	0	21.9 °C
644	1:28:32 PM	1%	20.90%	0.4	0	21.9 °C
645	1:28:37 PM	1%	20.90%	0.4	0	21.9 °C
646	1:28:42 PM	1%	20.90%	0.4	0	21.9 °C
647	1:28:47 PM	1%	20.90%	0.4	0	21.9 °C
648	1:28:52 PM	1%	20.90%	0.4	0	21.9 °C
649	1:28:57 PM	1%	20.90%	0.4	0	21.9 °C
650	1:29:02 PM	1%	20.90%	0.4	0	21.9 °C
651	1:29:07 PM	1%	20.90%	0.4	0	21.9 °C
652	1:29:12 PM	1%	20.90%	0.4	0	21.9 °C
653	1:29:17 PM	1%	20.90%	0.4	0	21.9 °C
654	1:29:22 PM	1%	20.90%	0.4	0	21.9 °C
655	1:29:27 PM	1%	20.90%	0.4	0	21.9 °C
656	1:29:32 PM	1%	20.90%	0.4	0	21.9 °C
657	1:29:37 PM	1%	20.90%	0.4	0	21.9 °C
658	1:29:42 PM	1%	20.90%	0.4	0	21.9 °C
659	1:29:47 PM	1%	20.90%	0.5	0	21.9 °C
660	1:29:52 PM	1%	20.90%	0.5	0	22.0 °C

661	1:29:57 PM	1%	20.90%	0.5	0	22.0 °C
662	1:30:02 PM	1%	20.90%	0.4	0	22.0 °C
663	1:30:07 PM	1%	20.90%	0.4	0	22.0 °C
664	1:30:12 PM	1%	20.90%	0.4	0	22.0 °C
665	1:30:17 PM	1%	20.90%	0.4	0	22.0 °C
666	1:30:22 PM	1%	20.90%	0.4	0	22.0 °C
667	1:30:27 PM	1%	20.90%	0.4	0	22.0 °C
668	1:30:32 PM	1%	20.90%	0.4	0	22.0 °C
669	1:30:37 PM	1%	20.90%	0.4	0	22.0 °C
670	1:30:42 PM	1%	20.90%	0.4	0	22.0 °C
671	1:30:47 PM	1%	20.90%	0.4	0	22.0 °C
672	1:30:52 PM	1%	20.90%	0.4	0	22.0 °C
673	1:30:57 PM	1%	20.90%	0.4	0	22.0 °C
674	1:31:02 PM	1%	20.90%	0.4	0	22.0 °C
675	1:31:07 PM	1%	20.90%	0.4	0	22.0 °C
676	1:31:12 PM	1%	20.90%	0.4	0	22.0 °C
677	1:31:17 PM	1%	20.90%	0.4	0	22.0 °C
678	1:31:22 PM	1%	20.90%	0.4	0	22.0 °C
679	1:31:27 PM	1%	20.90%	0.4	0	22.0 °C
680	1:31:32 PM	1%	20.90%	0.4	0	22.0 °C
681	1:31:37 PM	1%	20.90%	0.4	0	22.0 °C
682	1:31:42 PM	1%	20.90%	0.4	0	22.0 °C
683	1:31:47 PM	1%	20.90%	0.4	0	22.0 °C
684	1:31:52 PM	1%	20.90%	0.4	0	22.0 °C
685	1:31:57 PM	1%	20.90%	0.4	0	22.0 °C
686	1:32:02 PM	1%	20.90%	0.4	0	22.0 °C
687	1:32:07 PM	1%	20.90%	0.4	0	22.0 °C
688	1:32:12 PM	1%	20.90%	0.4	0	22.0 °C
689	1:32:17 PM	1%	20.90%	0.4	0	22.0 °C
690	1:32:22 PM	1%	20.90%	0.4	0	22.0 °C
691	1:32:27 PM	1%	20.90%	0.4	0	22.0 °C
692	1:32:32 PM	1%	20.90%	0.4	0	22.0 °C
693	1:32:37 PM	1%	20.90%	0.4	0	22.0 °C
694	1:32:42 PM	1%	20.90%	0.4	0	22.0 °C
695	1:32:47 PM	1%	20.90%	0.4	0	22.0 °C
696	1:32:52 PM	1%	20.90%	0.4	0	22.0 °C
697	1:32:57 PM	1%	20.90%	0.4	0	22.1 °C
698	1:33:02 PM	1%	20.90%	0.4	0	22.0 °C
699	1:33:07 PM	1%	20.90%	0.5	0	22.0 °C
700	1:33:12 PM	1%	20.90%	0.4	0	22.1 °C
701	1:33:17 PM	1%	20.90%	0.4	0	22.1 °C
702	1:33:22 PM	1%	20.90%	0.4	0	22.1 °C
703	1:33:27 PM	1%	20.90%	0.4	0	22.1 °C
704	1:33:32 PM	1%	20.90%	0.4	0	22.1 °C
705	1:33:37 PM	1%	20.90%	0.4	0	22.1 °C
706	1:33:42 PM	1%	20.90%	0.4	0	22.1 °C
707	1:33:47 PM	1%	20.90%	0.4	0	22.1 °C
708	1:33:52 PM	1%	20.90%	0.4	0	22.1 °C
709	1:33:57 PM	1%	20.90%	0.4	0	22.1 °C

710	1:34:02 PM	1%	20.90%	0.4	0	22.1 °C
711	1:34:07 PM	1%	20.90%	0.4	0	22.1 °C
712	1:34:12 PM	1%	20.90%	0.4	0	22.1 °C
713	1:34:17 PM	1%	20.90%	0.4	0	22.1 °C
714	1:34:22 PM	1%	20.90%	0.4	0	22.1 °C
715	1:34:27 PM	1%	20.90%	0.4	0	22.1 °C
716	1:34:32 PM	1%	20.90%	0.4	0	22.1 °C
717	1:34:37 PM	1%	20.90%	0.4	0	22.1 °C
718	1:34:42 PM	1%	20.90%	0.4	0	22.1 °C
719	1:34:47 PM	1%	20.90%	0.4	0	22.1 °C
720	1:34:52 PM	1%	20.90%	0.4	0	22.1 °C
57	1:38:27 PM	1%	20.90%	0.4	0	22.1 °C
58	1:43:27 PM	0%	20.90%	0.4	0	22.4 °C
59	1:48:27 PM	0%	20.90%	0.4	0	22.9 °C
60	1:53:27 PM	0%	20.90%	0.4	0	23.0 °C
61	1:58:27 PM	0%	20.90%	0.4	0	23.4 °C
62	2:03:27 PM	0%	20.90%	0.4	1	24.2 °C
63	2:08:27 PM	0%	20.90%	0.4	0	24.8 °C
64	2:13:27 PM	0%	20.90%	0.4	2	25.3 °C
65	2:18:27 PM	0%	20.90%	0.5	1	25.8 °C
66	2:23:27 PM	0%	20.90%	0.5	0	26.4 °C
67	2:28:27 PM	0%	20.90%	0.4	0	26.9 °C
68	2:33:27 PM	0%	20.90%	0.5	0	27.4 °C
69	2:38:27 PM	0%	20.90%	0.5	0	27.8 °C
70	2:43:27 PM	0%	20.90%	0.4	0	27.9 °C
71	2:48:27 PM	0%	20.90%	0.5	0	27.9 °C
72	2:53:27 PM	0%	20.90%	0.5	0	28.2 °C
73	2:58:27 PM	0%	20.90%	0.5	0	28.2 °C
74	3:03:27 PM	1%	20.90%	0.5	0	27.4 °C
75	3:08:27 PM	1%	20.90%	0.5	0	26.2 °C
76	3:13:27 PM	0%	20.90%	0.5	0	26.0 °C
77	3:18:27 PM	0%	20.90%	0.5	0	26.2 °C
78	3:23:27 PM	1%	20.90%	0.6	0	26.5 °C
79	3:28:27 PM	1%	20.90%	0.6	0	26.9 °C
80	3:33:27 PM	2%	20.90%	0.5	0	27.3 °C
81	3:38:27 PM	2%	20.90%	0.5	0	27.9 °C
82	3:43:27 PM	2%	20.90%	0.5	0	28.5 °C
83	3:48:27 PM	2%	20.90%	0.5	0	29.2 °C
84	3:53:27 PM	2%	20.90%	0.5	0	29.9 °C
85	3:58:27 PM	2%	20.90%	0.5	0	30.6 °C
86	4:03:27 PM	2%	20.90%	0.6	0	31.2 °C
87	4:08:27 PM	2%	20.90%	0.6	0	31.7 °C
88	4:13:27 PM	2%	20.90%	0.5	0	32.0 °C
89	4:18:27 PM	2%	20.90%	0.6	0	32.2 °C
90	4:23:27 PM	2%	20.90%	0.6	0	32.2 °C
91	4:28:27 PM	1%	20.90%	0.5	0	32.3 °C
92	4:33:27 PM	2%	20.90%	0.6	0	32.3 °C
93	4:38:27 PM	1%	20.90%	0.5	0	32.6 °C
94	4:43:27 PM	2%	20.90%	0.5	0	32.6 °C

95	4:48:27 PM	3%	20.90%	0.6	0	32.5 °C
96	4:53:27 PM	3%	20.90%	0.6	0	32.3 °C
97	4:58:27 PM	3%	20.90%	0.5	0	32.2 °C
98	5:03:27 PM	3%	20.90%	0.5	0	32.0 °C
99	5:08:27 PM	3%	20.90%	0.6	0	31.7 °C
100	5:13:27 PM	4%	20.90%	0.5	0	31.5 °C
101	5:18:27 PM	3%	20.90%	0.6	0	31.2 °C
102	5:23:27 PM	4%	20.90%	0.6	0	31.0 °C
103	5:28:27 PM	3%	20.90%	0.5	0	30.8 °C
104	5:33:27 PM	3%	20.90%	0.6	0	30.7 °C
105	5:38:27 PM	3%	20.90%	0.6	0	30.6 °C
106	5:43:27 PM	3%	20.90%	0.5	0	30.6 °C
107	5:48:27 PM	3%	20.90%	0.5	0	30.6 °C
108	5:53:27 PM	3%	20.90%	0.6	0	30.6 °C
109	5:58:27 PM	3%	20.90%	0.6	0	30.6 °C
110	6:03:27 PM	3%	20.90%	0.5	0	30.7 °C
111	6:08:27 PM	3%	20.90%	0.6	0	30.8 °C
112	6:13:27 PM	3%	20.90%	0.5	0	30.9 °C
113	6:18:27 PM	3%	20.90%	0.6	0	31.0 °C
114	6:23:27 PM	3%	20.90%	0.6	0	31.1 °C
115	6:28:27 PM	4%	20.90%	0.5	0	31.1 °C
116	6:33:27 PM	4%	20.90%	0.6	0	31.2 °C
117	6:38:27 PM	4%	20.90%	0.6	0	31.2 °C
118	6:43:27 PM	4%	20.90%	0.5	1	31.2 °C
119	6:48:27 PM	4%	20.90%	0.6	2	31.1 °C
120	6:53:27 PM	4%	20.90%	0.5	2	31.0 °C
121	6:58:27 PM	4%	20.90%	0.5	2	31.0 °C
122	7:03:27 PM	4%	20.90%	0.5	2	30.9 °C
123	7:08:27 PM	4%	20.90%	0.5	1	30.8 °C
124	7:13:27 PM	4%	20.90%	0.5	0	30.8 °C
125	7:18:27 PM	4%	20.90%	0.5	0	30.8 °C
126	7:23:27 PM	4%	20.90%	0.5	0	30.8 °C
127	7:28:27 PM	4%	20.90%	0.5	0	30.9 °C
128	7:33:27 PM	4%	20.90%	0.5	0	31.0 °C
129	7:38:27 PM	4%	20.90%	0.5	2	31.0 °C
130	7:43:27 PM	4%	20.90%	0.5	1	31.0 °C
131	7:48:27 PM	4%	20.90%	0.5	0	30.9 °C
132	7:53:27 PM	4%	20.90%	0.5	0	30.8 °C
133	7:58:27 PM	4%	20.90%	0.5	0	30.8 °C
134	8:03:27 PM	4%	20.90%	0.5	0	30.7 °C
135	8:08:27 PM	3%	20.90%	0.5	0	30.2 °C
136	8:13:27 PM	3%	20.90%	0.5	0	30.1 °C

GX-3R Data Sample

Name	al26130450_176023500RN
Alarm Date	9/26/2024
Serial No.	176023500RN
Interval Time (sec)	5

Gas(FullScale)	Warning	Alarm	AlarmH	STEL	TWA
CH4(100%LEL)	10 %LEL	25 %LEL	50 %LEL	*****	*****
O2(40.0%)	19.50%	18.00%	23.50%	*****	*****
H2S(200.0ppm)	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
CO(2000ppm)	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm

No	Time	CH4(100%LEL)	O2(40.0%)	H2S(200.0ppm)	CO(2000ppm)	Temperature
1	12:34:00 PM	0%	20.90%	0	0	22.6 °C
2	12:34:00 PM	0%	20.90%	0	0	22.6 °C
3	12:35:00 PM	0%	20.90%	0	0	22.6 °C
4	12:35:00 PM	0%	20.90%	0	0	22.6 °C
5	12:35:00 PM	0%	20.90%	0	0	22.6 °C
6	12:35:00 PM	0%	20.90%	0	0	22.6 °C
7	12:35:00 PM	0%	20.90%	0	0	22.6 °C
8	12:35:00 PM	0%	20.90%	0	0	22.6 °C
9	12:35:00 PM	0%	20.90%	0	0	22.6 °C
10	12:35:00 PM	0%	20.90%	0	0	22.6 °C
11	12:35:00 PM	0%	20.90%	0	0	22.5 °C
12	12:35:00 PM	0%	20.90%	0	0	22.5 °C
13	12:35:00 PM	0%	20.90%	0	0	22.5 °C
14	12:35:00 PM	0%	20.90%	0	0	22.5 °C
15	12:36:00 PM	0%	20.90%	0	0	22.5 °C
16	12:36:00 PM	0%	20.90%	0	0	22.5 °C
17	12:36:00 PM	0%	20.90%	0	0	22.5 °C
18	12:36:00 PM	0%	20.90%	0	0	22.5 °C
19	12:36:00 PM	0%	20.90%	0	0	22.4 °C
20	12:36:00 PM	0%	20.90%	0	0	22.4 °C
21	12:36:00 PM	0%	20.90%	0	0	22.4 °C
22	12:36:00 PM	0%	20.90%	0	0	22.4 °C
23	12:36:00 PM	0%	20.90%	0	0	22.4 °C
24	12:36:00 PM	0%	20.90%	0	0	22.4 °C
25	12:36:00 PM	0%	20.90%	0	0	22.4 °C
26	12:36:00 PM	0%	20.90%	0	0	22.4 °C
27	12:37:00 PM	0%	20.90%	0	0	22.4 °C
28	12:37:00 PM	0%	20.90%	0	0	22.4 °C
29	12:37:00 PM	0%	20.90%	0	0	22.4 °C
30	12:37:00 PM	0%	20.90%	0	0	22.3 °C
31	12:37:00 PM	0%	20.90%	0	0	22.3 °C
32	12:37:00 PM	0%	20.90%	0	0	22.3 °C
33	12:37:00 PM	0%	20.90%	0	0	22.3 °C
34	12:37:00 PM	0%	20.90%	0	0	22.3 °C
35	12:37:00 PM	0%	20.90%	0	0	22.3 °C
36	12:37:00 PM	0%	20.90%	0	0	22.3 °C

37	12:37:00 PM	0%	20.90%	0	0	22.3 °C
38	12:37:00 PM	0%	20.90%	0	0	22.3 °C
39	12:38:00 PM	0%	20.90%	0	0	22.3 °C
40	12:38:00 PM	0%	20.90%	0	2	22.3 °C
41	12:38:00 PM	0%	20.90%	0	8	22.2 °C
42	12:38:00 PM	0%	20.90%	0	8	22.2 °C
43	12:38:00 PM	0%	20.90%	0	8	22.2 °C
44	12:38:00 PM	0%	20.90%	0	7	22.2 °C
45	12:38:00 PM	0%	20.90%	0	6	22.2 °C
46	12:38:00 PM	0%	20.90%	0	5	22.2 °C
47	12:38:00 PM	0%	20.90%	0	4	22.2 °C
48	12:38:00 PM	0%	20.90%	0	3	22.2 °C
49	12:38:00 PM	0%	20.90%	0	3	22.2 °C
50	12:38:00 PM	0%	20.90%	0	2	22.2 °C
51	12:39:00 PM	0%	20.90%	0	2	22.2 °C
52	12:39:00 PM	0%	20.90%	0	0	22.2 °C
53	12:39:00 PM	0%	20.90%	0	0	22.2 °C
54	12:39:00 PM	0%	20.90%	0	0	22.2 °C
55	12:39:00 PM	0%	20.90%	0	0	22.2 °C
56	12:39:00 PM	0%	20.90%	0	0	22.2 °C
57	12:39:00 PM	0%	20.90%	0	0	22.2 °C
58	12:39:00 PM	0%	20.90%	0	0	22.2 °C
59	12:39:00 PM	0%	20.90%	0	2	22.2 °C
60	12:39:00 PM	0%	20.90%	0	2	22.1 °C
61	12:39:00 PM	0%	20.90%	0	0	22.2 °C
62	12:39:00 PM	0%	20.90%	0	0	22.2 °C
63	12:40:00 PM	0%	20.90%	0	0	22.2 °C
64	12:40:00 PM	0%	20.90%	0	0	22.2 °C
65	12:40:00 PM	0%	20.90%	0	0	22.2 °C
66	12:40:00 PM	0%	20.90%	0	0	22.2 °C
67	12:40:00 PM	0%	20.90%	0	0	22.2 °C
68	12:40:00 PM	0%	20.90%	0	0	22.1 °C
69	12:40:00 PM	0%	20.90%	0	0	22.2 °C
70	12:40:00 PM	0%	20.90%	0	0	22.1 °C
71	12:40:00 PM	0%	20.90%	0	0	22.1 °C
72	12:40:00 PM	0%	20.90%	0	0	22.1 °C
73	12:40:00 PM	0%	20.90%	0	0	22.1 °C
74	12:40:00 PM	0%	20.90%	0	0	22.1 °C
75	12:41:00 PM	0%	20.90%	0	0	22.1 °C
76	12:41:00 PM	0%	20.90%	0	0	22.1 °C
77	12:41:00 PM	0%	20.90%	0	0	22.1 °C
78	12:41:00 PM	0%	20.90%	0	0	22.1 °C
79	12:41:00 PM	0%	20.90%	0	0	22.1 °C
80	12:41:00 PM	0%	20.90%	0	0	22.1 °C
81	12:41:00 PM	0%	20.90%	0	0	22.1 °C
82	12:41:00 PM	0%	20.90%	0	0	22.1 °C
83	12:41:00 PM	0%	20.90%	0	0	22.1 °C
84	12:41:00 PM	0%	20.90%	0	0	22.1 °C
85	12:41:00 PM	0%	20.90%	0	0	22.1 °C

86	12:41:00 PM	0%	20.90%	0	0	22.1 °C
87	12:42:00 PM	0%	20.90%	0	0	22.0 °C
88	12:42:00 PM	0%	20.90%	0	0	22.0 °C
89	12:42:00 PM	0%	20.90%	0	0	22.0 °C
90	12:42:00 PM	0%	20.90%	0	0	22.0 °C
91	12:42:00 PM	0%	20.90%	0	0	22.0 °C
92	12:42:00 PM	0%	20.90%	0	0	22.0 °C
93	12:42:00 PM	0%	20.90%	0	0	22.0 °C
94	12:42:00 PM	0%	20.90%	0	0	22.0 °C
95	12:42:00 PM	0%	20.90%	0	0	22.0 °C
96	12:42:00 PM	0%	20.90%	0	0	22.0 °C
97	12:42:00 PM	0%	20.90%	0	0	22.0 °C
98	12:42:00 PM	0%	20.90%	0	0	22.0 °C
99	12:43:00 PM	0%	20.90%	0	0	22.0 °C
100	12:43:00 PM	0%	20.90%	0	0	22.0 °C
101	12:43:00 PM	0%	20.90%	0	0	21.9 °C
102	12:43:00 PM	0%	20.90%	0	0	21.9 °C
103	12:43:00 PM	0%	20.90%	0	0	21.9 °C
104	12:43:00 PM	0%	20.90%	0	0	21.9 °C
105	12:43:00 PM	0%	20.90%	0	0	21.9 °C
106	12:43:00 PM	0%	20.90%	0	0	21.9 °C
107	12:43:00 PM	0%	20.90%	0	0	21.9 °C
108	12:43:00 PM	0%	20.90%	0	0	21.9 °C
109	12:43:00 PM	0%	20.90%	0	0	21.9 °C
110	12:43:00 PM	0%	20.90%	0	0	21.9 °C
111	12:44:00 PM	0%	20.90%	0	0	21.9 °C
112	12:44:00 PM	0%	20.90%	0	0	21.9 °C
113	12:44:00 PM	0%	20.90%	0	0	21.9 °C
114	12:44:00 PM	0%	20.90%	0	0	21.9 °C
115	12:44:00 PM	0%	20.90%	0	0	21.9 °C
116	12:44:00 PM	0%	20.90%	0	0	21.9 °C
117	12:44:00 PM	0%	20.90%	0	0	21.9 °C
118	12:44:00 PM	0%	20.90%	0	0	21.9 °C
119	12:44:00 PM	0%	20.90%	0	0	21.9 °C
120	12:44:00 PM	0%	20.90%	0	0	21.9 °C
121	12:44:00 PM	0%	20.90%	0	0	21.9 °C
122	12:44:00 PM	0%	20.90%	0	0	21.9 °C
123	12:45:00 PM	0%	20.90%	0	0	21.9 °C
124	12:45:00 PM	0%	20.90%	0	0	21.9 °C
125	12:45:00 PM	0%	20.90%	0	0	21.9 °C
126	12:45:00 PM	0%	20.90%	0	0	21.9 °C
127	12:45:00 PM	0%	20.90%	0	0	21.9 °C
128	12:45:00 PM	0%	20.90%	0	0	21.9 °C
129	12:45:00 PM	0%	20.90%	0	0	21.9 °C
130	12:45:00 PM	0%	20.90%	0	0	21.9 °C
131	12:45:00 PM	0%	20.90%	0	0	21.9 °C
132	12:45:00 PM	0%	20.90%	0	0	21.9 °C
133	12:45:00 PM	0%	20.90%	0	0	21.9 °C
134	12:45:00 PM	0%	20.90%	0	0	21.9 °C

135	12:46:00 PM	0%	20.90%	0	0	21.9 °C
136	12:46:00 PM	0%	20.90%	0	0	21.9 °C
137	12:46:00 PM	0%	20.90%	0	0	21.9 °C
138	12:46:00 PM	0%	20.90%	0	0	21.9 °C
139	12:46:00 PM	0%	20.90%	0	0	21.9 °C
140	12:46:00 PM	0%	20.90%	0	0	21.9 °C
141	12:46:00 PM	0%	20.90%	0	0	21.9 °C
142	12:46:00 PM	0%	20.90%	0	0	21.9 °C
143	12:46:00 PM	0%	20.90%	0	0	21.9 °C
144	12:46:00 PM	0%	20.90%	0	0	21.9 °C
145	12:46:00 PM	0%	20.90%	0	0	21.9 °C
146	12:46:00 PM	0%	20.90%	0	0	21.9 °C
147	12:47:00 PM	0%	20.90%	0	0	21.9 °C
148	12:47:00 PM	0%	20.90%	0	0	21.9 °C
149	12:47:00 PM	0%	20.90%	0	0	21.9 °C
150	12:47:00 PM	0%	20.90%	0	0	21.9 °C
151	12:47:00 PM	0%	20.90%	0	0	21.9 °C
152	12:47:00 PM	0%	20.90%	0	0	21.9 °C
153	12:47:00 PM	0%	20.90%	0	0	21.9 °C
154	12:47:00 PM	0%	20.90%	0	0	21.9 °C
155	12:47:00 PM	0%	20.90%	0	0	21.9 °C
156	12:47:00 PM	0%	20.90%	0	0	21.9 °C
157	12:47:00 PM	0%	20.90%	0	0	21.9 °C
158	12:47:00 PM	0%	20.90%	0	0	21.9 °C
159	12:48:00 PM	0%	20.90%	0	0	21.9 °C
160	12:48:00 PM	0%	20.90%	0	0	21.9 °C
161	12:48:00 PM	0%	20.90%	0	0	21.9 °C
162	12:48:00 PM	0%	20.90%	0	0	21.9 °C
163	12:48:00 PM	0%	20.90%	0	0	21.9 °C
164	12:48:00 PM	0%	20.90%	0	0	21.9 °C
165	12:48:00 PM	0%	20.90%	0	0	21.9 °C
166	12:48:00 PM	0%	20.90%	0	0	21.9 °C
167	12:48:00 PM	0%	20.90%	0	0	21.9 °C
168	12:48:00 PM	0%	20.90%	0	0	21.9 °C
169	12:48:00 PM	0%	20.90%	0	0	21.8 °C
170	12:48:00 PM	0%	20.90%	0	0	21.8 °C
171	12:49:00 PM	0%	20.90%	0	0	21.8 °C
172	12:49:00 PM	0%	20.90%	0	0	21.8 °C
173	12:49:00 PM	0%	20.90%	0	0	21.8 °C
174	12:49:00 PM	0%	20.90%	0	0	21.8 °C
175	12:49:00 PM	0%	20.90%	0	0	21.8 °C
176	12:49:00 PM	0%	20.90%	0	0	21.8 °C
177	12:49:00 PM	0%	20.90%	0	0	21.8 °C
178	12:49:00 PM	0%	20.90%	0	0	21.8 °C
179	12:49:00 PM	0%	20.90%	0	0	21.8 °C
180	12:49:00 PM	0%	20.90%	0	0	21.8 °C
181	12:49:00 PM	0%	20.90%	0	0	21.7 °C
182	12:49:00 PM	0%	20.90%	0	0	21.7 °C
183	12:50:00 PM	0%	20.90%	0	0	21.7 °C

184	12:50:00 PM	0%	20.90%	0	0	21.7 °C
185	12:50:00 PM	0%	20.90%	0	0	21.7 °C
186	12:50:00 PM	0%	20.90%	0	0	21.7 °C
187	12:50:00 PM	0%	20.90%	0	0	21.7 °C
188	12:50:00 PM	0%	20.90%	0	0	21.7 °C
189	12:50:00 PM	0%	20.90%	0	0	21.7 °C
190	12:50:00 PM	0%	20.90%	0	0	21.7 °C
191	12:50:00 PM	0%	20.90%	0	0	21.7 °C
192	12:50:00 PM	0%	20.90%	0	0	21.6 °C
193	12:50:00 PM	0%	20.90%	0	0	21.6 °C
194	12:50:00 PM	0%	20.90%	0	0	21.6 °C
195	12:51:00 PM	0%	20.90%	0	0	21.6 °C
196	12:51:00 PM	0%	20.90%	0	0	21.6 °C
197	12:51:00 PM	0%	20.90%	0	0	21.6 °C
198	12:51:00 PM	0%	20.90%	0	0	21.6 °C
199	12:51:00 PM	0%	20.90%	0	0	21.5 °C
200	12:51:00 PM	0%	20.90%	0	0	21.5 °C
201	12:51:00 PM	0%	20.90%	0	0	21.5 °C
202	12:51:00 PM	0%	20.90%	0	0	21.5 °C
203	12:51:00 PM	0%	20.90%	0	0	21.5 °C
204	12:51:00 PM	0%	20.90%	0	0	21.4 °C
205	12:51:00 PM	0%	20.90%	0	0	21.4 °C
206	12:51:00 PM	0%	20.90%	0	0	21.4 °C
207	12:52:00 PM	0%	20.90%	0	0	21.4 °C
208	12:52:00 PM	0%	20.90%	0	0	21.4 °C
209	12:52:00 PM	0%	20.90%	0	0	21.4 °C
210	12:52:00 PM	0%	20.90%	0	0	21.4 °C
211	12:52:00 PM	0%	20.90%	0	0	21.3 °C
212	12:52:00 PM	0%	20.90%	0	0	21.3 °C
213	12:52:00 PM	0%	20.90%	0	0	21.3 °C
214	12:52:00 PM	0%	20.90%	0	0	21.3 °C
215	12:52:00 PM	0%	20.90%	0	0	21.3 °C
216	12:52:00 PM	0%	20.90%	0	0	21.3 °C
217	12:52:00 PM	0%	20.90%	0	0	21.3 °C
218	12:52:00 PM	0%	20.90%	0	0	21.3 °C
219	12:53:00 PM	0%	20.90%	0	0	21.3 °C
220	12:53:00 PM	0%	20.90%	0	0	21.3 °C
221	12:53:00 PM	0%	20.90%	0	0	21.3 °C
222	12:53:00 PM	0%	20.90%	0	0	21.3 °C
223	12:53:00 PM	0%	20.90%	0	0	21.2 °C
224	12:53:00 PM	0%	20.90%	0	0	21.2 °C
225	12:53:00 PM	0%	20.90%	0	0	21.2 °C
226	12:53:00 PM	0%	20.90%	0	0	21.2 °C
227	12:53:00 PM	0%	20.90%	0	0	21.2 °C
228	12:53:00 PM	0%	20.90%	0	0	21.2 °C
229	12:53:00 PM	0%	20.90%	0	0	21.2 °C
230	12:53:00 PM	0%	20.90%	0	0	21.2 °C
231	12:54:00 PM	0%	20.90%	0	0	21.2 °C
232	12:54:00 PM	0%	20.90%	0	0	21.2 °C

233	12:54:00 PM	0%	20.90%	0	0	21.2 °C
234	12:54:00 PM	0%	20.90%	0	0	21.2 °C
235	12:54:00 PM	0%	20.90%	0	0	21.2 °C
236	12:54:00 PM	0%	20.90%	0	0	21.2 °C
237	12:54:00 PM	0%	20.90%	0	0	21.2 °C
238	12:54:00 PM	0%	20.90%	0	0	21.2 °C
239	12:54:00 PM	0%	20.90%	0	0	21.2 °C
240	12:54:00 PM	0%	20.90%	0	0	21.2 °C
241	12:54:00 PM	0%	20.90%	0	0	21.2 °C
242	12:54:00 PM	0%	20.90%	0	0	21.2 °C
243	12:55:00 PM	0%	20.90%	0	0	21.2 °C
244	12:55:00 PM	0%	20.90%	0	0	21.2 °C
245	12:55:00 PM	0%	20.90%	0	0	21.2 °C
246	12:55:00 PM	0%	20.90%	0	0	21.2 °C
247	12:55:00 PM	0%	20.90%	0	0	21.2 °C
248	12:55:00 PM	0%	20.90%	0	0	21.2 °C
249	12:55:00 PM	0%	20.90%	0	0	21.2 °C
250	12:55:00 PM	0%	20.90%	0	0	21.2 °C
251	12:55:00 PM	0%	20.90%	0	0	21.2 °C
252	12:55:00 PM	0%	20.90%	0	0	21.2 °C
253	12:55:00 PM	0%	20.90%	0	0	21.2 °C
254	12:55:00 PM	0%	20.90%	0	0	21.2 °C
255	12:56:00 PM	0%	20.90%	0	0	21.2 °C
256	12:56:00 PM	0%	20.90%	0	0	21.3 °C
257	12:56:00 PM	0%	20.90%	0	0	21.3 °C
258	12:56:00 PM	0%	20.90%	0	0	21.3 °C
259	12:56:00 PM	0%	20.90%	0	0	21.3 °C
260	12:56:00 PM	0%	20.90%	0	0	21.3 °C
261	12:56:00 PM	0%	20.90%	0	0	21.3 °C
262	12:56:00 PM	0%	20.90%	0	0	21.3 °C
263	12:56:00 PM	0%	20.90%	0	0	21.3 °C
264	12:56:00 PM	0%	20.90%	0	0	21.3 °C
265	12:56:00 PM	0%	20.90%	0	0	21.3 °C
266	12:56:00 PM	0%	20.90%	0	0	21.3 °C
267	12:57:00 PM	0%	20.90%	0	0	21.3 °C
268	12:57:00 PM	0%	20.90%	0	0	21.3 °C
269	12:57:00 PM	0%	20.90%	0	0	21.3 °C
270	12:57:00 PM	0%	20.90%	0	0	21.3 °C
271	12:57:00 PM	0%	20.90%	0	0	21.3 °C
272	12:57:00 PM	0%	20.90%	0	0	21.3 °C
273	12:57:00 PM	0%	20.90%	0	0	21.3 °C
274	12:57:00 PM	0%	20.90%	0	0	21.3 °C
275	12:57:00 PM	0%	20.90%	0	0	21.3 °C
276	12:57:00 PM	0%	20.90%	0	0	21.3 °C
277	12:57:00 PM	0%	20.90%	0	0	21.4 °C
278	12:57:00 PM	0%	20.90%	0	0	21.4 °C
279	12:58:00 PM	0%	20.90%	0	0	21.4 °C
280	12:58:00 PM	0%	20.90%	0	0	21.4 °C
281	12:58:00 PM	0%	20.90%	0	0	21.4 °C

282	12:58:00 PM	0%	20.90%	0	0	21.4 °C
283	12:58:00 PM	0%	20.90%	0	0	21.4 °C
284	12:58:00 PM	0%	20.90%	0	0	21.4 °C
285	12:58:00 PM	0%	20.90%	0	0	21.4 °C
286	12:58:00 PM	0%	20.90%	0	0	21.4 °C
287	12:58:00 PM	0%	20.90%	0	0	21.4 °C
288	12:58:00 PM	0%	20.90%	0	0	21.4 °C
289	12:58:00 PM	0%	20.90%	0	0	21.4 °C
290	12:58:00 PM	0%	20.90%	0	0	21.5 °C
291	12:59:00 PM	0%	20.90%	0	0	21.5 °C
292	12:59:00 PM	0%	20.90%	0	0	21.5 °C
293	12:59:00 PM	0%	20.90%	0	0	21.5 °C
294	12:59:00 PM	0%	20.90%	0	0	21.5 °C
295	12:59:00 PM	0%	20.90%	0	0	21.5 °C
296	12:59:00 PM	0%	20.90%	0	0	21.5 °C
297	12:59:00 PM	0%	20.90%	0	0	21.5 °C
298	12:59:00 PM	0%	20.90%	0	0	21.5 °C
299	12:59:00 PM	0%	20.90%	0	0	21.5 °C
300	12:59:00 PM	0%	20.90%	0	0	21.5 °C
301	12:59:00 PM	0%	20.90%	0	0	21.5 °C
302	12:59:00 PM	0%	20.90%	0	0	21.5 °C
303	1:00:00 PM	0%	20.90%	0	0	21.6 °C
304	1:00:00 PM	0%	20.90%	0	0	21.6 °C
305	1:00:00 PM	0%	20.90%	0	0	21.6 °C
306	1:00:00 PM	0%	20.90%	0	0	21.6 °C
307	1:00:00 PM	0%	20.90%	0	0	21.6 °C
308	1:00:00 PM	0%	20.90%	0	0	21.6 °C
309	1:00:00 PM	0%	20.90%	0	0	21.6 °C
310	1:00:00 PM	0%	20.90%	0	0	21.6 °C
311	1:00:00 PM	0%	20.90%	0	0	21.6 °C
312	1:00:00 PM	0%	20.90%	0	0	21.6 °C
313	1:00:00 PM	0%	20.90%	0	0	21.6 °C
314	1:00:00 PM	0%	20.90%	0	0	21.6 °C
315	1:01:00 PM	0%	20.90%	0	0	21.7 °C
316	1:01:00 PM	0%	20.90%	0	0	21.7 °C
317	1:01:00 PM	0%	20.90%	0	0	21.7 °C
318	1:01:00 PM	0%	20.90%	0	0	21.7 °C
319	1:01:00 PM	0%	20.90%	0	0	21.7 °C
320	1:01:00 PM	0%	20.90%	0	0	21.7 °C
321	1:01:00 PM	0%	20.90%	0	0	21.7 °C
322	1:01:00 PM	0%	20.90%	0	0	21.8 °C
323	1:01:00 PM	0%	20.90%	0	0	21.8 °C
324	1:01:00 PM	0%	20.90%	0	0	21.8 °C
325	1:01:00 PM	0%	20.90%	0	0	21.8 °C
326	1:01:00 PM	0%	20.90%	0	0	21.8 °C
327	1:02:00 PM	0%	20.90%	0	0	21.8 °C
328	1:02:00 PM	0%	20.90%	0	0	21.8 °C
329	1:02:00 PM	0%	20.90%	0	0	21.9 °C
330	1:02:00 PM	0%	20.90%	0	0	21.9 °C

331	1:02:00 PM	0%	20.90%	0	0	21.9 °C
332	1:02:00 PM	0%	20.90%	0	0	21.9 °C
333	1:02:00 PM	0%	20.90%	0	0	21.9 °C
334	1:02:00 PM	0%	20.90%	0	0	21.9 °C
335	1:02:00 PM	0%	20.90%	0	0	22.0 °C
336	1:02:00 PM	0%	20.90%	0	0	22.0 °C
337	1:02:00 PM	0%	20.90%	0	0	22.0 °C
338	1:02:00 PM	0%	20.90%	0	0	22.0 °C
339	1:03:00 PM	0%	20.90%	0	0	22.0 °C
340	1:03:00 PM	0%	20.90%	0	0	22.0 °C
341	1:03:00 PM	0%	20.90%	0	0	22.0 °C
342	1:03:00 PM	0%	20.90%	0	0	22.1 °C
343	1:03:00 PM	0%	20.90%	0	0	22.1 °C
344	1:03:00 PM	0%	20.90%	0	0	22.1 °C
345	1:03:00 PM	0%	20.90%	0	0	22.1 °C
346	1:03:00 PM	0%	20.90%	0	0	22.1 °C
347	1:03:00 PM	0%	20.90%	0	0	22.1 °C
348	1:03:00 PM	0%	20.90%	0	0	22.2 °C
349	1:03:00 PM	0%	20.90%	0	0	22.2 °C
350	1:03:00 PM	0%	20.90%	0	0	22.2 °C
351	1:04:00 PM	0%	20.90%	0	0	22.2 °C
352	1:04:00 PM	0%	20.90%	0	0	22.2 °C
353	1:04:00 PM	0%	20.90%	0	0	22.2 °C
354	1:04:00 PM	0%	20.90%	0	0	22.3 °C
355	1:04:00 PM	0%	20.90%	0	0	22.3 °C
356	1:04:00 PM	0%	20.90%	0	0	22.3 °C
357	1:04:00 PM	0%	20.90%	0	2	22.3 °C
358	1:04:00 PM	0%	20.90%	0	9	22.3 °C
359	1:04:00 PM	0%	20.90%	0	17	22.3 °C
360	1:04:00 PM	0%	20.90%	0	24	22.3 °C
361	1:04:00 PM	0%	20.90%	0	25	22.4 °C
362	1:04:00 PM	0%	20.90%	0	26	22.4 °C
363	1:05:00 PM	0%	20.90%	0	26	22.4 °C
364	1:05:00 PM	0%	20.90%	0	26	22.4 °C
365	1:05:00 PM	0%	20.90%	0	24	22.4 °C
366	1:05:00 PM	0%	20.90%	0	26	22.4 °C
367	1:05:00 PM	0%	20.90%	0	27	22.4 °C
368	1:05:00 PM	0%	20.90%	1.6	170	22.5 °C
369	1:05:00 PM	0%	20.90%	1.4	199	22.5 °C
370	1:05:00 PM	0%	20.90%	0	48	22.5 °C
371	1:05:00 PM	0%	20.90%	0	29	22.5 °C
372	1:05:00 PM	0%	20.90%	0	21	22.5 °C
373	1:05:00 PM	0%	20.90%	0	15	22.5 °C
374	1:05:00 PM	0%	20.90%	0	10	22.6 °C
375	1:06:00 PM	0%	20.90%	0	24	22.6 °C
376	1:06:00 PM	0%	20.90%	0	20	22.6 °C
377	1:06:00 PM	0%	20.90%	0	16	22.6 °C
378	1:06:00 PM	0%	20.90%	0	9	22.6 °C
379	1:06:00 PM	0%	20.90%	0	5	22.7 °C

380	1:06:00 PM	0%	20.90%	0	5	22.7 °C
381	1:06:00 PM	0%	20.90%	0	4	22.7 °C
382	1:06:00 PM	0%	20.90%	0	3	22.7 °C
383	1:06:00 PM	0%	20.90%	0	3	22.7 °C
384	1:06:00 PM	0%	20.90%	0	2	22.8 °C
385	1:06:00 PM	0%	20.90%	0	2	22.8 °C
386	1:06:00 PM	0%	20.90%	0	2	22.8 °C
387	1:07:00 PM	0%	20.90%	0	2	22.8 °C
388	1:07:00 PM	0%	20.90%	4.5	455	22.9 °C
389	1:07:00 PM	6%	20.90%	10	1436	22.9 °C
390	1:07:00 PM	6%	20.90%	0	659	22.9 °C
391	1:07:00 PM	0%	20.90%	2.1	754	22.9 °C
392	1:07:00 PM	5%	20.90%	6.6	1503	22.9 °C
393	1:07:00 PM	5%	20.90%	-5.6	999	23.0 °C
394	1:07:00 PM	0%	20.90%	0	164	23.0 °C
395	1:07:00 PM	0%	20.90%	0	56	23.0 °C
396	1:07:00 PM	0%	20.90%	0	31	23.0 °C
397	1:07:00 PM	0%	20.90%	0.4	22	23.1 °C
398	1:07:00 PM	0%	20.90%	0.5	15	23.1 °C
399	1:08:00 PM	0%	20.90%	0.5	11	23.1 °C
400	1:08:00 PM	0%	20.90%	0.5	9	23.1 °C
401	1:08:00 PM	0%	20.90%	0.5	7	23.1 °C
402	1:08:00 PM	0%	20.90%	0.5	6	23.1 °C
403	1:08:00 PM	0%	20.90%	0.5	5	23.2 °C
404	1:08:00 PM	0%	20.90%	0.5	4	23.2 °C
405	1:08:00 PM	0%	20.90%	0.5	4	23.2 °C
406	1:08:00 PM	0%	20.90%	0.5	3	23.2 °C
407	1:08:00 PM	0%	20.90%	0.5	3	23.2 °C
408	1:08:00 PM	0%	20.90%	0.5	3	23.2 °C
409	1:08:00 PM	0%	20.90%	0.5	2	23.3 °C
410	1:08:00 PM	0%	20.90%	0.5	2	23.3 °C
411	1:09:00 PM	0%	20.90%	0.5	2	23.3 °C
412	1:09:00 PM	0%	20.90%	0.7	24	23.3 °C
413	1:09:00 PM	0%	20.90%	0.6	18	23.3 °C
414	1:09:00 PM	0%	20.90%	0.5	3	23.3 °C
415	1:09:00 PM	0%	20.90%	0.5	2	23.3 °C
416	1:09:00 PM	0%	20.90%	0.5	2	23.3 °C
417	1:09:00 PM	0%	20.90%	0.5	0	23.3 °C
418	1:09:00 PM	0%	20.90%	0.5	0	23.3 °C
419	1:09:00 PM	0%	20.90%	0.5	0	23.3 °C
420	1:09:00 PM	0%	20.90%	0.5	0	23.3 °C
421	1:09:00 PM	0%	20.90%	0.5	0	23.3 °C
422	1:09:00 PM	0%	20.90%	0.5	0	23.3 °C
423	1:10:00 PM	0%	20.90%	0.5	0	23.3 °C
424	1:10:00 PM	0%	20.90%	0.5	0	23.3 °C
425	1:10:00 PM	0%	20.90%	0.5	0	23.3 °C
426	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
427	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
428	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C

429	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
430	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
431	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
432	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
433	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
434	1:10:00 PM	0%	20.90%	0.5	0	23.2 °C
435	1:11:00 PM	0%	20.90%	0.5	0	23.2 °C
436	1:11:00 PM	0%	20.90%	0.5	0	23.1 °C
437	1:11:00 PM	0%	20.90%	0.5	0	23.1 °C
438	1:11:00 PM	0%	20.90%	0.5	0	23.1 °C
439	1:11:00 PM	0%	20.90%	0.5	0	23.1 °C
440	1:11:00 PM	0%	20.90%	0.6	17	23.1 °C
441	1:11:00 PM	0%	20.90%	0.6	22	23.1 °C
442	1:11:00 PM	0%	20.90%	0.5	18	23.1 °C
443	1:11:00 PM	0%	20.90%	0.5	15	23.1 °C
444	1:11:00 PM	0%	20.90%	0.5	8	23.1 °C
445	1:11:00 PM	0%	20.90%	0.5	2	23.1 °C
446	1:11:00 PM	0%	20.90%	0.5	0	23.1 °C
447	1:12:00 PM	0%	20.90%	0.5	0	23.1 °C
448	1:12:00 PM	0%	20.90%	0.5	0	23.0 °C
449	1:12:00 PM	0%	20.90%	0.5	0	23.0 °C
450	1:12:00 PM	0%	20.90%	0.5	0	23.0 °C
451	1:12:00 PM	0%	20.90%	0.5	0	23.0 °C
452	1:12:00 PM	0%	20.90%	0.6	11	23.0 °C
453	1:12:00 PM	0%	20.90%	0.6	18	23.0 °C
454	1:12:00 PM	0%	20.90%	0.6	18	23.0 °C
455	1:12:00 PM	0%	20.90%	0.6	24	23.0 °C
456	1:12:00 PM	0%	20.90%	0.8	44	23.0 °C
457	1:12:00 PM	0%	20.90%	0.7	43	23.0 °C
458	1:12:00 PM	0%	20.90%	0.8	53	23.0 °C
459	1:13:00 PM	0%	20.90%	0.7	52	23.0 °C
460	1:13:00 PM	0%	20.90%	0.7	53	23.0 °C
461	1:13:00 PM	0%	20.90%	0.5	40	23.0 °C
462	1:13:00 PM	0%	20.90%	0.6	25	23.0 °C
463	1:13:00 PM	0%	20.90%	0.6	30	23.0 °C
464	1:13:00 PM	0%	20.90%	0.5	10	23.0 °C
465	1:13:00 PM	0%	20.90%	0.5	2	23.0 °C
466	1:13:00 PM	0%	20.90%	0.7	25	23.0 °C
467	1:13:00 PM	0%	20.90%	2.6	288	23.0 °C
468	1:13:00 PM	0%	20.90%	2.4	330	23.0 °C
469	1:13:00 PM	0%	20.90%	0.5	269	23.0 °C
470	1:13:00 PM	0%	20.90%	0.4	198	23.0 °C
471	1:14:00 PM	0%	20.90%	0.5	175	23.0 °C
472	1:14:00 PM	0%	20.90%	0.7	189	23.0 °C
473	1:14:00 PM	0%	20.90%	0.5	173	23.0 °C
474	1:14:00 PM	0%	20.90%	0.4	107	22.9 °C
475	1:14:00 PM	0%	20.90%	0.4	96	22.9 °C
476	1:14:00 PM	0%	20.90%	0.4	82	22.9 °C
477	1:14:00 PM	0%	20.90%	0.4	71	22.9 °C

478	1:14:00 PM	0%	20.90%	0.4	51	22.9 °C
479	1:14:00 PM	0%	20.90%	0.5	46	22.9 °C
480	1:14:00 PM	0%	20.90%	0.4	38	22.9 °C
481	1:14:00 PM	0%	20.90%	0.5	30	22.9 °C
482	1:14:00 PM	0%	20.90%	0.5	23	22.9 °C
483	1:15:00 PM	0%	20.90%	0.5	18	22.9 °C
484	1:15:00 PM	0%	20.90%	0.5	13	22.9 °C
485	1:15:00 PM	0%	20.90%	0.5	8	22.9 °C
486	1:15:00 PM	0%	20.90%	0.5	7	22.9 °C
487	1:15:00 PM	0%	20.90%	0.5	5	22.9 °C
488	1:15:00 PM	0%	20.90%	0.5	5	22.9 °C
489	1:15:00 PM	0%	20.90%	0.5	4	22.9 °C
490	1:15:00 PM	0%	20.90%	0.5	4	22.9 °C
491	1:15:00 PM	0%	20.90%	0.5	2	22.8 °C
492	1:15:00 PM	0%	20.90%	0.5	0	22.8 °C
493	1:15:00 PM	0%	20.90%	0.5	0	22.8 °C
494	1:15:00 PM	0%	20.90%	0.5	0	22.8 °C
495	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
496	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
497	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
498	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
499	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
500	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
501	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
502	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
503	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
504	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
505	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
506	1:16:00 PM	0%	20.90%	0.5	0	22.8 °C
507	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
508	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
509	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
510	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
511	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
512	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
513	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
514	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
515	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
516	1:17:00 PM	0%	20.90%	0.5	0	22.8 °C
517	1:17:00 PM	0%	20.90%	0.5	0	22.7 °C
518	1:17:00 PM	0%	20.90%	0.5	0	22.7 °C
519	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
520	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
521	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
522	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
523	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
524	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
525	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C
526	1:18:00 PM	0%	20.90%	0.5	0	22.7 °C

527	1:18:00 PM	0%	20.90%	0.6	5	22.7 °C
528	1:18:00 PM	0%	20.90%	0.5	4	22.7 °C
529	1:18:00 PM	0%	20.90%	1.4	94	22.7 °C
530	1:18:00 PM	0%	20.90%	0.4	51	22.7 °C
531	1:19:00 PM	0%	20.90%	0.4	7	22.7 °C
532	1:19:00 PM	0%	20.90%	0.5	2	22.7 °C
533	1:19:00 PM	0%	20.90%	0.5	0	22.7 °C
534	1:19:00 PM	0%	20.90%	0.5	0	22.7 °C
535	1:19:00 PM	0%	20.90%	0.5	0	22.7 °C
536	1:19:00 PM	0%	20.90%	0.5	0	22.7 °C
537	1:19:00 PM	0%	20.90%	0.5	0	22.7 °C
538	1:19:00 PM	0%	20.90%	0.5	0	22.7 °C
539	1:19:00 PM	0%	20.90%	0.5	0	22.6 °C
540	1:19:00 PM	0%	20.90%	0.5	0	22.6 °C
541	1:19:00 PM	0%	20.90%	0.5	0	22.6 °C
542	1:19:00 PM	0%	20.90%	0.5	0	22.6 °C
543	1:20:00 PM	0%	20.90%	0.7	9	22.6 °C
544	1:20:00 PM	0%	20.90%	0.7	51	22.6 °C
545	1:20:00 PM	0%	20.90%	0.4	13	22.6 °C
546	1:20:00 PM	0%	20.90%	0.5	6	22.6 °C
547	1:20:00 PM	0%	20.90%	0.5	0	22.6 °C
548	1:20:00 PM	0%	20.90%	0.5	0	22.6 °C
549	1:20:00 PM	0%	20.90%	0.5	0	22.6 °C
550	1:20:00 PM	0%	20.90%	0.5	0	22.6 °C
551	1:20:00 PM	0%	20.90%	0.5	0	22.6 °C
552	1:20:00 PM	0%	20.90%	0.5	0	22.6 °C
553	1:20:00 PM	0%	20.90%	0.5	0	22.5 °C
554	1:20:00 PM	0%	20.90%	0.5	0	22.5 °C
555	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
556	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
557	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
558	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
559	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
560	1:21:00 PM	0%	20.90%	0.6	0	22.5 °C
561	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
562	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
563	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
564	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
565	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
566	1:21:00 PM	0%	20.90%	0.5	0	22.5 °C
567	1:22:00 PM	0%	20.90%	0.5	0	22.5 °C
568	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
569	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
570	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
571	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
572	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
573	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
574	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C
575	1:22:00 PM	0%	20.90%	0.5	0	22.4 °C

576	1:22:00 PM	0%	20.90%	0.5	0	22.3 °C
577	1:22:00 PM	0%	20.90%	0.5	0	22.3 °C
578	1:22:00 PM	0%	20.90%	0.5	0	22.3 °C
579	1:23:00 PM	0%	20.90%	0.5	0	22.3 °C
580	1:23:00 PM	0%	20.90%	0.5	0	22.3 °C
581	1:23:00 PM	0%	20.90%	0.5	0	22.3 °C
582	1:23:00 PM	0%	20.90%	0.5	0	22.3 °C
583	1:23:00 PM	0%	20.90%	0.5	0	22.3 °C
584	1:23:00 PM	0%	20.90%	0.5	0	22.2 °C
585	1:23:00 PM	0%	20.90%	0.5	0	22.2 °C
586	1:23:00 PM	0%	20.90%	0.6	0	22.2 °C
587	1:23:00 PM	0%	20.90%	0.5	0	22.2 °C
588	1:23:00 PM	0%	20.90%	0.5	0	22.2 °C
589	1:23:00 PM	0%	20.90%	0.6	0	22.2 °C
590	1:23:00 PM	0%	20.90%	0.5	0	22.2 °C
591	1:24:00 PM	0%	20.90%	0.5	0	22.1 °C
592	1:24:00 PM	0%	20.90%	0.6	0	22.1 °C
593	1:24:00 PM	0%	20.90%	0.6	0	22.1 °C
594	1:24:00 PM	0%	20.90%	0.5	0	22.1 °C
595	1:24:00 PM	0%	20.90%	0.6	0	22.1 °C
596	1:24:00 PM	0%	20.90%	0.6	0	22.1 °C
597	1:24:00 PM	0%	20.90%	0.6	0	22.1 °C
598	1:24:00 PM	0%	20.90%	0.6	0	22.0 °C
599	1:24:00 PM	0%	20.90%	0.6	0	22.0 °C
600	1:24:00 PM	0%	20.90%	0.6	0	22.0 °C
601	1:24:00 PM	0%	20.90%	0.6	0	22.0 °C
602	1:24:00 PM	0%	20.90%	0.6	0	22.0 °C
603	1:25:00 PM	0%	20.90%	0.6	0	22.0 °C
604	1:25:00 PM	0%	20.90%	0.5	0	22.0 °C
605	1:25:00 PM	0%	20.90%	0.6	0	22.0 °C
606	1:25:00 PM	0%	20.90%	0.6	0	22.0 °C
607	1:25:00 PM	0%	20.90%	0.6	0	22.0 °C
608	1:25:00 PM	0%	20.90%	0.6	0	21.9 °C
609	1:25:00 PM	0%	20.90%	0.6	0	21.9 °C
610	1:25:00 PM	0%	20.90%	0.5	0	21.9 °C
611	1:25:00 PM	0%	20.90%	0.6	0	21.9 °C
612	1:25:00 PM	0%	20.90%	0.6	0	21.9 °C
613	1:25:00 PM	0%	20.90%	0.6	0	21.9 °C
614	1:25:00 PM	0%	20.90%	0.6	0	21.9 °C
615	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
616	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
617	1:26:00 PM	0%	20.90%	0.5	0	21.9 °C
618	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
619	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
620	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
621	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
622	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
623	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
624	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C

625	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
626	1:26:00 PM	0%	20.90%	0.6	0	21.9 °C
627	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
628	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
629	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
630	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
631	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
632	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
633	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
634	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
635	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
636	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
637	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
638	1:27:00 PM	0%	20.90%	0.6	0	21.9 °C
639	1:28:00 PM	0%	20.90%	0.6	0	21.9 °C
640	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
641	1:28:00 PM	0%	20.90%	0.6	0	21.9 °C
642	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
643	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
644	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
645	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
646	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
647	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
648	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
649	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
650	1:28:00 PM	0%	20.90%	0.6	0	22.0 °C
651	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
652	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
653	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
654	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
655	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
656	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
657	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
658	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
659	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
660	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
661	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
662	1:29:00 PM	0%	20.90%	0.6	0	22.0 °C
663	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
664	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
665	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
666	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
667	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
668	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
669	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
670	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
671	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
672	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
673	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C

674	1:30:00 PM	0%	20.90%	0.6	0	22.1 °C
675	1:31:00 PM	0%	20.90%	0.6	0	22.1 °C
676	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
677	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
678	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
679	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
680	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
681	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
682	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
683	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
684	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
685	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
686	1:31:00 PM	0%	20.90%	0.6	0	22.2 °C
687	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
688	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
689	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
690	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
691	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
692	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
693	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
694	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
695	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
696	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
697	1:32:00 PM	0%	20.90%	0.6	0	22.3 °C
698	1:32:00 PM	0%	20.90%	0.6	0	22.4 °C
699	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
700	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
701	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
702	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
703	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
704	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
705	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
706	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
707	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
708	1:33:00 PM	0%	20.90%	0.6	0	22.4 °C
709	1:33:00 PM	0%	20.90%	0.6	0	22.5 °C
710	1:33:00 PM	0%	20.90%	0.6	0	22.5 °C
711	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
712	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
713	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
714	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
715	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
716	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
717	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
718	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
719	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
720	1:34:00 PM	0%	20.90%	0.6	0	22.5 °C
540	1:34:00 PM	0%	20.90%	0.6	0	22.6 °C
541	1:34:00 PM	0%	20.90%	0.6	0	22.6 °C

542	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
543	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
544	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
545	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
546	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
547	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
548	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
549	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
550	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
551	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
552	1:35:00 PM	0%	20.90%	0.6	0	22.6 °C
553	1:35:00 PM	0%	20.90%	0.6	0	22.7 °C
554	1:36:00 PM	0%	20.90%	0.6	0	22.6 °C
555	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
556	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
557	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
558	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
559	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
560	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
561	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
562	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
563	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
564	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
565	1:36:00 PM	0%	20.90%	0.6	0	22.7 °C
566	1:37:00 PM	0%	20.90%	0.6	0	22.7 °C
567	1:37:00 PM	0%	20.90%	0.6	0	22.7 °C
568	1:37:00 PM	0%	20.90%	0.6	0	22.7 °C
569	1:37:00 PM	0%	20.90%	0.6	0	22.7 °C
570	1:37:00 PM	0%	20.90%	0.6	0	22.7 °C
571	1:37:00 PM	0%	20.90%	0.5	0	22.7 °C
572	1:37:00 PM	0%	20.90%	0.6	0	22.8 °C
573	1:37:00 PM	0%	20.90%	0.6	0	22.8 °C
574	1:37:00 PM	0%	20.90%	0.6	0	22.8 °C
575	1:37:00 PM	0%	20.90%	0.6	0	22.8 °C
576	1:37:00 PM	0%	20.90%	0.6	0	22.8 °C
577	1:37:00 PM	0%	20.90%	0.6	0	22.8 °C
578	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
579	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
580	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
581	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
582	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
583	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
584	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
585	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
586	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
587	1:38:00 PM	0%	20.90%	0.6	0	22.8 °C
588	1:38:00 PM	0%	20.90%	0.6	0	22.9 °C
589	1:38:00 PM	0%	20.90%	0.6	0	22.9 °C
590	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C

591	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
592	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
593	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
594	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
595	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
596	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
597	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
598	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
599	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
600	1:39:00 PM	0%	20.90%	0.6	0	23.0 °C
601	1:39:00 PM	0%	20.90%	0.6	0	22.9 °C
602	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
603	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
604	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
605	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
606	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
607	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
608	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
609	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
610	1:40:00 PM	0%	20.90%	0.6	0	23.0 °C
611	1:40:00 PM	0%	20.90%	0.6	0	23.1 °C
612	1:40:00 PM	0%	20.90%	0.6	0	23.1 °C
613	1:40:00 PM	0%	20.90%	0.6	0	23.1 °C
614	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
615	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
616	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
617	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
618	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
619	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
620	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
621	1:41:00 PM	0%	20.90%	0.6	0	23.1 °C
622	1:41:00 PM	0%	20.90%	0.6	0	23.2 °C
623	1:41:00 PM	0%	20.90%	0.6	0	23.2 °C
624	1:41:00 PM	0%	20.90%	0.6	0	23.2 °C
625	1:41:00 PM	0%	20.90%	0.6	0	23.2 °C
626	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
627	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
628	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
629	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
630	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
631	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
632	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
633	1:42:00 PM	0%	20.90%	0.6	0	23.2 °C
634	1:42:00 PM	0%	20.90%	0.6	0	23.3 °C
635	1:42:00 PM	0%	20.90%	0.6	0	23.3 °C
636	1:42:00 PM	0%	20.90%	0.6	0	23.3 °C
637	1:42:00 PM	0%	20.90%	0.6	0	23.3 °C
638	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
639	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C

640	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
641	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
642	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
643	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
644	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
645	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
646	1:43:00 PM	0%	20.90%	0.6	0	23.3 °C
647	1:43:00 PM	0%	20.90%	0.6	0	23.4 °C
648	1:43:00 PM	0%	20.90%	0.6	0	23.4 °C
649	1:43:00 PM	0%	20.90%	0.6	0	23.4 °C
650	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
651	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
652	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
653	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
654	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
655	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
656	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
657	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
658	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
659	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
660	1:44:00 PM	0%	20.90%	0.6	0	23.4 °C
661	1:44:00 PM	0%	20.90%	0.6	0	23.5 °C
662	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
663	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
664	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
665	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
666	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
667	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
668	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
669	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
670	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
671	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
672	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
673	1:45:00 PM	0%	20.90%	0.6	0	23.5 °C
674	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
675	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
676	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
677	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
678	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
679	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
680	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
681	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
682	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
683	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
684	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
685	1:46:00 PM	0%	20.90%	0.6	0	23.6 °C
686	1:47:00 PM	0%	20.90%	0.6	0	23.6 °C
687	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
688	1:47:00 PM	0%	20.90%	0.6	0	23.6 °C

689	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
690	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
691	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
692	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
693	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
694	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
695	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
696	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
697	1:47:00 PM	0%	20.90%	0.6	0	23.7 °C
698	1:48:00 PM	0%	20.90%	0.6	0	23.7 °C
699	1:48:00 PM	0%	20.90%	0.6	0	23.7 °C
700	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
701	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
702	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
703	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
704	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
705	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
706	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
707	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
708	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
709	1:48:00 PM	0%	20.90%	0.6	0	23.8 °C
710	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
711	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
712	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
713	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
714	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
715	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
716	1:49:00 PM	0%	20.90%	0.6	0	23.8 °C
717	1:49:00 PM	0%	20.90%	0.6	0	23.9 °C
718	1:49:00 PM	0%	20.90%	0.6	0	23.9 °C
719	1:49:00 PM	0%	20.90%	0.6	0	23.9 °C
720	1:49:00 PM	0%	20.90%	0.6	0	23.9 °C
1	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
2	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
3	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
4	3:02:00 PM	0%	20.90%	0.6	0	28.3 °C
5	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
6	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
7	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
8	3:02:00 PM	0%	20.90%	0.6	0	28.3 °C
9	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
10	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
11	3:02:00 PM	0%	20.90%	0.7	0	28.3 °C
12	3:03:00 PM	0%	20.90%	0.7	0	28.3 °C
13	3:03:00 PM	0%	20.90%	0.7	0	28.3 °C
14	3:03:00 PM	0%	20.90%	0.6	0	28.3 °C
15	3:03:00 PM	0%	20.90%	0.6	0	28.3 °C
16	3:03:00 PM	0%	20.90%	0.7	0	28.3 °C
17	3:03:00 PM	0%	20.90%	0.7	0	28.3 °C

18	3:03:00 PM	0%	20.90%	0.7	0	28.3 °C
19	3:03:00 PM	0%	20.90%	0.6	0	28.3 °C
20	3:03:00 PM	0%	20.90%	0.7	0	28.3 °C
21	3:03:00 PM	0%	20.90%	0.6	0	28.4 °C
22	3:03:00 PM	0%	20.90%	0.7	0	28.4 °C
23	3:03:00 PM	0%	20.90%	0.7	0	28.4 °C
24	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
25	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
26	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
27	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
28	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
29	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
30	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
31	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
32	3:04:00 PM	0%	20.90%	0.6	0	28.4 °C
33	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
34	3:04:00 PM	0%	20.90%	0.7	0	28.4 °C
35	3:04:00 PM	0%	20.90%	0.6	0	28.4 °C
36	3:05:00 PM	0%	20.90%	0.7	0	28.4 °C
37	3:05:00 PM	0%	20.90%	0.7	0	28.4 °C
38	3:05:00 PM	0%	20.90%	0.7	0	28.4 °C
39	3:05:00 PM	0%	20.90%	0.7	0	28.4 °C
40	3:05:00 PM	0%	20.90%	0.6	0	28.5 °C
41	3:05:00 PM	0%	20.90%	0.7	0	28.5 °C
42	3:05:00 PM	0%	20.90%	0.7	0	28.5 °C
43	3:05:00 PM	0%	20.90%	0.7	0	28.5 °C
44	3:05:00 PM	0%	20.90%	0.6	0	28.5 °C
45	3:05:00 PM	0%	20.90%	0.7	0	28.5 °C
46	3:05:00 PM	0%	20.90%	0.7	0	28.5 °C
47	3:05:00 PM	0%	20.90%	0.6	0	28.5 °C
48	3:06:00 PM	0%	20.90%	0.7	0	28.5 °C
49	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
50	3:06:00 PM	0%	20.90%	0.7	0	28.5 °C
51	3:06:00 PM	0%	20.90%	0.7	0	28.5 °C
52	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
53	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
54	3:06:00 PM	0%	20.90%	0.7	0	28.5 °C
55	3:06:00 PM	0%	20.90%	0.7	0	28.5 °C
56	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
57	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
58	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
59	3:06:00 PM	0%	20.90%	0.6	0	28.5 °C
60	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
61	3:07:00 PM	0%	20.90%	0.6	0	28.6 °C
62	3:07:00 PM	0%	20.90%	0.6	0	28.6 °C
63	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
64	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
65	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
66	3:07:00 PM	0%	20.90%	0.6	0	28.6 °C

67	3:07:00 PM	0%	20.90%	0.6	0	28.6 °C
68	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
69	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
70	3:07:00 PM	0%	20.90%	0.6	0	28.6 °C
71	3:07:00 PM	0%	20.90%	0.7	0	28.6 °C
72	3:08:00 PM	0%	20.90%	0.7	0	28.6 °C
73	3:08:00 PM	0%	20.90%	0.6	0	28.6 °C
74	3:08:00 PM	0%	20.90%	0.7	0	28.6 °C
75	3:08:00 PM	0%	20.90%	0.7	0	28.6 °C
76	3:08:00 PM	0%	20.90%	0.6	0	28.7 °C
77	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
78	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
79	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
80	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
81	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
82	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
83	3:08:00 PM	0%	20.90%	0.7	0	28.7 °C
84	3:09:00 PM	0%	20.90%	0.7	0	28.7 °C
85	3:09:00 PM	0%	20.90%	0.7	0	28.7 °C
86	3:09:00 PM	0%	20.90%	0.6	0	28.7 °C
87	3:09:00 PM	0%	20.90%	0.7	0	28.7 °C
88	3:09:00 PM	0%	20.90%	0.6	0	28.7 °C
89	3:09:00 PM	0%	20.90%	0.7	0	28.7 °C
90	3:09:00 PM	0%	20.90%	0.6	0	28.7 °C
91	3:09:00 PM	0%	20.90%	0.7	0	28.7 °C
92	3:09:00 PM	0%	20.90%	0.7	0	28.7 °C
93	3:09:00 PM	0%	20.90%	0.6	0	28.8 °C
94	3:09:00 PM	0%	20.90%	0.7	0	28.8 °C
95	3:09:00 PM	0%	20.90%	0.6	0	28.8 °C
96	3:10:00 PM	0%	20.90%	0.7	0	28.8 °C
97	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
98	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
99	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
100	3:10:00 PM	0%	20.90%	0.7	0	28.8 °C
101	3:10:00 PM	0%	20.90%	0.7	0	28.8 °C
102	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
103	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
104	3:10:00 PM	0%	20.90%	0.7	0	28.8 °C
105	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
106	3:10:00 PM	0%	20.90%	0.6	0	28.8 °C
107	3:10:00 PM	0%	20.90%	0.7	0	28.8 °C
108	3:11:00 PM	0%	20.90%	0.6	0	28.8 °C
109	3:11:00 PM	0%	20.90%	0.7	0	28.8 °C
110	3:11:00 PM	0%	20.90%	0.6	0	28.8 °C
111	3:11:00 PM	0%	20.90%	0.7	0	28.9 °C
112	3:11:00 PM	0%	20.90%	0.7	0	28.9 °C
113	3:11:00 PM	0%	20.90%	0.7	0	28.9 °C
114	3:11:00 PM	0%	20.90%	0.6	0	28.9 °C
115	3:11:00 PM	0%	20.90%	0.6	0	28.9 °C

116	3:11:00 PM	0%	20.90%	0.6	0	28.9 °C
117	3:11:00 PM	0%	20.90%	0.7	0	28.9 °C
118	3:11:00 PM	0%	20.90%	0.6	0	28.9 °C
119	3:11:00 PM	0%	21.00%	0.6	0	28.9 °C
120	3:12:00 PM	0%	21.00%	0.7	0	28.9 °C
121	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
122	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
123	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
124	3:12:00 PM	0%	21.00%	0.7	0	28.9 °C
125	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
126	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
127	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
128	3:12:00 PM	0%	21.00%	0.6	0	28.9 °C
129	3:12:00 PM	0%	20.90%	0.6	0	28.9 °C
130	3:12:00 PM	0%	20.90%	0.6	0	28.9 °C
131	3:12:00 PM	0%	20.90%	0.6	0	28.9 °C
132	3:13:00 PM	0%	20.90%	0.6	0	28.9 °C
133	3:13:00 PM	0%	20.90%	0.7	0	28.9 °C
134	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
135	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
136	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
137	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
138	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
139	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
140	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
141	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
142	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
143	3:13:00 PM	0%	20.90%	0.6	0	29.0 °C
144	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
145	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
146	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
147	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
148	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
149	3:14:00 PM	0%	20.90%	0.7	0	29.0 °C
150	3:14:00 PM	0%	20.90%	0.7	0	29.0 °C
151	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
152	3:14:00 PM	0%	20.90%	0.7	0	29.0 °C
153	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
154	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
155	3:14:00 PM	0%	20.90%	0.6	0	29.0 °C
156	3:15:00 PM	0%	20.90%	0.6	0	29.0 °C
157	3:15:00 PM	0%	20.90%	0.6	0	29.0 °C
158	3:15:00 PM	0%	20.90%	0.6	0	29.0 °C
159	3:15:00 PM	0%	20.90%	0.6	0	29.0 °C
160	3:15:00 PM	0%	20.90%	0.6	0	29.0 °C
161	3:15:00 PM	0%	20.90%	0.6	0	29.1 °C
162	3:15:00 PM	0%	20.90%	0.7	0	29.1 °C
163	3:15:00 PM	0%	20.90%	0.7	0	29.1 °C
164	3:15:00 PM	0%	20.90%	0.6	0	29.1 °C

165	3:15:00 PM	0%	20.90%	0.6	0	29.1 °C
166	3:15:00 PM	0%	20.90%	0.7	0	29.1 °C
167	3:15:00 PM	0%	20.90%	0.6	0	29.1 °C
168	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
169	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
170	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
171	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
172	3:16:00 PM	0%	20.90%	0.7	0	29.1 °C
173	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
174	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
175	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
176	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
177	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
178	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
179	3:16:00 PM	0%	20.90%	0.6	0	29.1 °C
180	3:17:00 PM	0%	20.90%	0.6	0	29.1 °C
181	3:17:00 PM	0%	20.90%	0.6	0	29.1 °C
182	3:17:00 PM	0%	20.90%	0.7	0	29.1 °C
183	3:17:00 PM	0%	20.90%	0.7	0	29.1 °C
184	3:17:00 PM	0%	20.90%	0.6	0	29.1 °C
185	3:17:00 PM	0%	20.90%	0.6	0	29.1 °C
186	3:17:00 PM	0%	20.90%	0.6	0	29.1 °C
187	3:17:00 PM	0%	20.90%	0.7	0	29.1 °C
188	3:17:00 PM	0%	20.90%	0.7	0	29.2 °C
189	3:17:00 PM	0%	20.90%	0.7	0	29.2 °C
190	3:17:00 PM	0%	20.90%	0.7	0	29.2 °C
191	3:17:00 PM	0%	20.90%	0.7	0	29.2 °C
192	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
193	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
194	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
195	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
196	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
197	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
198	3:18:00 PM	0%	20.90%	0.6	0	29.2 °C
199	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
200	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
201	3:18:00 PM	0%	20.90%	0.6	0	29.2 °C
202	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
203	3:18:00 PM	0%	20.90%	0.7	0	29.2 °C
204	3:19:00 PM	0%	20.90%	0.7	0	29.2 °C
205	3:19:00 PM	0%	20.90%	0.6	0	29.2 °C
206	3:19:00 PM	0%	20.90%	0.6	0	29.2 °C
207	3:19:00 PM	0%	20.90%	0.7	0	29.2 °C
208	3:19:00 PM	0%	20.90%	0.6	0	29.2 °C
209	3:19:00 PM	0%	20.90%	0.7	0	29.2 °C
210	3:19:00 PM	0%	20.90%	0.6	0	29.2 °C
211	3:19:00 PM	0%	20.90%	0.7	0	29.2 °C
212	3:19:00 PM	0%	20.90%	0.7	0	29.2 °C
213	3:19:00 PM	0%	20.90%	0.7	0	29.3 °C

214	3:19:00 PM	0%	20.90%	0.6	0	29.3 °C
215	3:19:00 PM	0%	20.90%	0.7	0	29.3 °C
216	3:20:00 PM	0%	20.90%	0.7	0	29.3 °C
217	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
218	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
219	3:20:00 PM	0%	20.90%	0.7	0	29.3 °C
220	3:20:00 PM	0%	20.90%	0.7	0	29.3 °C
221	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
222	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
223	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
224	3:20:00 PM	0%	20.90%	0.7	0	29.3 °C
225	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
226	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
227	3:20:00 PM	0%	20.90%	0.6	0	29.3 °C
228	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
229	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
230	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
231	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
232	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
233	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
234	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
235	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
236	3:21:00 PM	0%	20.90%	0.6	0	29.4 °C
237	3:21:00 PM	0%	20.90%	0.6	0	29.3 °C
238	3:21:00 PM	0%	20.90%	0.6	0	29.4 °C
239	3:21:00 PM	0%	21.00%	0.6	0	29.3 °C
240	3:22:00 PM	0%	21.00%	0.6	0	29.3 °C
241	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
242	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
243	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
244	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
245	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
246	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
247	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
248	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
249	3:22:00 PM	0%	20.90%	0.6	0	29.3 °C
250	3:22:00 PM	0%	21.00%	0.6	0	29.3 °C
251	3:22:00 PM	0%	21.00%	0.6	0	29.3 °C
252	3:23:00 PM	0%	21.00%	0.6	0	29.3 °C
253	3:23:00 PM	0%	21.00%	0.6	0	29.3 °C
254	3:23:00 PM	0%	20.90%	0.6	0	29.3 °C
255	3:23:00 PM	0%	20.90%	0.6	0	29.3 °C
256	3:23:00 PM	0%	20.90%	0.6	0	29.3 °C
257	3:23:00 PM	0%	21.00%	0.6	0	29.3 °C
258	3:23:00 PM	0%	21.00%	0.6	0	29.3 °C
259	3:23:00 PM	0%	21.00%	0.6	0	29.3 °C
260	3:23:00 PM	0%	21.00%	0.6	0	29.3 °C
261	3:23:00 PM	0%	20.90%	0.6	0	29.3 °C
262	3:23:00 PM	0%	20.90%	0.6	0	29.3 °C

263	3:23:00 PM	0%	20.90%	0.6	0	29.3 °C
264	3:24:00 PM	0%	20.90%	0.6	0	29.3 °C
265	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
266	3:24:00 PM	0%	20.90%	0.6	0	29.3 °C
267	3:24:00 PM	0%	20.90%	0.6	0	29.3 °C
268	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
269	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
270	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
271	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
272	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
273	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
274	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
275	3:24:00 PM	0%	21.00%	0.6	0	29.3 °C
276	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
277	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
278	3:25:00 PM	0%	20.90%	0.6	0	29.3 °C
279	3:25:00 PM	0%	20.90%	0.6	0	29.3 °C
280	3:25:00 PM	0%	20.90%	0.6	0	29.3 °C
281	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
282	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
283	3:25:00 PM	0%	21.00%	0.7	0	29.3 °C
284	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
285	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
286	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
287	3:25:00 PM	0%	21.00%	0.6	0	29.3 °C
288	3:26:00 PM	0%	21.00%	0.6	0	29.3 °C
289	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
290	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
291	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
292	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
293	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
294	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
295	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
296	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
297	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
298	3:26:00 PM	0%	20.90%	0.6	0	29.3 °C
299	3:26:00 PM	0%	20.90%	0.7	0	29.3 °C
300	3:27:00 PM	0%	20.90%	0.6	0	29.3 °C
301	3:27:00 PM	0%	20.90%	0.7	0	29.3 °C
302	3:27:00 PM	0%	20.90%	0.6	0	29.3 °C
303	3:27:00 PM	0%	20.90%	0.6	0	29.3 °C
304	3:27:00 PM	0%	20.90%	0.7	0	29.3 °C
305	3:27:00 PM	0%	21.00%	0.6	0	29.3 °C
306	3:27:00 PM	0%	20.90%	0.6	0	29.3 °C
307	3:27:00 PM	0%	20.90%	0.6	0	29.3 °C
308	3:27:00 PM	0%	20.90%	0.7	0	29.3 °C
309	3:27:00 PM	0%	20.90%	0.6	0	29.3 °C
310	3:27:00 PM	0%	21.00%	0.6	0	29.3 °C
311	3:27:00 PM	0%	21.00%	0.6	0	29.3 °C

312	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
313	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
314	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
315	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
316	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
317	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
318	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
319	3:28:00 PM	0%	20.90%	0.6	0	29.3 °C
320	3:28:00 PM	0%	20.90%	0.6	4	29.3 °C
321	3:28:00 PM	0%	20.90%	0.6	4	29.3 °C
322	3:28:00 PM	0%	20.90%	0.6	3	29.3 °C
323	3:28:00 PM	0%	20.90%	0.6	2	29.3 °C
324	3:29:00 PM	0%	20.90%	0.6	0	29.3 °C
325	3:29:00 PM	0%	20.90%	0.6	0	29.3 °C
326	3:29:00 PM	0%	20.90%	0.6	0	29.3 °C
327	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
328	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
329	3:29:00 PM	0%	20.90%	0.6	0	29.3 °C
330	3:29:00 PM	0%	20.90%	0.6	0	29.3 °C
331	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
332	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
333	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
334	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
335	3:29:00 PM	0%	21.00%	0.6	0	29.3 °C
336	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
337	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
338	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
339	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
340	3:30:00 PM	0%	20.90%	0.6	0	29.3 °C
341	3:30:00 PM	0%	20.90%	0.6	0	29.3 °C
342	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
343	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
344	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
345	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
346	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
347	3:30:00 PM	0%	21.00%	0.6	0	29.3 °C
348	3:31:00 PM	0%	21.00%	0.6	0	29.3 °C
349	3:31:00 PM	0%	21.00%	0.7	2	29.3 °C
350	3:31:00 PM	0%	21.00%	0.7	2	29.3 °C
351	3:31:00 PM	0%	21.00%	0.6	2	29.3 °C
352	3:31:00 PM	0%	21.00%	0.6	2	29.3 °C
353	3:31:00 PM	0%	20.90%	0.7	4	29.3 °C
354	3:31:00 PM	0%	20.90%	0.7	9	29.3 °C
355	3:31:00 PM	0%	20.90%	0.7	6	29.3 °C
356	3:31:00 PM	0%	20.90%	0.6	4	29.3 °C
357	3:31:00 PM	0%	20.90%	0.7	7	29.3 °C
358	3:31:00 PM	0%	20.90%	0.6	6	29.3 °C
359	3:31:00 PM	0%	20.90%	0.7	6	29.3 °C
360	3:32:00 PM	0%	20.90%	0.8	20	29.3 °C

361	3:32:00 PM	0%	20.90%	0.8	27	29.3 °C
362	3:32:00 PM	0%	20.90%	0.9	49	29.3 °C
363	3:32:00 PM	0%	20.90%	0.8	50	29.3 °C
364	3:32:00 PM	0%	20.90%	0.6	34	29.3 °C
365	3:32:00 PM	0%	20.90%	0.6	11	29.3 °C
366	3:32:00 PM	0%	20.90%	0.6	5	29.3 °C
367	3:32:00 PM	0%	20.90%	0.6	8	29.3 °C
368	3:32:00 PM	0%	20.90%	0.6	10	29.3 °C
369	3:32:00 PM	0%	20.90%	0.8	23	29.3 °C
370	3:32:00 PM	0%	20.90%	0.8	47	29.3 °C
371	3:32:00 PM	0%	20.90%	0.8	46	29.3 °C
372	3:33:00 PM	0%	20.90%	0.5	12	29.3 °C
373	3:33:00 PM	0%	20.90%	0.6	2	29.3 °C
374	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
375	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
376	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
377	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
378	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
379	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
380	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
381	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
382	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
383	3:33:00 PM	0%	20.90%	0.6	0	29.3 °C
384	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
385	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
386	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
387	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
388	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
389	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
390	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
391	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
392	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
393	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
394	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
395	3:34:00 PM	0%	20.90%	0.6	0	29.3 °C
396	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
397	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
398	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
399	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
400	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
401	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
402	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
403	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
404	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
405	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
406	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
407	3:35:00 PM	0%	20.90%	0.6	0	29.3 °C
408	3:36:00 PM	0%	20.90%	0.6	0	29.3 °C
409	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C

410	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
411	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
412	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
413	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
414	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
415	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
416	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
417	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
418	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
419	3:36:00 PM	0%	20.90%	0.6	0	29.4 °C
420	3:37:00 PM	0%	20.90%	0.6	0	29.4 °C
421	3:37:00 PM	0%	20.90%	0.6	0	29.4 °C
422	3:37:00 PM	0%	20.90%	0.6	0	29.4 °C
423	3:37:00 PM	0%	20.90%	0.6	0	29.4 °C
424	3:37:00 PM	0%	20.90%	0.6	0	29.4 °C
425	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
426	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
427	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
428	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
429	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
430	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
431	3:37:00 PM	0%	20.90%	0.6	0	29.5 °C
432	3:38:00 PM	0%	20.90%	0.6	0	29.5 °C
433	3:38:00 PM	0%	20.90%	0.6	0	29.5 °C
434	3:38:00 PM	0%	20.90%	0.6	0	29.5 °C
435	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
436	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
437	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
438	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
439	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
440	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
441	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
442	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
443	3:38:00 PM	0%	20.90%	0.6	0	29.6 °C
444	3:39:00 PM	0%	20.90%	0.6	0	29.6 °C
445	3:39:00 PM	0%	20.90%	0.6	0	29.6 °C
446	3:39:00 PM	0%	20.90%	0.6	0	29.6 °C
447	3:39:00 PM	0%	20.90%	0.6	0	29.7 °C
448	3:39:00 PM	0%	21.00%	0.6	0	29.7 °C
449	3:39:00 PM	0%	20.90%	0.6	0	29.7 °C
450	3:39:00 PM	0%	20.90%	0.6	0	29.7 °C
451	3:39:00 PM	0%	20.90%	0.6	0	29.7 °C
452	3:39:00 PM	0%	20.90%	0.6	0	29.7 °C
453	3:39:00 PM	0%	21.00%	0.6	0	29.7 °C
454	3:39:00 PM	0%	21.00%	0.6	0	29.7 °C
455	3:39:00 PM	0%	21.00%	0.6	0	29.7 °C
456	3:40:00 PM	0%	21.00%	0.6	0	29.7 °C
457	3:40:00 PM	0%	21.00%	0.6	0	29.7 °C
458	3:40:00 PM	0%	21.00%	0.6	0	29.7 °C

459	3:40:00 PM	0%	21.00%	0.6	0	29.7 °C
460	3:40:00 PM	0%	21.00%	0.6	0	29.7 °C
461	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
462	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
463	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
464	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
465	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
466	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
467	3:40:00 PM	0%	21.00%	0.6	0	29.8 °C
468	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
469	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
470	3:41:00 PM	0%	20.90%	0.6	0	29.8 °C
471	3:41:00 PM	0%	20.90%	0.6	0	29.8 °C
472	3:41:00 PM	0%	20.90%	0.6	0	29.8 °C
473	3:41:00 PM	0%	20.90%	0.6	0	29.8 °C
474	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
475	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
476	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
477	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
478	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
479	3:41:00 PM	0%	21.00%	0.6	0	29.8 °C
480	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
481	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
482	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
483	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
484	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
485	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
486	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
487	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
488	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
489	3:42:00 PM	0%	20.90%	0.7	0	29.8 °C
490	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
491	3:42:00 PM	0%	20.90%	0.6	0	29.8 °C
492	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
493	3:43:00 PM	0%	20.90%	0.7	0	29.8 °C
494	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
495	3:43:00 PM	0%	20.90%	0.7	0	29.8 °C
496	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
497	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
498	3:43:00 PM	0%	20.90%	0.7	0	29.8 °C
499	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
500	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
501	3:43:00 PM	0%	20.90%	0.6	0	29.8 °C
502	3:43:00 PM	0%	21.00%	0.6	0	29.8 °C
503	3:43:00 PM	0%	21.00%	0.6	0	29.8 °C
504	3:44:00 PM	0%	20.90%	0.7	0	29.8 °C
505	3:44:00 PM	0%	20.90%	0.6	0	29.8 °C
506	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
507	3:44:00 PM	0%	21.00%	0.7	0	29.8 °C

508	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
509	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
510	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
511	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
512	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
513	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
514	3:44:00 PM	0%	21.00%	0.6	0	29.8 °C
515	3:44:00 PM	0%	20.90%	0.7	0	29.9 °C
516	3:45:00 PM	0%	20.90%	0.6	0	29.9 °C
517	3:45:00 PM	0%	20.90%	0.6	0	29.9 °C
518	3:45:00 PM	0%	20.90%	0.6	0	29.9 °C
519	3:45:00 PM	0%	21.00%	0.7	0	29.9 °C
520	3:45:00 PM	0%	21.00%	0.6	0	29.9 °C
521	3:45:00 PM	0%	21.00%	0.6	0	29.9 °C
522	3:45:00 PM	0%	21.00%	0.7	0	29.9 °C
523	3:45:00 PM	0%	21.00%	0.6	0	29.9 °C
524	3:45:00 PM	0%	21.00%	0.6	0	29.9 °C
525	3:45:00 PM	0%	21.00%	0.7	0	29.9 °C
526	3:45:00 PM	0%	20.90%	0.6	0	29.9 °C
527	3:45:00 PM	0%	21.00%	0.6	0	29.9 °C
528	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
529	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
530	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
531	3:46:00 PM	0%	21.00%	0.7	0	29.9 °C
532	3:46:00 PM	0%	21.00%	0.7	0	29.9 °C
533	3:46:00 PM	0%	21.00%	0.7	0	29.9 °C
534	3:46:00 PM	0%	21.00%	0.7	0	29.9 °C
535	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
536	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
537	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
538	3:46:00 PM	0%	21.00%	0.6	0	29.9 °C
539	3:46:00 PM	0%	20.90%	0.6	0	29.9 °C
540	3:47:00 PM	0%	20.90%	0.7	0	29.9 °C
541	3:47:00 PM	0%	20.90%	0.7	0	29.9 °C
542	3:47:00 PM	0%	21.00%	0.6	0	29.9 °C
543	3:47:00 PM	0%	21.00%	0.6	0	29.9 °C
544	3:47:00 PM	0%	21.00%	0.6	0	29.9 °C
545	3:47:00 PM	0%	21.00%	0.6	0	29.9 °C
546	3:47:00 PM	0%	21.00%	0.7	0	29.9 °C
547	3:47:00 PM	0%	21.00%	0.7	0	29.9 °C
548	3:47:00 PM	0%	21.00%	0.7	0	29.9 °C
549	3:47:00 PM	0%	21.00%	0.6	0	29.9 °C
550	3:47:00 PM	0%	21.00%	0.6	0	29.9 °C
551	3:47:00 PM	0%	21.00%	0.7	0	29.9 °C
552	3:48:00 PM	0%	21.00%	0.7	0	29.9 °C
553	3:48:00 PM	0%	21.00%	0.6	0	29.9 °C
554	3:48:00 PM	0%	21.00%	0.6	0	29.9 °C
555	3:48:00 PM	0%	21.00%	0.7	0	29.9 °C
556	3:48:00 PM	0%	21.00%	0.7	0	29.9 °C

557	3:48:00 PM	0%	21.00%	0.6	0	29.9 °C
558	3:48:00 PM	0%	21.00%	0.6	0	29.9 °C
559	3:48:00 PM	0%	21.00%	0.7	0	29.9 °C
560	3:48:00 PM	0%	21.00%	0.7	0	29.9 °C
561	3:48:00 PM	0%	21.00%	0.6	0	29.9 °C
562	3:48:00 PM	0%	21.00%	0.7	0	29.9 °C
563	3:48:00 PM	0%	21.00%	0.6	0	29.9 °C
564	3:49:00 PM	0%	21.00%	0.7	0	29.9 °C
565	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
566	3:49:00 PM	0%	21.00%	0.7	0	29.9 °C
567	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
568	3:49:00 PM	0%	21.00%	0.7	0	29.9 °C
569	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
570	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
571	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
572	3:49:00 PM	0%	21.00%	0.7	0	29.9 °C
573	3:49:00 PM	0%	21.00%	0.7	0	29.9 °C
574	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
575	3:49:00 PM	0%	21.00%	0.6	0	29.9 °C
576	3:50:00 PM	0%	21.00%	0.6	0	29.9 °C
577	3:50:00 PM	0%	21.00%	0.7	0	29.9 °C
578	3:50:00 PM	0%	21.00%	0.6	0	29.9 °C
579	3:50:00 PM	0%	21.00%	0.6	0	29.9 °C
580	3:50:00 PM	0%	21.00%	0.7	0	29.9 °C
581	3:50:00 PM	0%	21.00%	0.7	0	29.9 °C
582	3:50:00 PM	0%	21.00%	0.7	0	29.9 °C
583	3:50:00 PM	0%	21.00%	0.6	0	29.9 °C
584	3:50:00 PM	0%	21.00%	0.6	0	29.9 °C
585	3:50:00 PM	0%	21.00%	0.7	0	29.9 °C
586	3:50:00 PM	0%	20.90%	0.7	0	29.9 °C
587	3:50:00 PM	0%	20.90%	0.7	0	29.9 °C
588	3:51:00 PM	0%	20.90%	0.6	0	29.9 °C
589	3:51:00 PM	0%	20.90%	0.7	0	29.9 °C
590	3:51:00 PM	0%	20.90%	0.7	0	29.9 °C
591	3:51:00 PM	0%	20.90%	0.6	0	29.9 °C
592	3:51:00 PM	0%	20.90%	0.7	0	29.9 °C
593	3:51:00 PM	0%	20.90%	0.6	0	29.9 °C
594	3:51:00 PM	0%	20.90%	0.7	0	29.9 °C
595	3:51:00 PM	0%	20.90%	0.6	0	29.9 °C
596	3:51:00 PM	0%	20.90%	0.7	0	29.9 °C
597	3:51:00 PM	0%	20.90%	0.7	0	30.0 °C
598	3:51:00 PM	0%	21.00%	0.7	0	30.0 °C
599	3:51:00 PM	0%	21.00%	0.7	0	29.9 °C
600	3:52:00 PM	0%	20.90%	0.7	0	30.0 °C
601	3:52:00 PM	0%	20.90%	0.7	0	29.9 °C
602	3:52:00 PM	0%	21.00%	0.6	0	29.9 °C
603	3:52:00 PM	0%	21.00%	0.7	0	30.0 °C
604	3:52:00 PM	0%	21.00%	0.7	0	30.0 °C
605	3:52:00 PM	0%	21.00%	0.6	0	29.9 °C

606	3:52:00 PM	0%	21.00%	0.6	0	30.0 °C
607	3:52:00 PM	0%	21.00%	0.6	0	30.0 °C
608	3:52:00 PM	0%	21.00%	0.6	0	30.0 °C
609	3:52:00 PM	0%	21.00%	0.7	0	30.0 °C
610	3:52:00 PM	0%	21.00%	0.6	0	30.0 °C
611	3:52:00 PM	0%	21.00%	0.7	0	30.0 °C
612	3:53:00 PM	0%	20.90%	0.6	0	30.0 °C
613	3:53:00 PM	0%	20.90%	0.7	0	30.0 °C
614	3:53:00 PM	0%	20.90%	0.7	0	30.0 °C
615	3:53:00 PM	0%	20.90%	0.6	0	30.0 °C
616	3:53:00 PM	0%	20.90%	0.6	0	30.0 °C
617	3:53:00 PM	0%	21.00%	0.7	0	30.0 °C
618	3:53:00 PM	0%	20.90%	0.6	0	30.0 °C
619	3:53:00 PM	0%	20.90%	0.6	0	30.0 °C
620	3:53:00 PM	0%	20.90%	0.7	0	30.0 °C
621	3:53:00 PM	0%	20.90%	0.6	0	30.0 °C
622	3:53:00 PM	0%	20.90%	0.7	0	30.0 °C
623	3:53:00 PM	0%	20.90%	0.7	0	30.0 °C
624	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
625	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
626	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
627	3:54:00 PM	0%	20.90%	0.6	0	30.0 °C
628	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
629	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
630	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
631	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
632	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
633	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
634	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
635	3:54:00 PM	0%	20.90%	0.7	0	30.0 °C
636	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
637	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
638	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
639	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
640	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
641	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
642	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
643	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
644	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
645	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
646	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
647	3:55:00 PM	0%	20.90%	0.7	0	30.0 °C
648	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
649	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
650	3:56:00 PM	0%	20.90%	0.6	0	30.0 °C
651	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
652	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
653	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
654	3:56:00 PM	0%	20.90%	0.6	0	30.0 °C

655	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
656	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
657	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
658	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
659	3:56:00 PM	0%	20.90%	0.7	0	30.0 °C
660	3:57:00 PM	0%	20.90%	0.7	0	30.0 °C
661	3:57:00 PM	0%	20.90%	0.7	0	30.0 °C
662	3:57:00 PM	0%	20.90%	0.7	0	30.0 °C
663	3:57:00 PM	0%	20.90%	0.7	0	30.0 °C
664	3:57:00 PM	0%	20.90%	0.7	0	30.0 °C
665	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
666	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
667	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
668	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
669	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
670	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
671	3:57:00 PM	0%	20.90%	0.7	0	30.1 °C
672	3:58:00 PM	0%	20.90%	0.7	0	30.1 °C
673	3:58:00 PM	0%	20.90%	0.7	0	30.1 °C
674	3:58:00 PM	0%	20.90%	0.6	0	30.2 °C
675	3:58:00 PM	0%	20.90%	0.7	0	30.2 °C
676	3:58:00 PM	0%	20.90%	0.7	0	30.2 °C
677	3:58:00 PM	0%	20.90%	0.7	0	30.2 °C
678	3:58:00 PM	0%	20.90%	0.7	0	30.2 °C
679	3:58:00 PM	0%	20.90%	0.7	0	30.2 °C
680	3:58:00 PM	0%	20.90%	0.7	0	30.3 °C
681	3:58:00 PM	0%	20.90%	0.7	0	30.3 °C
682	3:58:00 PM	0%	20.90%	0.7	0	30.3 °C
683	3:58:00 PM	0%	20.90%	0.6	0	30.3 °C
684	3:59:00 PM	0%	20.90%	0.7	0	30.3 °C
685	3:59:00 PM	0%	20.90%	0.7	0	30.3 °C
686	3:59:00 PM	0%	20.90%	0.7	0	30.4 °C
687	3:59:00 PM	0%	20.90%	0.6	0	30.4 °C
688	3:59:00 PM	0%	20.90%	0.7	0	30.4 °C
689	3:59:00 PM	0%	20.90%	0.7	0	30.4 °C
690	3:59:00 PM	0%	20.90%	0.7	0	30.4 °C
691	3:59:00 PM	0%	20.90%	0.7	0	30.4 °C
692	3:59:00 PM	0%	20.90%	0.7	0	30.4 °C
693	3:59:00 PM	0%	20.90%	0.7	0	30.5 °C
694	3:59:00 PM	0%	20.90%	0.7	0	30.5 °C
695	3:59:00 PM	0%	20.90%	0.7	0	30.5 °C
696	4:00:00 PM	0%	20.90%	0.7	0	30.5 °C
697	4:00:00 PM	0%	20.90%	0.7	0	30.5 °C
698	4:00:00 PM	0%	21.00%	0.7	0	30.5 °C
699	4:00:00 PM	0%	21.00%	0.6	0	30.5 °C
700	4:00:00 PM	0%	21.00%	0.7	0	30.5 °C
701	4:00:00 PM	0%	21.00%	0.7	0	30.6 °C
702	4:00:00 PM	0%	21.00%	0.7	0	30.6 °C
703	4:00:00 PM	0%	21.00%	0.7	0	30.6 °C

704	4:00:00 PM	0%	21.00%	0.7	0	30.6 °C
705	4:00:00 PM	0%	21.00%	0.6	0	30.6 °C
706	4:00:00 PM	0%	21.00%	0.6	0	30.6 °C
707	4:00:00 PM	0%	21.00%	0.6	0	30.6 °C
708	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
709	4:01:00 PM	0%	21.00%	0.7	0	30.6 °C
710	4:01:00 PM	0%	21.00%	0.7	0	30.6 °C
711	4:01:00 PM	0%	21.00%	0.7	0	30.6 °C
712	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
713	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
714	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
715	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
716	4:01:00 PM	0%	21.00%	0.7	0	30.6 °C
717	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
718	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
719	4:01:00 PM	0%	21.00%	0.6	0	30.6 °C
720	4:02:00 PM	0%	21.00%	0.6	0	30.6 °C
183	3:17:16 PM	0%	20.90%	0.7	0	29.1 °C
184	3:17:21 PM	0%	20.90%	0.6	0	29.1 °C
185	3:17:26 PM	0%	20.90%	0.6	0	29.1 °C
186	3:17:31 PM	0%	20.90%	0.6	0	29.1 °C
187	3:17:36 PM	0%	20.90%	0.7	0	29.1 °C
188	3:17:41 PM	0%	20.90%	0.7	0	29.2 °C
189	3:17:46 PM	0%	20.90%	0.7	0	29.2 °C
190	3:17:51 PM	0%	20.90%	0.7	0	29.2 °C
191	3:17:56 PM	0%	20.90%	0.7	0	29.2 °C
192	3:18:01 PM	0%	20.90%	0.7	0	29.2 °C
193	3:18:06 PM	0%	20.90%	0.7	0	29.2 °C
194	3:18:11 PM	0%	20.90%	0.7	0	29.2 °C
195	3:18:16 PM	0%	20.90%	0.7	0	29.2 °C
196	3:18:21 PM	0%	20.90%	0.7	0	29.2 °C
197	3:18:26 PM	0%	20.90%	0.7	0	29.2 °C
198	3:18:31 PM	0%	20.90%	0.6	0	29.2 °C
199	3:18:36 PM	0%	20.90%	0.7	0	29.2 °C
200	3:18:41 PM	0%	20.90%	0.7	0	29.2 °C
201	3:18:46 PM	0%	20.90%	0.6	0	29.2 °C
202	3:18:51 PM	0%	20.90%	0.7	0	29.2 °C
203	3:18:56 PM	0%	20.90%	0.7	0	29.2 °C
204	3:19:01 PM	0%	20.90%	0.7	0	29.2 °C
205	3:19:06 PM	0%	20.90%	0.6	0	29.2 °C
206	3:19:11 PM	0%	20.90%	0.6	0	29.2 °C
207	3:19:16 PM	0%	20.90%	0.7	0	29.2 °C
208	3:19:21 PM	0%	20.90%	0.6	0	29.2 °C
209	3:19:26 PM	0%	20.90%	0.7	0	29.2 °C
210	3:19:31 PM	0%	20.90%	0.6	0	29.2 °C
211	3:19:36 PM	0%	20.90%	0.7	0	29.2 °C
212	3:19:41 PM	0%	20.90%	0.7	0	29.2 °C
213	3:19:46 PM	0%	20.90%	0.7	0	29.3 °C
214	3:19:51 PM	0%	20.90%	0.6	0	29.3 °C

215	3:19:56 PM	0%	20.90%	0.7	0	29.3 °C
216	3:20:01 PM	0%	20.90%	0.7	0	29.3 °C
217	3:20:06 PM	0%	20.90%	0.6	0	29.3 °C
218	3:20:11 PM	0%	20.90%	0.6	0	29.3 °C
219	3:20:16 PM	0%	20.90%	0.7	0	29.3 °C
220	3:20:21 PM	0%	20.90%	0.7	0	29.3 °C
221	3:20:26 PM	0%	20.90%	0.6	0	29.3 °C
222	3:20:31 PM	0%	20.90%	0.6	0	29.3 °C
223	3:20:36 PM	0%	20.90%	0.6	0	29.3 °C
224	3:20:41 PM	0%	20.90%	0.7	0	29.3 °C
225	3:20:46 PM	0%	20.90%	0.6	0	29.3 °C
226	3:20:51 PM	0%	20.90%	0.6	0	29.3 °C
227	3:20:56 PM	0%	20.90%	0.6	0	29.3 °C
228	3:21:01 PM	0%	20.90%	0.6	0	29.3 °C
229	3:21:06 PM	0%	20.90%	0.6	0	29.3 °C
230	3:21:11 PM	0%	20.90%	0.6	0	29.3 °C
231	3:21:16 PM	0%	20.90%	0.6	0	29.3 °C
232	3:21:21 PM	0%	20.90%	0.6	0	29.3 °C
233	3:21:26 PM	0%	20.90%	0.6	0	29.3 °C
234	3:21:31 PM	0%	20.90%	0.6	0	29.3 °C
235	3:21:36 PM	0%	20.90%	0.6	0	29.3 °C
236	3:21:41 PM	0%	20.90%	0.6	0	29.4 °C
237	3:21:46 PM	0%	20.90%	0.6	0	29.3 °C
238	3:21:51 PM	0%	20.90%	0.6	0	29.4 °C
239	3:21:56 PM	0%	21.00%	0.6	0	29.3 °C
240	3:22:01 PM	0%	21.00%	0.6	0	29.3 °C
241	3:22:06 PM	0%	20.90%	0.6	0	29.3 °C
242	3:22:11 PM	0%	20.90%	0.6	0	29.3 °C
243	3:22:16 PM	0%	20.90%	0.6	0	29.3 °C
244	3:22:21 PM	0%	20.90%	0.6	0	29.3 °C
245	3:22:26 PM	0%	20.90%	0.6	0	29.3 °C
246	3:22:31 PM	0%	20.90%	0.6	0	29.3 °C
247	3:22:36 PM	0%	20.90%	0.6	0	29.3 °C
248	3:22:41 PM	0%	20.90%	0.6	0	29.3 °C
249	3:22:46 PM	0%	20.90%	0.6	0	29.3 °C
250	3:22:51 PM	0%	21.00%	0.6	0	29.3 °C
251	3:22:56 PM	0%	21.00%	0.6	0	29.3 °C
252	3:23:01 PM	0%	21.00%	0.6	0	29.3 °C
253	3:23:06 PM	0%	21.00%	0.6	0	29.3 °C
254	3:23:11 PM	0%	20.90%	0.6	0	29.3 °C
255	3:23:16 PM	0%	20.90%	0.6	0	29.3 °C
256	3:23:21 PM	0%	20.90%	0.6	0	29.3 °C
257	3:23:26 PM	0%	21.00%	0.6	0	29.3 °C
258	3:23:31 PM	0%	21.00%	0.6	0	29.3 °C
259	3:23:36 PM	0%	21.00%	0.6	0	29.3 °C
260	3:23:41 PM	0%	21.00%	0.6	0	29.3 °C
261	3:23:46 PM	0%	20.90%	0.6	0	29.3 °C
262	3:23:51 PM	0%	20.90%	0.6	0	29.3 °C
263	3:23:56 PM	0%	20.90%	0.6	0	29.3 °C

264	3:24:01 PM	0%	20.90%	0.6	0	29.3 °C
265	3:24:06 PM	0%	21.00%	0.6	0	29.3 °C
266	3:24:11 PM	0%	20.90%	0.6	0	29.3 °C
267	3:24:16 PM	0%	20.90%	0.6	0	29.3 °C
268	3:24:21 PM	0%	21.00%	0.6	0	29.3 °C
269	3:24:26 PM	0%	21.00%	0.6	0	29.3 °C
270	3:24:31 PM	0%	21.00%	0.6	0	29.3 °C
271	3:24:36 PM	0%	21.00%	0.6	0	29.3 °C
272	3:24:41 PM	0%	21.00%	0.6	0	29.3 °C
273	3:24:46 PM	0%	21.00%	0.6	0	29.3 °C
274	3:24:51 PM	0%	21.00%	0.6	0	29.3 °C
275	3:24:56 PM	0%	21.00%	0.6	0	29.3 °C
276	3:25:01 PM	0%	21.00%	0.6	0	29.3 °C
277	3:25:06 PM	0%	21.00%	0.6	0	29.3 °C
278	3:25:11 PM	0%	20.90%	0.6	0	29.3 °C
279	3:25:16 PM	0%	20.90%	0.6	0	29.3 °C
280	3:25:21 PM	0%	20.90%	0.6	0	29.3 °C
281	3:25:26 PM	0%	21.00%	0.6	0	29.3 °C
282	3:25:31 PM	0%	21.00%	0.6	0	29.3 °C
283	3:25:36 PM	0%	21.00%	0.7	0	29.3 °C
284	3:25:41 PM	0%	21.00%	0.6	0	29.3 °C
285	3:25:46 PM	0%	21.00%	0.6	0	29.3 °C
286	3:25:51 PM	0%	21.00%	0.6	0	29.3 °C
287	3:25:56 PM	0%	21.00%	0.6	0	29.3 °C
288	3:26:01 PM	0%	21.00%	0.6	0	29.3 °C
289	3:26:06 PM	0%	20.90%	0.6	0	29.3 °C
290	3:26:11 PM	0%	20.90%	0.6	0	29.3 °C
291	3:26:16 PM	0%	20.90%	0.6	0	29.3 °C
292	3:26:21 PM	0%	20.90%	0.6	0	29.3 °C
293	3:26:26 PM	0%	20.90%	0.6	0	29.3 °C
294	3:26:31 PM	0%	20.90%	0.6	0	29.3 °C
295	3:26:36 PM	0%	20.90%	0.6	0	29.3 °C
296	3:26:41 PM	0%	20.90%	0.6	0	29.3 °C
297	3:26:46 PM	0%	20.90%	0.6	0	29.3 °C
298	3:26:51 PM	0%	20.90%	0.6	0	29.3 °C
299	3:26:56 PM	0%	20.90%	0.7	0	29.3 °C
300	3:27:01 PM	0%	20.90%	0.6	0	29.3 °C
301	3:27:06 PM	0%	20.90%	0.7	0	29.3 °C
302	3:27:11 PM	0%	20.90%	0.6	0	29.3 °C
303	3:27:16 PM	0%	20.90%	0.6	0	29.3 °C
304	3:27:21 PM	0%	20.90%	0.7	0	29.3 °C
305	3:27:26 PM	0%	21.00%	0.6	0	29.3 °C
306	3:27:31 PM	0%	20.90%	0.6	0	29.3 °C
307	3:27:36 PM	0%	20.90%	0.6	0	29.3 °C
308	3:27:41 PM	0%	20.90%	0.7	0	29.3 °C
309	3:27:46 PM	0%	20.90%	0.6	0	29.3 °C
310	3:27:51 PM	0%	21.00%	0.6	0	29.3 °C
311	3:27:56 PM	0%	21.00%	0.6	0	29.3 °C
312	3:28:01 PM	0%	20.90%	0.6	0	29.3 °C

313	3:28:06 PM	0%	20.90%	0.6	0	29.3 °C
314	3:28:11 PM	0%	20.90%	0.6	0	29.3 °C
315	3:28:16 PM	0%	20.90%	0.6	0	29.3 °C
316	3:28:21 PM	0%	20.90%	0.6	0	29.3 °C
317	3:28:26 PM	0%	20.90%	0.6	0	29.3 °C
318	3:28:31 PM	0%	20.90%	0.6	0	29.3 °C
319	3:28:36 PM	0%	20.90%	0.6	0	29.3 °C
320	3:28:41 PM	0%	20.90%	0.6	4	29.3 °C
321	3:28:46 PM	0%	20.90%	0.6	4	29.3 °C
322	3:28:51 PM	0%	20.90%	0.6	3	29.3 °C
323	3:28:56 PM	0%	20.90%	0.6	2	29.3 °C
324	3:29:01 PM	0%	20.90%	0.6	0	29.3 °C
325	3:29:06 PM	0%	20.90%	0.6	0	29.3 °C
326	3:29:11 PM	0%	20.90%	0.6	0	29.3 °C
327	3:29:16 PM	0%	21.00%	0.6	0	29.3 °C
328	3:29:21 PM	0%	21.00%	0.6	0	29.3 °C
329	3:29:26 PM	0%	20.90%	0.6	0	29.3 °C
330	3:29:31 PM	0%	20.90%	0.6	0	29.3 °C
331	3:29:36 PM	0%	21.00%	0.6	0	29.3 °C
332	3:29:41 PM	0%	21.00%	0.6	0	29.3 °C
333	3:29:46 PM	0%	21.00%	0.6	0	29.3 °C
334	3:29:51 PM	0%	21.00%	0.6	0	29.3 °C
335	3:29:56 PM	0%	21.00%	0.6	0	29.3 °C
336	3:30:01 PM	0%	21.00%	0.6	0	29.3 °C
337	3:30:06 PM	0%	21.00%	0.6	0	29.3 °C
338	3:30:11 PM	0%	21.00%	0.6	0	29.3 °C
339	3:30:16 PM	0%	21.00%	0.6	0	29.3 °C
340	3:30:21 PM	0%	20.90%	0.6	0	29.3 °C
341	3:30:26 PM	0%	20.90%	0.6	0	29.3 °C
342	3:30:31 PM	0%	21.00%	0.6	0	29.3 °C
343	3:30:36 PM	0%	21.00%	0.6	0	29.3 °C
344	3:30:41 PM	0%	21.00%	0.6	0	29.3 °C
345	3:30:46 PM	0%	21.00%	0.6	0	29.3 °C
346	3:30:51 PM	0%	21.00%	0.6	0	29.3 °C
347	3:30:56 PM	0%	21.00%	0.6	0	29.3 °C
348	3:31:01 PM	0%	21.00%	0.6	0	29.3 °C
349	3:31:06 PM	0%	21.00%	0.7	2	29.3 °C
350	3:31:11 PM	0%	21.00%	0.7	2	29.3 °C
351	3:31:16 PM	0%	21.00%	0.6	2	29.3 °C
352	3:31:21 PM	0%	21.00%	0.6	2	29.3 °C
353	3:31:26 PM	0%	20.90%	0.7	4	29.3 °C
354	3:31:31 PM	0%	20.90%	0.7	9	29.3 °C
355	3:31:36 PM	0%	20.90%	0.7	6	29.3 °C
356	3:31:41 PM	0%	20.90%	0.6	4	29.3 °C
357	3:31:46 PM	0%	20.90%	0.7	7	29.3 °C
358	3:31:51 PM	0%	20.90%	0.6	6	29.3 °C
359	3:31:56 PM	0%	20.90%	0.7	6	29.3 °C
360	3:32:01 PM	0%	20.90%	0.8	20	29.3 °C
361	3:32:06 PM	0%	20.90%	0.8	27	29.3 °C

362	3:32:11 PM	0%	20.90%	0.9	49	29.3 °C
363	3:32:16 PM	0%	20.90%	0.8	50	29.3 °C
364	3:32:21 PM	0%	20.90%	0.6	34	29.3 °C
365	3:32:26 PM	0%	20.90%	0.6	11	29.3 °C
366	3:32:31 PM	0%	20.90%	0.6	5	29.3 °C
367	3:32:36 PM	0%	20.90%	0.6	8	29.3 °C
368	3:32:41 PM	0%	20.90%	0.6	10	29.3 °C
369	3:32:46 PM	0%	20.90%	0.8	23	29.3 °C
370	3:32:51 PM	0%	20.90%	0.8	47	29.3 °C
371	3:32:56 PM	0%	20.90%	0.8	46	29.3 °C
372	3:33:01 PM	0%	20.90%	0.5	12	29.3 °C
373	3:33:06 PM	0%	20.90%	0.6	2	29.3 °C
374	3:33:11 PM	0%	20.90%	0.6	0	29.3 °C
375	3:33:16 PM	0%	20.90%	0.6	0	29.3 °C
376	3:33:21 PM	0%	20.90%	0.6	0	29.3 °C
377	3:33:26 PM	0%	20.90%	0.6	0	29.3 °C
378	3:33:31 PM	0%	20.90%	0.6	0	29.3 °C
379	3:33:36 PM	0%	20.90%	0.6	0	29.3 °C
380	3:33:41 PM	0%	20.90%	0.6	0	29.3 °C
381	3:33:46 PM	0%	20.90%	0.6	0	29.3 °C
382	3:33:51 PM	0%	20.90%	0.6	0	29.3 °C
383	3:33:56 PM	0%	20.90%	0.6	0	29.3 °C
384	3:34:01 PM	0%	20.90%	0.6	0	29.3 °C
385	3:34:06 PM	0%	20.90%	0.6	0	29.3 °C
386	3:34:11 PM	0%	20.90%	0.6	0	29.3 °C
387	3:34:16 PM	0%	20.90%	0.6	0	29.3 °C
388	3:34:21 PM	0%	20.90%	0.6	0	29.3 °C
389	3:34:26 PM	0%	20.90%	0.6	0	29.3 °C
390	3:34:31 PM	0%	20.90%	0.6	0	29.3 °C
391	3:34:36 PM	0%	20.90%	0.6	0	29.3 °C
392	3:34:41 PM	0%	20.90%	0.6	0	29.3 °C
393	3:34:46 PM	0%	20.90%	0.6	0	29.3 °C
394	3:34:51 PM	0%	20.90%	0.6	0	29.3 °C
395	3:34:56 PM	0%	20.90%	0.6	0	29.3 °C
396	3:35:01 PM	0%	20.90%	0.6	0	29.3 °C
397	3:35:06 PM	0%	20.90%	0.6	0	29.3 °C
398	3:35:11 PM	0%	20.90%	0.6	0	29.3 °C
399	3:35:16 PM	0%	20.90%	0.6	0	29.3 °C
400	3:35:21 PM	0%	20.90%	0.6	0	29.3 °C
401	3:35:26 PM	0%	20.90%	0.6	0	29.3 °C
402	3:35:31 PM	0%	20.90%	0.6	0	29.3 °C
403	3:35:36 PM	0%	20.90%	0.6	0	29.3 °C
404	3:35:41 PM	0%	20.90%	0.6	0	29.3 °C
405	3:35:46 PM	0%	20.90%	0.6	0	29.3 °C
406	3:35:51 PM	0%	20.90%	0.6	0	29.3 °C
407	3:35:56 PM	0%	20.90%	0.6	0	29.3 °C
408	3:36:01 PM	0%	20.90%	0.6	0	29.3 °C
409	3:36:06 PM	0%	20.90%	0.6	0	29.4 °C
410	3:36:11 PM	0%	20.90%	0.6	0	29.4 °C

411	3:36:16 PM	0%	20.90%	0.6	0	29.4 °C
412	3:36:21 PM	0%	20.90%	0.6	0	29.4 °C
413	3:36:26 PM	0%	20.90%	0.6	0	29.4 °C
414	3:36:31 PM	0%	20.90%	0.6	0	29.4 °C
415	3:36:36 PM	0%	20.90%	0.6	0	29.4 °C
416	3:36:41 PM	0%	20.90%	0.6	0	29.4 °C
417	3:36:46 PM	0%	20.90%	0.6	0	29.4 °C
418	3:36:51 PM	0%	20.90%	0.6	0	29.4 °C
419	3:36:56 PM	0%	20.90%	0.6	0	29.4 °C
420	3:37:01 PM	0%	20.90%	0.6	0	29.4 °C
421	3:37:06 PM	0%	20.90%	0.6	0	29.4 °C
422	3:37:11 PM	0%	20.90%	0.6	0	29.4 °C
423	3:37:16 PM	0%	20.90%	0.6	0	29.4 °C
424	3:37:21 PM	0%	20.90%	0.6	0	29.4 °C
425	3:37:26 PM	0%	20.90%	0.6	0	29.5 °C
426	3:37:31 PM	0%	20.90%	0.6	0	29.5 °C
427	3:37:36 PM	0%	20.90%	0.6	0	29.5 °C
428	3:37:41 PM	0%	20.90%	0.6	0	29.5 °C
429	3:37:46 PM	0%	20.90%	0.6	0	29.5 °C
430	3:37:51 PM	0%	20.90%	0.6	0	29.5 °C
431	3:37:56 PM	0%	20.90%	0.6	0	29.5 °C
432	3:38:01 PM	0%	20.90%	0.6	0	29.5 °C
433	3:38:06 PM	0%	20.90%	0.6	0	29.5 °C
434	3:38:11 PM	0%	20.90%	0.6	0	29.5 °C
435	3:38:16 PM	0%	20.90%	0.6	0	29.6 °C
436	3:38:21 PM	0%	20.90%	0.6	0	29.6 °C
437	3:38:26 PM	0%	20.90%	0.6	0	29.6 °C
438	3:38:31 PM	0%	20.90%	0.6	0	29.6 °C
439	3:38:36 PM	0%	20.90%	0.6	0	29.6 °C
440	3:38:41 PM	0%	20.90%	0.6	0	29.6 °C
441	3:38:46 PM	0%	20.90%	0.6	0	29.6 °C
442	3:38:51 PM	0%	20.90%	0.6	0	29.6 °C
443	3:38:56 PM	0%	20.90%	0.6	0	29.6 °C
444	3:39:01 PM	0%	20.90%	0.6	0	29.6 °C
445	3:39:06 PM	0%	20.90%	0.6	0	29.6 °C
446	3:39:11 PM	0%	20.90%	0.6	0	29.6 °C
447	3:39:16 PM	0%	20.90%	0.6	0	29.7 °C
448	3:39:21 PM	0%	21.00%	0.6	0	29.7 °C
449	3:39:26 PM	0%	20.90%	0.6	0	29.7 °C
450	3:39:31 PM	0%	20.90%	0.6	0	29.7 °C
451	3:39:36 PM	0%	20.90%	0.6	0	29.7 °C
452	3:39:41 PM	0%	20.90%	0.6	0	29.7 °C
453	3:39:46 PM	0%	21.00%	0.6	0	29.7 °C
454	3:39:51 PM	0%	21.00%	0.6	0	29.7 °C
455	3:39:56 PM	0%	21.00%	0.6	0	29.7 °C
456	3:40:01 PM	0%	21.00%	0.6	0	29.7 °C
457	3:40:06 PM	0%	21.00%	0.6	0	29.7 °C
458	3:40:11 PM	0%	21.00%	0.6	0	29.7 °C
459	3:40:16 PM	0%	21.00%	0.6	0	29.7 °C

460	3:40:21 PM	0%	21.00%	0.6	0	29.7 °C
461	3:40:26 PM	0%	21.00%	0.6	0	29.8 °C
462	3:40:31 PM	0%	21.00%	0.6	0	29.8 °C
463	3:40:36 PM	0%	21.00%	0.6	0	29.8 °C
464	3:40:41 PM	0%	21.00%	0.6	0	29.8 °C
465	3:40:46 PM	0%	21.00%	0.6	0	29.8 °C
466	3:40:51 PM	0%	21.00%	0.6	0	29.8 °C
467	3:40:56 PM	0%	21.00%	0.6	0	29.8 °C
468	3:41:01 PM	0%	21.00%	0.6	0	29.8 °C
469	3:41:06 PM	0%	21.00%	0.6	0	29.8 °C
470	3:41:11 PM	0%	20.90%	0.6	0	29.8 °C
471	3:41:16 PM	0%	20.90%	0.6	0	29.8 °C
472	3:41:21 PM	0%	20.90%	0.6	0	29.8 °C
473	3:41:26 PM	0%	20.90%	0.6	0	29.8 °C
474	3:41:31 PM	0%	21.00%	0.6	0	29.8 °C
475	3:41:36 PM	0%	21.00%	0.6	0	29.8 °C
476	3:41:41 PM	0%	21.00%	0.6	0	29.8 °C
477	3:41:46 PM	0%	21.00%	0.6	0	29.8 °C
478	3:41:51 PM	0%	21.00%	0.6	0	29.8 °C
479	3:41:56 PM	0%	21.00%	0.6	0	29.8 °C
480	3:42:01 PM	0%	20.90%	0.6	0	29.8 °C
481	3:42:06 PM	0%	20.90%	0.6	0	29.8 °C
482	3:42:11 PM	0%	20.90%	0.6	0	29.8 °C
483	3:42:16 PM	0%	20.90%	0.6	0	29.8 °C
484	3:42:21 PM	0%	20.90%	0.6	0	29.8 °C
485	3:42:26 PM	0%	20.90%	0.6	0	29.8 °C
486	3:42:31 PM	0%	20.90%	0.6	0	29.8 °C
487	3:42:36 PM	0%	20.90%	0.6	0	29.8 °C
488	3:42:41 PM	0%	20.90%	0.6	0	29.8 °C
489	3:42:46 PM	0%	20.90%	0.7	0	29.8 °C
490	3:42:51 PM	0%	20.90%	0.6	0	29.8 °C
491	3:42:56 PM	0%	20.90%	0.6	0	29.8 °C
492	3:43:01 PM	0%	20.90%	0.6	0	29.8 °C
493	3:43:06 PM	0%	20.90%	0.7	0	29.8 °C
494	3:43:11 PM	0%	20.90%	0.6	0	29.8 °C
495	3:43:16 PM	0%	20.90%	0.7	0	29.8 °C
496	3:43:21 PM	0%	20.90%	0.6	0	29.8 °C
497	3:43:26 PM	0%	20.90%	0.6	0	29.8 °C
498	3:43:31 PM	0%	20.90%	0.7	0	29.8 °C
499	3:43:36 PM	0%	20.90%	0.6	0	29.8 °C
500	3:43:41 PM	0%	20.90%	0.6	0	29.8 °C
501	3:43:46 PM	0%	20.90%	0.6	0	29.8 °C
502	3:43:51 PM	0%	21.00%	0.6	0	29.8 °C
503	3:43:56 PM	0%	21.00%	0.6	0	29.8 °C
504	3:44:01 PM	0%	20.90%	0.7	0	29.8 °C
505	3:44:06 PM	0%	20.90%	0.6	0	29.8 °C
506	3:44:11 PM	0%	21.00%	0.6	0	29.8 °C
507	3:44:16 PM	0%	21.00%	0.7	0	29.8 °C
508	3:44:21 PM	0%	21.00%	0.6	0	29.8 °C

509	3:44:26 PM	0%	21.00%	0.6	0	29.8 °C
510	3:44:31 PM	0%	21.00%	0.6	0	29.8 °C
511	3:44:36 PM	0%	21.00%	0.6	0	29.8 °C
512	3:44:41 PM	0%	21.00%	0.6	0	29.8 °C
513	3:44:46 PM	0%	21.00%	0.6	0	29.8 °C
514	3:44:51 PM	0%	21.00%	0.6	0	29.8 °C
515	3:44:56 PM	0%	20.90%	0.7	0	29.9 °C
516	3:45:01 PM	0%	20.90%	0.6	0	29.9 °C
517	3:45:06 PM	0%	20.90%	0.6	0	29.9 °C
518	3:45:11 PM	0%	20.90%	0.6	0	29.9 °C
519	3:45:16 PM	0%	21.00%	0.7	0	29.9 °C
520	3:45:21 PM	0%	21.00%	0.6	0	29.9 °C
521	3:45:26 PM	0%	21.00%	0.6	0	29.9 °C
522	3:45:31 PM	0%	21.00%	0.7	0	29.9 °C
523	3:45:36 PM	0%	21.00%	0.6	0	29.9 °C
524	3:45:41 PM	0%	21.00%	0.6	0	29.9 °C
525	3:45:46 PM	0%	21.00%	0.7	0	29.9 °C
526	3:45:51 PM	0%	20.90%	0.6	0	29.9 °C
527	3:45:56 PM	0%	21.00%	0.6	0	29.9 °C
528	3:46:01 PM	0%	21.00%	0.6	0	29.9 °C
529	3:46:06 PM	0%	21.00%	0.6	0	29.9 °C
530	3:46:11 PM	0%	21.00%	0.6	0	29.9 °C
531	3:46:16 PM	0%	21.00%	0.7	0	29.9 °C
532	3:46:21 PM	0%	21.00%	0.7	0	29.9 °C
533	3:46:26 PM	0%	21.00%	0.7	0	29.9 °C
534	3:46:31 PM	0%	21.00%	0.7	0	29.9 °C
535	3:46:36 PM	0%	21.00%	0.6	0	29.9 °C
536	3:46:41 PM	0%	21.00%	0.6	0	29.9 °C
537	3:46:46 PM	0%	21.00%	0.6	0	29.9 °C
538	3:46:51 PM	0%	21.00%	0.6	0	29.9 °C
539	3:46:56 PM	0%	20.90%	0.6	0	29.9 °C
540	3:47:01 PM	0%	20.90%	0.7	0	29.9 °C
541	3:47:06 PM	0%	20.90%	0.7	0	29.9 °C
542	3:47:11 PM	0%	21.00%	0.6	0	29.9 °C
543	3:47:16 PM	0%	21.00%	0.6	0	29.9 °C
544	3:47:21 PM	0%	21.00%	0.6	0	29.9 °C
545	3:47:26 PM	0%	21.00%	0.6	0	29.9 °C
546	3:47:31 PM	0%	21.00%	0.7	0	29.9 °C
547	3:47:36 PM	0%	21.00%	0.7	0	29.9 °C
548	3:47:41 PM	0%	21.00%	0.7	0	29.9 °C
549	3:47:46 PM	0%	21.00%	0.6	0	29.9 °C
550	3:47:51 PM	0%	21.00%	0.6	0	29.9 °C
551	3:47:56 PM	0%	21.00%	0.7	0	29.9 °C
552	3:48:01 PM	0%	21.00%	0.7	0	29.9 °C
553	3:48:06 PM	0%	21.00%	0.6	0	29.9 °C
554	3:48:11 PM	0%	21.00%	0.6	0	29.9 °C
555	3:48:16 PM	0%	21.00%	0.7	0	29.9 °C
556	3:48:21 PM	0%	21.00%	0.7	0	29.9 °C
557	3:48:26 PM	0%	21.00%	0.6	0	29.9 °C

558	3:48:31 PM	0%	21.00%	0.6	0	29.9 °C
559	3:48:36 PM	0%	21.00%	0.7	0	29.9 °C
560	3:48:41 PM	0%	21.00%	0.7	0	29.9 °C
561	3:48:46 PM	0%	21.00%	0.6	0	29.9 °C
562	3:48:51 PM	0%	21.00%	0.7	0	29.9 °C
563	3:48:56 PM	0%	21.00%	0.6	0	29.9 °C
564	3:49:01 PM	0%	21.00%	0.7	0	29.9 °C
565	3:49:06 PM	0%	21.00%	0.6	0	29.9 °C
566	3:49:11 PM	0%	21.00%	0.7	0	29.9 °C
567	3:49:16 PM	0%	21.00%	0.6	0	29.9 °C
568	3:49:21 PM	0%	21.00%	0.7	0	29.9 °C
569	3:49:26 PM	0%	21.00%	0.6	0	29.9 °C
570	3:49:31 PM	0%	21.00%	0.6	0	29.9 °C
571	3:49:36 PM	0%	21.00%	0.6	0	29.9 °C
572	3:49:41 PM	0%	21.00%	0.7	0	29.9 °C
573	3:49:46 PM	0%	21.00%	0.7	0	29.9 °C
574	3:49:51 PM	0%	21.00%	0.6	0	29.9 °C
575	3:49:56 PM	0%	21.00%	0.6	0	29.9 °C
576	3:50:01 PM	0%	21.00%	0.6	0	29.9 °C
577	3:50:06 PM	0%	21.00%	0.7	0	29.9 °C
578	3:50:11 PM	0%	21.00%	0.6	0	29.9 °C
579	3:50:16 PM	0%	21.00%	0.6	0	29.9 °C
580	3:50:21 PM	0%	21.00%	0.7	0	29.9 °C
581	3:50:26 PM	0%	21.00%	0.7	0	29.9 °C
582	3:50:31 PM	0%	21.00%	0.7	0	29.9 °C
583	3:50:36 PM	0%	21.00%	0.6	0	29.9 °C
584	3:50:41 PM	0%	21.00%	0.6	0	29.9 °C
585	3:50:46 PM	0%	21.00%	0.7	0	29.9 °C
586	3:50:51 PM	0%	20.90%	0.7	0	29.9 °C
587	3:50:56 PM	0%	20.90%	0.7	0	29.9 °C
588	3:51:01 PM	0%	20.90%	0.6	0	29.9 °C
589	3:51:06 PM	0%	20.90%	0.7	0	29.9 °C
590	3:51:11 PM	0%	20.90%	0.7	0	29.9 °C
591	3:51:16 PM	0%	20.90%	0.6	0	29.9 °C
592	3:51:21 PM	0%	20.90%	0.7	0	29.9 °C
593	3:51:26 PM	0%	20.90%	0.6	0	29.9 °C
594	3:51:31 PM	0%	20.90%	0.7	0	29.9 °C
595	3:51:36 PM	0%	20.90%	0.6	0	29.9 °C
596	3:51:41 PM	0%	20.90%	0.7	0	29.9 °C
597	3:51:46 PM	0%	20.90%	0.7	0	30.0 °C
598	3:51:51 PM	0%	21.00%	0.7	0	30.0 °C
599	3:51:56 PM	0%	21.00%	0.7	0	29.9 °C
600	3:52:01 PM	0%	20.90%	0.7	0	30.0 °C
601	3:52:06 PM	0%	20.90%	0.7	0	29.9 °C
602	3:52:11 PM	0%	21.00%	0.6	0	29.9 °C
603	3:52:16 PM	0%	21.00%	0.7	0	30.0 °C
604	3:52:21 PM	0%	21.00%	0.7	0	30.0 °C
605	3:52:26 PM	0%	21.00%	0.6	0	29.9 °C
606	3:52:31 PM	0%	21.00%	0.6	0	30.0 °C

607	3:52:36 PM	0%	21.00%	0.6	0	30.0 °C
608	3:52:41 PM	0%	21.00%	0.6	0	30.0 °C
609	3:52:46 PM	0%	21.00%	0.7	0	30.0 °C
610	3:52:51 PM	0%	21.00%	0.6	0	30.0 °C
611	3:52:56 PM	0%	21.00%	0.7	0	30.0 °C
612	3:53:01 PM	0%	20.90%	0.6	0	30.0 °C
613	3:53:06 PM	0%	20.90%	0.7	0	30.0 °C
614	3:53:11 PM	0%	20.90%	0.7	0	30.0 °C
615	3:53:16 PM	0%	20.90%	0.6	0	30.0 °C
616	3:53:21 PM	0%	20.90%	0.6	0	30.0 °C
617	3:53:26 PM	0%	21.00%	0.7	0	30.0 °C
618	3:53:31 PM	0%	20.90%	0.6	0	30.0 °C
619	3:53:36 PM	0%	20.90%	0.6	0	30.0 °C
620	3:53:41 PM	0%	20.90%	0.7	0	30.0 °C
621	3:53:46 PM	0%	20.90%	0.6	0	30.0 °C
622	3:53:51 PM	0%	20.90%	0.7	0	30.0 °C
623	3:53:56 PM	0%	20.90%	0.7	0	30.0 °C
624	3:54:01 PM	0%	20.90%	0.7	0	30.0 °C
625	3:54:06 PM	0%	20.90%	0.7	0	30.0 °C
626	3:54:11 PM	0%	20.90%	0.7	0	30.0 °C
627	3:54:16 PM	0%	20.90%	0.6	0	30.0 °C
628	3:54:21 PM	0%	20.90%	0.7	0	30.0 °C
629	3:54:26 PM	0%	20.90%	0.7	0	30.0 °C
630	3:54:31 PM	0%	20.90%	0.7	0	30.0 °C
631	3:54:36 PM	0%	20.90%	0.7	0	30.0 °C
632	3:54:41 PM	0%	20.90%	0.7	0	30.0 °C
633	3:54:46 PM	0%	20.90%	0.7	0	30.0 °C
634	3:54:51 PM	0%	20.90%	0.7	0	30.0 °C
635	3:54:56 PM	0%	20.90%	0.7	0	30.0 °C
636	3:55:01 PM	0%	20.90%	0.7	0	30.0 °C
637	3:55:06 PM	0%	20.90%	0.7	0	30.0 °C
638	3:55:11 PM	0%	20.90%	0.7	0	30.0 °C
639	3:55:16 PM	0%	20.90%	0.7	0	30.0 °C
640	3:55:21 PM	0%	20.90%	0.7	0	30.0 °C
641	3:55:26 PM	0%	20.90%	0.7	0	30.0 °C
642	3:55:31 PM	0%	20.90%	0.7	0	30.0 °C
643	3:55:36 PM	0%	20.90%	0.7	0	30.0 °C
644	3:55:41 PM	0%	20.90%	0.7	0	30.0 °C
645	3:55:46 PM	0%	20.90%	0.7	0	30.0 °C
646	3:55:51 PM	0%	20.90%	0.7	0	30.0 °C
647	3:55:56 PM	0%	20.90%	0.7	0	30.0 °C
648	3:56:01 PM	0%	20.90%	0.7	0	30.0 °C
649	3:56:06 PM	0%	20.90%	0.7	0	30.0 °C
650	3:56:11 PM	0%	20.90%	0.6	0	30.0 °C
651	3:56:16 PM	0%	20.90%	0.7	0	30.0 °C
652	3:56:21 PM	0%	20.90%	0.7	0	30.0 °C
653	3:56:26 PM	0%	20.90%	0.7	0	30.0 °C
654	3:56:31 PM	0%	20.90%	0.6	0	30.0 °C
655	3:56:36 PM	0%	20.90%	0.7	0	30.0 °C

656	3:56:41 PM	0%	20.90%	0.7	0	30.0 °C
657	3:56:46 PM	0%	20.90%	0.7	0	30.0 °C
658	3:56:51 PM	0%	20.90%	0.7	0	30.0 °C
659	3:56:56 PM	0%	20.90%	0.7	0	30.0 °C
660	3:57:01 PM	0%	20.90%	0.7	0	30.0 °C
661	3:57:06 PM	0%	20.90%	0.7	0	30.0 °C
662	3:57:11 PM	0%	20.90%	0.7	0	30.0 °C
663	3:57:16 PM	0%	20.90%	0.7	0	30.0 °C
664	3:57:21 PM	0%	20.90%	0.7	0	30.0 °C
665	3:57:26 PM	0%	20.90%	0.7	0	30.1 °C
666	3:57:31 PM	0%	20.90%	0.7	0	30.1 °C
667	3:57:36 PM	0%	20.90%	0.7	0	30.1 °C
668	3:57:41 PM	0%	20.90%	0.7	0	30.1 °C
669	3:57:46 PM	0%	20.90%	0.7	0	30.1 °C
670	3:57:51 PM	0%	20.90%	0.7	0	30.1 °C
671	3:57:56 PM	0%	20.90%	0.7	0	30.1 °C
672	3:58:01 PM	0%	20.90%	0.7	0	30.1 °C
673	3:58:06 PM	0%	20.90%	0.7	0	30.1 °C
674	3:58:11 PM	0%	20.90%	0.6	0	30.2 °C
675	3:58:16 PM	0%	20.90%	0.7	0	30.2 °C
676	3:58:21 PM	0%	20.90%	0.7	0	30.2 °C
677	3:58:26 PM	0%	20.90%	0.7	0	30.2 °C
678	3:58:31 PM	0%	20.90%	0.7	0	30.2 °C
679	3:58:36 PM	0%	20.90%	0.7	0	30.2 °C
680	3:58:41 PM	0%	20.90%	0.7	0	30.3 °C
681	3:58:46 PM	0%	20.90%	0.7	0	30.3 °C
682	3:58:51 PM	0%	20.90%	0.7	0	30.3 °C
683	3:58:56 PM	0%	20.90%	0.6	0	30.3 °C
684	3:59:01 PM	0%	20.90%	0.7	0	30.3 °C
685	3:59:06 PM	0%	20.90%	0.7	0	30.3 °C
686	3:59:11 PM	0%	20.90%	0.7	0	30.4 °C
687	3:59:16 PM	0%	20.90%	0.6	0	30.4 °C
688	3:59:21 PM	0%	20.90%	0.7	0	30.4 °C
689	3:59:26 PM	0%	20.90%	0.7	0	30.4 °C
690	3:59:31 PM	0%	20.90%	0.7	0	30.4 °C
691	3:59:36 PM	0%	20.90%	0.7	0	30.4 °C
692	3:59:41 PM	0%	20.90%	0.7	0	30.4 °C
693	3:59:46 PM	0%	20.90%	0.7	0	30.5 °C
694	3:59:51 PM	0%	20.90%	0.7	0	30.5 °C
695	3:59:56 PM	0%	20.90%	0.7	0	30.5 °C
696	4:00:01 PM	0%	20.90%	0.7	0	30.5 °C
697	4:00:06 PM	0%	20.90%	0.7	0	30.5 °C
698	4:00:11 PM	0%	21.00%	0.7	0	30.5 °C
699	4:00:16 PM	0%	21.00%	0.6	0	30.5 °C
700	4:00:21 PM	0%	21.00%	0.7	0	30.5 °C
701	4:00:26 PM	0%	21.00%	0.7	0	30.6 °C
702	4:00:31 PM	0%	21.00%	0.7	0	30.6 °C
703	4:00:36 PM	0%	21.00%	0.7	0	30.6 °C
704	4:00:41 PM	0%	21.00%	0.7	0	30.6 °C

705	4:00:46 PM	0%	21.00%	0.6	0	30.6 °C
706	4:00:51 PM	0%	21.00%	0.6	0	30.6 °C
707	4:00:56 PM	0%	21.00%	0.6	0	30.6 °C
708	4:01:01 PM	0%	21.00%	0.6	0	30.6 °C
709	4:01:06 PM	0%	21.00%	0.7	0	30.6 °C
710	4:01:11 PM	0%	21.00%	0.7	0	30.6 °C
711	4:01:16 PM	0%	21.00%	0.7	0	30.6 °C
712	4:01:21 PM	0%	21.00%	0.6	0	30.6 °C
713	4:01:26 PM	0%	21.00%	0.6	0	30.6 °C
714	4:01:31 PM	0%	21.00%	0.6	0	30.6 °C
715	4:01:36 PM	0%	21.00%	0.6	0	30.6 °C
716	4:01:41 PM	0%	21.00%	0.7	0	30.6 °C
717	4:01:46 PM	0%	21.00%	0.6	0	30.6 °C
718	4:01:51 PM	0%	21.00%	0.6	0	30.6 °C
719	4:01:56 PM	0%	21.00%	0.6	0	30.6 °C
720	4:02:01 PM	0%	21.00%	0.6	0	30.6 °C

GX-3R Data Sample

Name	al26111754_176023500RN
Date	9/26/2024
Serial No.	176023500RN
Interval Time (sec)	5

Gas(FullScale)	Warning	Alarm	AlarmH	STEL	TWA
CH4(100%LEL)	10 %LEL	25 %LEL	50 %LEL	*****	*****
O2(40.0%)	19.50%	18.00%	23.50%	*****	*****
H2S(200.0ppm)	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
CO(2000ppm)	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm

No	Time	CH4(100%LEL)	O2(40.0%)	H2S(200.0ppm)	CO(2000ppm)	Temperature
240	11:07:00 AM	0%	20.90%	0	0	19.6 °C
241	11:07:00 AM	0%	20.90%	0	0	19.6 °C
242	11:07:00 AM	0%	20.90%	0	0	19.6 °C
243	11:08:00 AM	0%	20.90%	0	0	19.7 °C
244	11:08:00 AM	0%	20.90%	0	0	19.7 °C
245	11:08:00 AM	0%	20.90%	0	0	19.7 °C
246	11:08:00 AM	0%	20.90%	0	0	19.7 °C
247	11:08:00 AM	0%	20.90%	0	0	19.7 °C
248	11:08:00 AM	0%	20.90%	0	0	19.8 °C
249	11:08:00 AM	0%	20.90%	0	0	19.8 °C
250	11:08:00 AM	0%	20.90%	0	0	19.8 °C
251	11:08:00 AM	0%	20.90%	0	0	19.8 °C
252	11:08:00 AM	0%	20.90%	0	0	19.9 °C
253	11:08:00 AM	0%	20.90%	0	0	19.9 °C
254	11:08:00 AM	0%	20.90%	0	0	19.9 °C
255	11:09:00 AM	0%	20.90%	0	0	19.9 °C
256	11:09:00 AM	0%	20.90%	0	0	19.9 °C
257	11:09:00 AM	0%	20.90%	0	0	20.0 °C
258	11:09:00 AM	0%	20.90%	0	0	20.0 °C
259	11:09:00 AM	0%	20.90%	0	0	20.0 °C
260	11:09:00 AM	0%	20.90%	0	0	20.0 °C
261	11:09:00 AM	0%	20.90%	0	0	20.0 °C
262	11:09:00 AM	0%	20.90%	0	0	20.1 °C
263	11:09:00 AM	0%	20.90%	0	0	20.1 °C
264	11:09:00 AM	0%	20.90%	0	0	20.1 °C
265	11:09:00 AM	0%	20.90%	0	0	20.1 °C
266	11:09:00 AM	0%	20.90%	0	0	20.1 °C
267	11:10:00 AM	0%	20.90%	0	0	20.1 °C
268	11:10:00 AM	0%	20.90%	0	0	20.1 °C
269	11:10:00 AM	0%	20.90%	0	0	20.2 °C
270	11:10:00 AM	0%	20.90%	0	0	20.2 °C
271	11:10:00 AM	0%	20.90%	0	0	20.2 °C
272	11:10:00 AM	0%	20.90%	0	0	20.2 °C
273	11:10:00 AM	0%	20.90%	0	0	20.2 °C
274	11:10:00 AM	0%	20.90%	0	0	20.3 °C
275	11:10:00 AM	0%	20.90%	0	0	20.3 °C

276	11:10:00 AM	0%	20.90%	0	0	20.3 °C
277	11:10:00 AM	0%	20.90%	0	0	20.3 °C
278	11:10:00 AM	0%	20.90%	0	0	20.3 °C
279	11:11:00 AM	0%	20.90%	0	0	20.3 °C
280	11:11:00 AM	0%	20.90%	0	0	20.4 °C
281	11:11:00 AM	0%	20.90%	0	0	20.4 °C
282	11:11:00 AM	0%	20.90%	0	0	20.4 °C
283	11:11:00 AM	0%	20.90%	0	0	20.4 °C
284	11:11:00 AM	0%	20.90%	0	0	20.4 °C
285	11:11:00 AM	0%	20.90%	0	0	20.4 °C
286	11:11:00 AM	0%	20.90%	0	0	20.4 °C
287	11:11:00 AM	0%	20.90%	0	0	20.4 °C
288	11:11:00 AM	0%	20.90%	0	0	20.5 °C
289	11:11:00 AM	0%	20.90%	0	0	20.5 °C
290	11:11:00 AM	0%	20.90%	0	0	20.5 °C
291	11:12:00 AM	0%	20.90%	0	0	20.5 °C
292	11:12:00 AM	0%	20.90%	0	0	20.5 °C
293	11:12:00 AM	0%	20.90%	0	0	20.5 °C
294	11:12:00 AM	0%	20.90%	0	0	20.5 °C
295	11:12:00 AM	0%	20.90%	0	0	20.6 °C
296	11:12:00 AM	0%	20.90%	0	0	20.6 °C
297	11:12:00 AM	0%	20.90%	0	0	20.6 °C
298	11:12:00 AM	0%	20.90%	0	0	20.6 °C
299	11:12:00 AM	0%	20.90%	0	0	20.6 °C
300	11:12:00 AM	0%	20.90%	0	0	20.6 °C
301	11:12:00 AM	0%	20.90%	0	0	20.6 °C
302	11:12:00 AM	0%	20.90%	0	0	20.6 °C
303	11:13:00 AM	0%	20.90%	0	0	20.7 °C
304	11:13:00 AM	0%	20.90%	0	0	20.7 °C
305	11:13:00 AM	0%	20.90%	0	0	20.7 °C
306	11:13:00 AM	0%	20.90%	0	0	20.7 °C
307	11:13:00 AM	0%	20.90%	0	0	20.7 °C
308	11:13:00 AM	0%	20.90%	0	0	20.7 °C
309	11:13:00 AM	0%	20.90%	0	0	20.7 °C
310	11:13:00 AM	0%	20.90%	0	0	20.7 °C
311	11:13:00 AM	0%	20.90%	0	0	20.8 °C
312	11:13:00 AM	0%	20.90%	0	0	20.8 °C
313	11:13:00 AM	0%	20.90%	0	0	20.8 °C
314	11:13:00 AM	0%	20.90%	0	0	20.8 °C
315	11:14:00 AM	0%	20.90%	0	0	20.8 °C
316	11:14:00 AM	0%	20.90%	0	0	20.8 °C
317	11:14:00 AM	0%	20.90%	0	0	20.8 °C
318	11:14:00 AM	0%	20.90%	0	0	20.8 °C
319	11:14:00 AM	0%	20.90%	0	0	20.8 °C
320	11:14:00 AM	0%	20.90%	0	0	20.8 °C
321	11:14:00 AM	0%	20.90%	0	0	20.9 °C
322	11:14:00 AM	0%	20.90%	0	0	20.8 °C
323	11:14:00 AM	0%	20.90%	0	0	20.8 °C
324	11:14:00 AM	0%	20.90%	0	0	20.9 °C

325	11:14:00 AM	0%	20.90%	0	0	20.9 °C
326	11:14:00 AM	0%	20.90%	0	0	20.9 °C
327	11:15:00 AM	0%	20.90%	0	0	20.9 °C
328	11:15:00 AM	0%	20.90%	0	0	20.9 °C
329	11:15:00 AM	0%	20.90%	0	0	20.9 °C
330	11:15:00 AM	0%	20.90%	0	0	20.9 °C
331	11:15:00 AM	0%	20.90%	0	0	20.9 °C
332	11:15:00 AM	0%	20.90%	0	0	20.9 °C
333	11:15:00 AM	0%	20.90%	0	0	20.9 °C
334	11:15:00 AM	0%	20.90%	0	0	20.9 °C
335	11:15:00 AM	0%	20.90%	0	0	20.9 °C
336	11:15:00 AM	0%	20.90%	0	0	20.9 °C
337	11:15:00 AM	0%	20.90%	0	0	20.9 °C
338	11:15:00 AM	0%	20.90%	0	0	20.9 °C
339	11:16:00 AM	0%	20.90%	0	0	20.9 °C
340	11:16:00 AM	0%	20.90%	0	0	20.9 °C
341	11:16:00 AM	0%	20.90%	0	0	20.9 °C
342	11:16:00 AM	0%	20.90%	0	0	20.9 °C
343	11:16:00 AM	0%	20.90%	0	0	20.9 °C
344	11:16:00 AM	0%	20.90%	0	0	20.9 °C
345	11:16:00 AM	0%	20.90%	0	0	20.9 °C
346	11:16:00 AM	0%	20.90%	0	2	20.9 °C
347	11:16:00 AM	0%	20.90%	0	2	20.9 °C
348	11:16:00 AM	0%	20.90%	0	3	20.9 °C
349	11:16:00 AM	0%	20.90%	0	3	20.9 °C
350	11:16:00 AM	0%	20.90%	0	4	20.9 °C
351	11:17:00 AM	0%	20.90%	0	4	20.9 °C
352	11:17:00 AM	0%	20.90%	0	4	20.9 °C
353	11:17:00 AM	0%	20.90%	0	5	20.9 °C
354	11:17:00 AM	0%	20.90%	0	5	20.9 °C
355	11:17:00 AM	0%	20.90%	0	5	20.9 °C
356	11:17:00 AM	0%	20.90%	0	5	20.9 °C
357	11:17:00 AM	0%	20.90%	0	5	20.9 °C
358	11:17:00 AM	0%	20.90%	0	5	20.9 °C
359	11:17:00 AM	0%	20.90%	0	5	20.9 °C
360	11:17:00 AM	0%	20.90%	0	11	20.9 °C
361	11:17:00 AM	0%	20.90%	0	25	20.9 °C
362	11:17:00 AM	0%	20.90%	0	27	20.9 °C
363	11:18:00 AM	0%	20.90%	0	27	20.9 °C
364	11:18:00 AM	0%	20.90%	0	23	20.9 °C
365	11:18:00 AM	0%	20.90%	0	22	20.9 °C
366	11:18:00 AM	0%	20.90%	0	21	20.9 °C
367	11:18:00 AM	0%	20.90%	0	21	20.9 °C
368	11:18:00 AM	0%	20.90%	0	21	20.9 °C
369	11:18:00 AM	0%	20.90%	0	19	20.9 °C
370	11:18:00 AM	0%	20.90%	0	19	20.9 °C
371	11:18:00 AM	0%	20.90%	0	16	20.9 °C
372	11:18:00 AM	0%	20.90%	0	14	20.9 °C
373	11:18:00 AM	0%	20.90%	0	14	20.9 °C

374	11:18:00 AM	0%	20.90%	0	12	21.0 °C
375	11:19:00 AM	0%	20.90%	0	11	21.0 °C
376	11:19:00 AM	0%	20.90%	0	12	21.0 °C
377	11:19:00 AM	0%	20.90%	0	13	21.0 °C
378	11:19:00 AM	0%	20.90%	0	14	21.0 °C
379	11:19:00 AM	0%	20.90%	0	15	21.0 °C
380	11:19:00 AM	0%	20.90%	0	15	21.0 °C
381	11:19:00 AM	0%	20.90%	0	15	21.0 °C
382	11:19:00 AM	0%	20.90%	0	14	21.0 °C
383	11:19:00 AM	0%	20.90%	0	13	21.0 °C
384	11:19:00 AM	0%	20.90%	0	12	21.0 °C
385	11:19:00 AM	0%	20.90%	0	11	21.0 °C
386	11:19:00 AM	0%	20.90%	0	8	21.0 °C
387	11:20:00 AM	0%	20.90%	0	6	21.0 °C
388	11:20:00 AM	0%	20.90%	0	6	21.1 °C
389	11:20:00 AM	0%	20.90%	0	5	21.1 °C
390	11:20:00 AM	0%	20.90%	0	4	21.1 °C
391	11:20:00 AM	0%	20.90%	0	4	21.1 °C
392	11:20:00 AM	0%	20.90%	0	3	21.1 °C
393	11:20:00 AM	0%	20.90%	0	2	21.1 °C
394	11:20:00 AM	0%	20.90%	0	2	21.1 °C
395	11:20:00 AM	0%	20.90%	0	2	21.1 °C
396	11:20:00 AM	0%	20.90%	0	2	21.1 °C
397	11:20:00 AM	0%	20.90%	0	2	21.1 °C
398	11:20:00 AM	0%	20.90%	0	2	21.1 °C
399	11:21:00 AM	0%	20.90%	0	0	21.1 °C
400	11:21:00 AM	0%	20.90%	0	0	21.1 °C
401	11:21:00 AM	0%	20.90%	0	0	21.2 °C
402	11:21:00 AM	0%	20.90%	0	0	21.2 °C
403	11:21:00 AM	0%	20.90%	0	0	21.2 °C
404	11:21:00 AM	0%	20.90%	0	0	21.2 °C
405	11:21:00 AM	0%	20.90%	0	0	21.2 °C
406	11:21:00 AM	0%	20.90%	0	0	21.2 °C
407	11:21:00 AM	0%	20.90%	0	0	21.2 °C
408	11:21:00 AM	0%	20.90%	0	0	21.2 °C
409	11:21:00 AM	0%	20.90%	0	0	21.2 °C
410	11:21:00 AM	0%	20.90%	0	0	21.2 °C
411	11:22:00 AM	0%	20.90%	0	0	21.3 °C
412	11:22:00 AM	0%	20.90%	0	0	21.3 °C
413	11:22:00 AM	0%	20.90%	0	0	21.3 °C
414	11:22:00 AM	0%	20.90%	0	0	21.3 °C
415	11:22:00 AM	0%	20.90%	0	0	21.3 °C
416	11:22:00 AM	0%	20.90%	0	0	21.3 °C
417	11:22:00 AM	0%	20.90%	0	0	21.3 °C
418	11:22:00 AM	0%	20.90%	0	0	21.3 °C
419	11:22:00 AM	0%	20.90%	0	0	21.3 °C
420	11:22:00 AM	0%	20.90%	0	0	21.4 °C
421	11:22:00 AM	0%	20.90%	0	0	21.4 °C
422	11:22:00 AM	0%	20.90%	0	0	21.4 °C

423	11:23:00 AM	0%	20.90%	0	0	21.4 °C
424	11:23:00 AM	0%	20.90%	0	0	21.4 °C
425	11:23:00 AM	0%	20.90%	0	0	21.4 °C
426	11:23:00 AM	0%	20.90%	0	0	21.4 °C
427	11:23:00 AM	0%	20.90%	0	0	21.4 °C
428	11:23:00 AM	0%	20.90%	0	0	21.4 °C
429	11:23:00 AM	0%	20.90%	0	0	21.5 °C
430	11:23:00 AM	0%	20.90%	0	0	21.5 °C
431	11:23:00 AM	0%	20.90%	0	0	21.5 °C
432	11:23:00 AM	0%	20.90%	0	0	21.5 °C
433	11:23:00 AM	0%	20.90%	0	0	21.5 °C
434	11:23:00 AM	0%	20.90%	0	0	21.5 °C
435	11:24:00 AM	0%	20.90%	0	0	21.5 °C
436	11:24:00 AM	0%	20.90%	0	0	21.5 °C
437	11:24:00 AM	0%	20.90%	0	0	21.5 °C
438	11:24:00 AM	0%	20.90%	0	0	21.5 °C
439	11:24:00 AM	0%	20.90%	0	0	21.6 °C
440	11:24:00 AM	0%	20.90%	0	2	21.6 °C
441	11:24:00 AM	0%	20.90%	0	3	21.6 °C
442	11:24:00 AM	0%	20.90%	0	6	21.6 °C
443	11:24:00 AM	0%	20.90%	0	8	21.6 °C
444	11:24:00 AM	0%	20.90%	0	10	21.6 °C
445	11:24:00 AM	0%	20.90%	0	10	21.6 °C
446	11:24:00 AM	0%	20.90%	0	15	21.6 °C
447	11:25:00 AM	0%	20.90%	0	15	21.7 °C
448	11:25:00 AM	0%	20.90%	0	12	21.7 °C
449	11:25:00 AM	0%	20.90%	0	11	21.7 °C
450	11:25:00 AM	0%	20.90%	0	5	21.7 °C
451	11:25:00 AM	0%	20.90%	0	0	21.7 °C
452	11:25:00 AM	0%	20.90%	0	0	21.7 °C
453	11:25:00 AM	0%	20.90%	0	0	21.8 °C
454	11:25:00 AM	0%	20.90%	0	0	21.8 °C
455	11:25:00 AM	0%	20.90%	0	0	21.8 °C
456	11:25:00 AM	0%	20.90%	0	0	21.8 °C
457	11:25:00 AM	0%	20.90%	0	0	21.8 °C
458	11:25:00 AM	0%	20.90%	0	0	21.8 °C
459	11:26:00 AM	0%	20.90%	0	0	21.8 °C
460	11:26:00 AM	0%	20.90%	0	0	21.8 °C
461	11:26:00 AM	0%	20.90%	0	0	21.8 °C
462	11:26:00 AM	0%	20.90%	0	0	21.8 °C
463	11:26:00 AM	0%	20.90%	0	0	21.9 °C
464	11:26:00 AM	0%	20.90%	0	0	21.9 °C
465	11:26:00 AM	0%	20.90%	0	0	21.9 °C
466	11:26:00 AM	0%	20.90%	0	0	21.9 °C
467	11:26:00 AM	0%	20.90%	0	0	21.9 °C
468	11:26:00 AM	0%	20.90%	0	0	21.9 °C
469	11:26:00 AM	0%	20.90%	0	0	21.9 °C
470	11:26:00 AM	0%	20.90%	0	0	21.9 °C
471	11:27:00 AM	0%	20.90%	0	0	21.9 °C

472	11:27:00 AM	0%	20.90%	0	0	21.9 °C
473	11:27:00 AM	0%	20.90%	0	0	21.9 °C
474	11:27:00 AM	0%	20.90%	0	0	21.9 °C
475	11:27:00 AM	0%	20.90%	0	0	21.9 °C
476	11:27:00 AM	0%	20.90%	0	0	21.9 °C
477	11:27:00 AM	0%	20.90%	0	0	21.9 °C
478	11:27:00 AM	0%	20.90%	0	0	21.9 °C
479	11:27:00 AM	0%	20.90%	0	0	21.9 °C
480	11:27:00 AM	0%	20.90%	0	0	21.9 °C
481	11:27:00 AM	0%	20.90%	0	0	21.9 °C
482	11:27:00 AM	0%	20.90%	0	0	21.9 °C
483	11:28:00 AM	0%	20.90%	0	0	21.9 °C
484	11:28:00 AM	0%	20.90%	0	0	21.9 °C
485	11:28:00 AM	0%	20.90%	0	0	21.9 °C
486	11:28:00 AM	0%	20.90%	0	0	21.9 °C
487	11:28:00 AM	0%	20.90%	0	0	21.9 °C
488	11:28:00 AM	0%	20.90%	0	0	21.9 °C
489	11:28:00 AM	0%	20.90%	0	0	21.9 °C
490	11:28:00 AM	0%	20.90%	0	0	21.9 °C
491	11:28:00 AM	0%	20.90%	0	0	21.9 °C
492	11:28:00 AM	0%	20.90%	0	0	21.9 °C
493	11:28:00 AM	0%	20.90%	0	0	21.9 °C
494	11:28:00 AM	0%	20.90%	0	0	21.9 °C
495	11:29:00 AM	0%	20.90%	0	0	21.9 °C
496	11:29:00 AM	0%	20.90%	0	0	21.9 °C
497	11:29:00 AM	0%	20.90%	0	0	21.9 °C
498	11:29:00 AM	0%	20.90%	0	0	21.9 °C
499	11:29:00 AM	0%	20.90%	0	0	21.9 °C
500	11:29:00 AM	0%	20.90%	0	0	21.9 °C
501	11:29:00 AM	0%	20.90%	0	0	21.9 °C
502	11:29:00 AM	0%	20.90%	0	0	21.9 °C
503	11:29:00 AM	0%	20.90%	0	0	21.9 °C
504	11:29:00 AM	0%	20.90%	0	0	21.9 °C
505	11:29:00 AM	0%	20.90%	0	0	21.9 °C
506	11:29:00 AM	0%	20.90%	0	0	21.9 °C
507	11:30:00 AM	0%	20.90%	0	0	21.9 °C
508	11:30:00 AM	0%	20.90%	0	0	21.9 °C
509	11:30:00 AM	0%	20.90%	0	0	21.9 °C
510	11:30:00 AM	0%	20.90%	0	0	21.9 °C
511	11:30:00 AM	0%	20.90%	0	0	21.8 °C
512	11:30:00 AM	0%	20.90%	0	0	21.8 °C
513	11:30:00 AM	0%	20.90%	0	0	21.8 °C
514	11:30:00 AM	0%	20.90%	0	0	21.8 °C
515	11:30:00 AM	0%	20.90%	0	0	21.8 °C
516	11:30:00 AM	0%	20.90%	0	0	21.8 °C
517	11:30:00 AM	0%	20.90%	0	0	21.8 °C
518	11:30:00 AM	0%	20.90%	0	0	21.8 °C
519	11:31:00 AM	0%	20.90%	0	0	21.8 °C
520	11:31:00 AM	0%	20.90%	0	0	21.8 °C

521	11:31:00 AM	0%	20.90%	0	0	21.8 °C
522	11:31:00 AM	0%	20.90%	0	0	21.8 °C
523	11:31:00 AM	0%	20.90%	0	0	21.8 °C
524	11:31:00 AM	0%	20.90%	0	0	21.8 °C
525	11:31:00 AM	0%	20.90%	0	0	21.8 °C
526	11:31:00 AM	0%	20.90%	0	0	21.8 °C
527	11:31:00 AM	0%	20.90%	0	0	21.8 °C
528	11:31:00 AM	0%	20.90%	0	0	21.8 °C
529	11:31:00 AM	0%	20.90%	0	0	21.8 °C
530	11:31:00 AM	0%	20.90%	0	0	21.8 °C
531	11:32:00 AM	0%	20.90%	0	0	21.8 °C
532	11:32:00 AM	0%	20.90%	0	0	21.7 °C
533	11:32:00 AM	0%	20.90%	0	0	21.7 °C
534	11:32:00 AM	0%	20.90%	0	0	21.7 °C
535	11:32:00 AM	0%	20.90%	0	0	21.7 °C
536	11:32:00 AM	0%	20.90%	0	0	21.7 °C
537	11:32:00 AM	0%	20.90%	0.3	0	21.7 °C
538	11:32:00 AM	0%	20.90%	0	0	21.7 °C
539	11:32:00 AM	0%	20.90%	0	0	21.7 °C
540	11:32:00 AM	0%	20.90%	0	0	21.7 °C
541	11:32:00 AM	0%	20.90%	0	0	21.7 °C
542	11:32:00 AM	0%	20.90%	1.1	0	21.7 °C
543	11:33:00 AM	3%	20.90%	1.4	0	21.7 °C
544	11:33:00 AM	3%	20.90%	1.3	0	21.7 °C
545	11:33:00 AM	3%	20.90%	0.9	0	21.7 °C
546	11:33:00 AM	1%	20.90%	0.7	0	21.7 °C
547	11:33:00 AM	1%	20.90%	1	0	21.7 °C
548	11:33:00 AM	1%	20.90%	1	0	21.7 °C
549	11:33:00 AM	1%	20.90%	0.5	0	21.6 °C
550	11:33:00 AM	0%	20.90%	0	0	21.6 °C
551	11:33:00 AM	0%	20.90%	0	0	21.6 °C
552	11:33:00 AM	0%	20.90%	0	0	21.6 °C
553	11:33:00 AM	0%	20.90%	0	0	21.6 °C
554	11:33:00 AM	0%	20.90%	0	0	21.6 °C
555	11:34:00 AM	0%	20.90%	0	0	21.6 °C
556	11:34:00 AM	0%	20.90%	0	0	21.6 °C
557	11:34:00 AM	0%	20.90%	0	0	21.6 °C
558	11:34:00 AM	0%	20.90%	0	0	21.6 °C
559	11:34:00 AM	0%	20.90%	0	0	21.6 °C
560	11:34:00 AM	0%	20.90%	0	0	21.6 °C
561	11:34:00 AM	0%	20.90%	0	0	21.6 °C
562	11:34:00 AM	0%	20.90%	0	0	21.6 °C
563	11:34:00 AM	0%	20.90%	0	0	21.6 °C
564	11:34:00 AM	0%	20.90%	0	0	21.6 °C
565	11:34:00 AM	0%	20.90%	0	0	21.5 °C
566	11:34:00 AM	0%	20.90%	0	0	21.6 °C
567	11:35:00 AM	0%	20.90%	0	0	21.5 °C
568	11:35:00 AM	0%	20.90%	0	0	21.5 °C
569	11:35:00 AM	0%	20.90%	0	0	21.5 °C

570	11:35:00 AM	0%	20.90%	0	0	21.5 °C
571	11:35:00 AM	0%	20.90%	0	0	21.5 °C
572	11:35:00 AM	0%	20.90%	0	0	21.5 °C
573	11:35:00 AM	0%	20.90%	0	0	21.5 °C
574	11:35:00 AM	0%	20.90%	0	0	21.5 °C
575	11:35:00 AM	0%	20.90%	0	0	21.5 °C
576	11:35:00 AM	0%	20.90%	0	0	21.5 °C
577	11:35:00 AM	0%	20.90%	0	0	21.5 °C
578	11:35:00 AM	0%	20.90%	0.4	0	21.5 °C
579	11:36:00 AM	0%	20.90%	0	0	21.5 °C
580	11:36:00 AM	0%	20.90%	0	0	21.5 °C
581	11:36:00 AM	0%	20.90%	0	0	21.5 °C
582	11:36:00 AM	0%	20.90%	0	0	21.5 °C
583	11:36:00 AM	0%	20.90%	0	0	21.5 °C
584	11:36:00 AM	0%	20.90%	0	0	21.5 °C
585	11:36:00 AM	0%	20.90%	0	0	21.5 °C
586	11:36:00 AM	0%	20.90%	0	0	21.5 °C
587	11:36:00 AM	0%	20.90%	0	0	21.5 °C
588	11:36:00 AM	0%	20.90%	0	0	21.5 °C
589	11:36:00 AM	0%	20.90%	0	0	21.5 °C
590	11:36:00 AM	0%	20.90%	0	0	21.5 °C
591	11:37:00 AM	0%	20.90%	0	0	21.5 °C
592	11:37:00 AM	0%	20.90%	0	0	21.5 °C
593	11:37:00 AM	0%	20.90%	0	0	21.5 °C
594	11:37:00 AM	0%	20.90%	0	0	21.5 °C
595	11:37:00 AM	0%	20.90%	0	0	21.5 °C
596	11:37:00 AM	0%	20.90%	0	0	21.5 °C
597	11:37:00 AM	0%	20.90%	0	0	21.4 °C
598	11:37:00 AM	0%	20.90%	0	0	21.4 °C
599	11:37:00 AM	0%	20.90%	0	0	21.4 °C
600	11:37:00 AM	0%	20.90%	0	0	21.4 °C
601	11:37:00 AM	0%	20.90%	0	0	21.4 °C
602	11:37:00 AM	0%	20.90%	0	0	21.4 °C
603	11:38:00 AM	0%	20.90%	0	0	21.4 °C
604	11:38:00 AM	0%	20.90%	0	0	21.4 °C
605	11:38:00 AM	0%	20.90%	0	0	21.4 °C
606	11:38:00 AM	0%	20.90%	0	0	21.4 °C
607	11:38:00 AM	0%	20.90%	0	0	21.4 °C
608	11:38:00 AM	0%	20.90%	0	0	21.4 °C
609	11:38:00 AM	0%	20.90%	0	0	21.4 °C
610	11:38:00 AM	0%	20.90%	0	0	21.4 °C
611	11:38:00 AM	0%	20.90%	0	0	21.4 °C
612	11:38:00 AM	0%	20.90%	0	0	21.4 °C
613	11:38:00 AM	0%	20.90%	0	0	21.4 °C
614	11:38:00 AM	0%	20.90%	0	0	21.4 °C
615	11:39:00 AM	0%	20.90%	0	0	21.4 °C
616	11:39:00 AM	0%	20.90%	0	0	21.4 °C
617	11:39:00 AM	0%	20.90%	0	0	21.4 °C
618	11:39:00 AM	0%	20.90%	0	0	21.4 °C

619	11:39:00 AM	0%	20.90%	0	0	21.4 °C
620	11:39:00 AM	0%	20.90%	0	0	21.4 °C
621	11:39:00 AM	0%	20.90%	0	0	21.4 °C
622	11:39:00 AM	0%	20.90%	0	0	21.4 °C
623	11:39:00 AM	0%	20.90%	0	0	21.4 °C
624	11:39:00 AM	0%	20.90%	0	0	21.4 °C
625	11:39:00 AM	0%	20.90%	0	0	21.4 °C
626	11:39:00 AM	0%	20.90%	0	0	21.4 °C
627	11:40:00 AM	0%	20.90%	0	0	21.4 °C
628	11:40:00 AM	0%	20.90%	0	0	21.4 °C
629	11:40:00 AM	0%	20.90%	0	0	21.4 °C
630	11:40:00 AM	0%	20.90%	0	0	21.4 °C
631	11:40:00 AM	0%	20.90%	0	0	21.4 °C
632	11:40:00 AM	0%	20.90%	0	0	21.4 °C
633	11:40:00 AM	0%	20.90%	0	0	21.4 °C
634	11:40:00 AM	0%	20.90%	0	0	21.3 °C
635	11:40:00 AM	0%	20.90%	0	0	21.4 °C
636	11:40:00 AM	0%	20.90%	0	0	21.4 °C
637	11:40:00 AM	0%	20.90%	0	0	21.3 °C
638	11:40:00 AM	0%	20.90%	0	0	21.4 °C
639	11:41:00 AM	0%	20.90%	0	0	21.3 °C
640	11:41:00 AM	0%	20.90%	0	0	21.3 °C
641	11:41:00 AM	0%	20.90%	0	0	21.3 °C
642	11:41:00 AM	0%	20.90%	0	0	21.3 °C
643	11:41:00 AM	0%	20.90%	0	0	21.3 °C
644	11:41:00 AM	0%	20.90%	0	0	21.3 °C
645	11:41:00 AM	0%	20.90%	0	0	21.3 °C
646	11:41:00 AM	0%	20.90%	0	0	21.3 °C
647	11:41:00 AM	0%	20.90%	0	0	21.3 °C
648	11:41:00 AM	0%	20.90%	0	0	21.3 °C
649	11:41:00 AM	0%	20.90%	0	0	21.3 °C
650	11:41:00 AM	0%	20.90%	0	0	21.3 °C
651	11:42:00 AM	0%	20.90%	0	0	21.3 °C
652	11:42:00 AM	0%	20.90%	0	0	21.3 °C
653	11:42:00 AM	0%	20.90%	0	0	21.3 °C
654	11:42:00 AM	0%	20.90%	0	0	21.3 °C
655	11:42:00 AM	0%	20.90%	0	0	21.3 °C
656	11:42:00 AM	0%	20.90%	0	0	21.3 °C
657	11:42:00 AM	0%	20.90%	0	0	21.3 °C
658	11:42:00 AM	0%	20.90%	0	0	21.3 °C
659	11:42:00 AM	0%	20.90%	0	0	21.3 °C
660	11:42:00 AM	0%	20.90%	0	0	21.3 °C
661	11:42:00 AM	0%	20.90%	0	0	21.3 °C
662	11:42:00 AM	0%	20.90%	0	0	21.3 °C
663	11:43:00 AM	0%	20.90%	0	0	21.3 °C
664	11:43:00 AM	0%	20.90%	0	0	21.3 °C
665	11:43:00 AM	0%	20.90%	0	0	21.3 °C
666	11:43:00 AM	0%	20.90%	0	0	21.3 °C
667	11:43:00 AM	0%	20.90%	0	0	21.3 °C

668	11:43:00 AM	0%	20.90%	0	0	21.3 °C
669	11:43:00 AM	0%	20.90%	0	0	21.3 °C
670	11:43:00 AM	0%	20.90%	0	0	21.3 °C
671	11:43:00 AM	0%	20.90%	0	0	21.3 °C
672	11:43:00 AM	0%	20.90%	0	0	21.3 °C
673	11:43:00 AM	0%	20.90%	0	0	21.3 °C
674	11:43:00 AM	0%	20.90%	0	0	21.3 °C
675	11:44:00 AM	0%	20.90%	0	0	21.3 °C
676	11:44:00 AM	0%	20.90%	0	0	21.3 °C
677	11:44:00 AM	0%	20.90%	0	0	21.3 °C
678	11:44:00 AM	0%	20.90%	0	0	21.3 °C
679	11:44:00 AM	0%	20.90%	0	0	21.3 °C
680	11:44:00 AM	0%	20.90%	0	0	21.3 °C
681	11:44:00 AM	0%	20.90%	0	0	21.3 °C
682	11:44:00 AM	0%	20.90%	0	0	21.3 °C
683	11:44:00 AM	0%	20.90%	0	0	21.3 °C
684	11:44:00 AM	0%	20.90%	0	0	21.3 °C
685	11:44:00 AM	0%	20.90%	0	0	21.3 °C
686	11:44:00 AM	0%	20.90%	0	0	21.3 °C
687	11:45:00 AM	0%	20.90%	0	0	21.3 °C
688	11:45:00 AM	0%	20.90%	0	0	21.3 °C
689	11:45:00 AM	0%	20.90%	0	0	21.3 °C
690	11:45:00 AM	0%	20.90%	0	0	21.3 °C
691	11:45:00 AM	0%	20.90%	0	0	21.3 °C
692	11:45:00 AM	0%	20.90%	0	0	21.3 °C
693	11:45:00 AM	0%	20.90%	0	0	21.3 °C
694	11:45:00 AM	0%	20.90%	0	0	21.3 °C
695	11:45:00 AM	0%	20.90%	0	0	21.3 °C
696	11:45:00 AM	0%	20.90%	0	0	21.3 °C
697	11:45:00 AM	0%	20.90%	0	0	21.3 °C
698	11:45:00 AM	0%	20.90%	0	0	21.3 °C
699	11:46:00 AM	0%	20.90%	0	0	21.3 °C
700	11:46:00 AM	0%	20.90%	0	0	21.3 °C
701	11:46:00 AM	0%	20.90%	0	0	21.3 °C
702	11:46:00 AM	0%	20.90%	0	0	21.3 °C
703	11:46:00 AM	0%	20.90%	0	0	21.3 °C
704	11:46:00 AM	0%	20.90%	0	0	21.3 °C
705	11:46:00 AM	0%	20.90%	0	0	21.3 °C
706	11:46:00 AM	0%	20.90%	0	0	21.3 °C
707	11:46:00 AM	0%	20.90%	0	0	21.3 °C
708	11:46:00 AM	0%	20.90%	0	0	21.3 °C
709	11:46:00 AM	0%	20.90%	0	0	21.3 °C
710	11:46:00 AM	0%	20.90%	0	0	21.3 °C
711	11:47:00 AM	0%	20.90%	0	0	21.3 °C
712	11:47:00 AM	0%	20.90%	0	0	21.3 °C
713	11:47:00 AM	0%	20.90%	0	0	21.3 °C
714	11:47:00 AM	0%	20.90%	0	0	21.3 °C
715	11:47:00 AM	0%	20.90%	0	0	21.3 °C
716	11:47:00 AM	0%	20.90%	0	0	21.3 °C

717	11:47:00 AM	0%	20.90%	0	0	21.3 °C
718	11:47:00 AM	0%	20.90%	0	0	21.3 °C
719	11:47:00 AM	0%	20.90%	0	0	21.2 °C
720	11:47:00 AM	0%	20.90%	0	0	21.2 °C

GX-3R Data Sample

Name	al26114250_176023499RN
Date	9/26/2024
Serial No.	176023499RN
Interval Time (sec)	5

Gas(FullScale)	Warning	Alarm	AlarmH	STEL	TWA
CH4(100%LEL)	10 %LEL	25 %LEL	50 %LEL	*****	*****
O2(40.0%)	19.50%	18.00%	23.50%	*****	*****
H2S(200.0ppm)	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm	1.0 ppm
CO(2000ppm)	25 ppm	50 ppm	1200 ppm	200 ppm	25 ppm

No	Time	CH4(100%LEL)	O2(40.0%)	H2S(200.0ppm)	CO(2000ppm)	Temperature
1	11:12:50 AM	0%	20.90%	0	0	21.3 °C
2	11:12:55 AM	0%	20.90%	0	0	21.3 °C
3	11:13:00 AM	0%	20.90%	0	0	21.3 °C
4	11:13:05 AM	0%	20.90%	0	0	21.3 °C
5	11:13:10 AM	0%	20.90%	0	0	21.3 °C
6	11:13:15 AM	0%	20.90%	0	0	21.3 °C
7	11:13:20 AM	0%	20.90%	0	0	21.3 °C
8	11:13:25 AM	0%	20.90%	0	0	21.3 °C
9	11:13:30 AM	0%	20.90%	0	0	21.3 °C
10	11:13:35 AM	0%	20.90%	0	0	21.3 °C
11	11:13:40 AM	0%	20.90%	0	0	21.3 °C
12	11:13:45 AM	0%	20.90%	0	0	21.4 °C
13	11:13:50 AM	0%	20.90%	0	0	21.4 °C
14	11:13:55 AM	0%	20.90%	0	0	21.4 °C
15	11:14:00 AM	0%	20.90%	0	0	21.4 °C
16	11:14:05 AM	0%	20.90%	0	0	21.4 °C
17	11:14:10 AM	0%	20.90%	0	0	21.4 °C
18	11:14:15 AM	0%	20.90%	0	0	21.4 °C
19	11:14:20 AM	0%	20.90%	0	0	21.4 °C
20	11:14:25 AM	0%	20.90%	0	0	21.4 °C
21	11:14:30 AM	0%	20.90%	0	0	21.4 °C
22	11:14:35 AM	0%	20.90%	0	0	21.4 °C
23	11:14:40 AM	0%	20.90%	0	0	21.4 °C
24	11:14:45 AM	0%	20.90%	0	0	21.4 °C
25	11:14:50 AM	0%	20.90%	0	0	21.4 °C
26	11:14:55 AM	0%	20.90%	0	0	21.4 °C
27	11:15:00 AM	0%	20.90%	0	0	21.4 °C
28	11:15:05 AM	0%	20.90%	0	0	21.4 °C
29	11:15:10 AM	0%	20.90%	0	0	21.4 °C
30	11:15:15 AM	0%	20.90%	0	0	21.3 °C
31	11:15:20 AM	0%	20.90%	0	0	21.3 °C
32	11:15:25 AM	0%	20.90%	0	0	21.3 °C
33	11:15:30 AM	0%	20.90%	0	0	21.3 °C
34	11:15:35 AM	0%	20.90%	0	0	21.3 °C
35	11:15:40 AM	0%	20.90%	0	0	21.2 °C
36	11:15:45 AM	0%	20.90%	0	0	21.2 °C

37	11:15:50 AM	0%	20.90%	0	0	21.2 °C
38	11:15:55 AM	0%	20.90%	0	0	21.2 °C
39	11:16:00 AM	0%	20.90%	0	0	21.2 °C
40	11:16:05 AM	0%	20.90%	0	0	21.1 °C
41	11:16:10 AM	0%	20.90%	0	0	21.1 °C
42	11:16:15 AM	0%	20.90%	0	0	21.1 °C
43	11:16:20 AM	0%	20.90%	0	0	21.0 °C
44	11:16:25 AM	0%	20.90%	0	0	21.0 °C
45	11:16:30 AM	0%	20.90%	0	0	21.0 °C
46	11:16:35 AM	0%	20.90%	0	0	21.0 °C
47	11:16:40 AM	0%	20.90%	0	0	20.9 °C
48	11:16:45 AM	0%	20.90%	0	0	20.9 °C
49	11:16:50 AM	0%	20.90%	0	0	20.9 °C
50	11:16:55 AM	0%	20.90%	0	0	20.9 °C
51	11:17:00 AM	0%	20.90%	0	0	20.8 °C
52	11:17:05 AM	0%	20.90%	0	0	20.8 °C
53	11:17:10 AM	0%	20.90%	0	0	20.8 °C
54	11:17:15 AM	0%	20.90%	0	0	20.8 °C
55	11:17:20 AM	0%	20.90%	0	0	20.8 °C
56	11:17:25 AM	0%	20.90%	0	0	20.7 °C
57	11:17:30 AM	0%	20.90%	0	0	20.7 °C
58	11:17:35 AM	0%	20.90%	0	0	20.7 °C
59	11:17:40 AM	0%	20.90%	0	0	20.7 °C
60	11:17:45 AM	0%	20.90%	0	0	20.7 °C
61	11:17:50 AM	0%	20.90%	0	0	20.7 °C
62	11:17:55 AM	0%	20.90%	0	0	20.6 °C
63	11:18:00 AM	0%	20.90%	0	0	20.6 °C
64	11:18:05 AM	0%	20.90%	0	0	20.6 °C
65	11:18:10 AM	0%	20.90%	0	0	20.6 °C
66	11:18:15 AM	0%	20.90%	0	0	20.6 °C
67	11:18:20 AM	0%	20.90%	0	0	20.6 °C
68	11:18:25 AM	0%	20.90%	0	0	20.6 °C
69	11:18:30 AM	0%	20.90%	0	0	20.6 °C
70	11:18:35 AM	0%	20.90%	0	0	20.6 °C
71	11:18:40 AM	0%	20.90%	0	0	20.6 °C
72	11:18:45 AM	0%	20.90%	0	0	20.6 °C
73	11:18:50 AM	0%	20.90%	0	0	20.6 °C
74	11:18:55 AM	0%	20.90%	0	0	20.6 °C
75	11:19:00 AM	0%	20.90%	0	0	20.6 °C
76	11:19:05 AM	0%	20.90%	0	0	20.6 °C
77	11:19:10 AM	0%	20.90%	0	0	20.6 °C
78	11:19:15 AM	0%	20.90%	0	0	20.6 °C
79	11:19:20 AM	0%	20.90%	0	0	20.6 °C
80	11:19:25 AM	0%	20.90%	0	0	20.6 °C
81	11:19:30 AM	0%	20.90%	0	0	20.6 °C
82	11:19:35 AM	0%	20.90%	0	0	20.6 °C
83	11:19:40 AM	0%	20.90%	0	0	20.6 °C
84	11:19:45 AM	0%	20.90%	0	0	20.6 °C
85	11:19:50 AM	0%	20.90%	0	0	20.6 °C

86	11:19:55 AM	0%	20.90%	0	0	20.6 °C
87	11:20:00 AM	0%	20.90%	0	0	20.6 °C
88	11:20:05 AM	0%	20.90%	0	0	20.7 °C
89	11:20:10 AM	0%	20.90%	0	0	20.7 °C
90	11:20:15 AM	0%	20.90%	0	0	20.7 °C
91	11:20:20 AM	0%	20.90%	0	0	20.7 °C
92	11:20:25 AM	0%	20.90%	0	0	20.7 °C
93	11:20:30 AM	0%	20.90%	0	0	20.7 °C
94	11:20:35 AM	0%	20.90%	0	0	20.7 °C
95	11:20:40 AM	0%	20.90%	0	0	20.7 °C
96	11:20:45 AM	0%	20.90%	0	0	20.7 °C
97	11:20:50 AM	0%	20.90%	0	0	20.7 °C
98	11:20:55 AM	0%	20.90%	0	0	20.7 °C
99	11:21:00 AM	0%	20.90%	0	0	20.8 °C
100	11:21:05 AM	0%	20.90%	0	0	20.8 °C
101	11:21:10 AM	0%	20.90%	0	0	20.8 °C
102	11:21:15 AM	0%	20.90%	0	0	20.8 °C
103	11:21:20 AM	0%	20.90%	0	0	20.8 °C
104	11:21:25 AM	0%	20.90%	0	0	20.8 °C
105	11:21:30 AM	0%	20.90%	0	0	20.8 °C
106	11:21:35 AM	0%	20.90%	0	0	20.9 °C
107	11:21:40 AM	0%	20.90%	0	0	20.9 °C
108	11:21:45 AM	0%	20.90%	0	0	20.9 °C
109	11:21:50 AM	0%	20.90%	0	0	20.9 °C
110	11:21:55 AM	0%	20.90%	0	0	20.9 °C
111	11:22:00 AM	0%	20.90%	0	0	20.9 °C
112	11:22:05 AM	0%	20.90%	0	0	20.9 °C
113	11:22:10 AM	0%	20.90%	0	2	21.0 °C
114	11:22:15 AM	0%	20.90%	0	3	21.0 °C
115	11:22:20 AM	0%	20.90%	0	3	21.0 °C
116	11:22:25 AM	0%	20.90%	0	2	21.0 °C
117	11:22:30 AM	0%	20.90%	0	2	21.0 °C
118	11:22:35 AM	0%	20.90%	0	0	21.0 °C
119	11:22:40 AM	0%	20.90%	0	0	21.1 °C
120	11:22:45 AM	0%	20.90%	0	0	21.1 °C
121	11:22:50 AM	0%	20.90%	0	0	21.1 °C
122	11:22:55 AM	0%	20.90%	0	0	21.1 °C
123	11:23:00 AM	0%	20.90%	0	0	21.1 °C
124	11:23:05 AM	0%	20.90%	0	0	21.1 °C
125	11:23:10 AM	0%	20.90%	0	0	21.2 °C
126	11:23:15 AM	0%	20.90%	0	0	21.2 °C
127	11:23:20 AM	0%	20.90%	0	0	21.2 °C
128	11:23:25 AM	0%	20.90%	0	0	21.2 °C
129	11:23:30 AM	0%	20.90%	0	0	21.2 °C
130	11:23:35 AM	0%	20.90%	0	0	21.3 °C
131	11:23:40 AM	0%	20.90%	0	0	21.3 °C
132	11:23:45 AM	0%	20.90%	0	0	21.3 °C
133	11:23:50 AM	0%	20.90%	0	0	21.3 °C
134	11:23:55 AM	0%	20.90%	0	0	21.3 °C

135	11:24:00 AM	0%	20.90%	0	0	21.3 °C
136	11:24:05 AM	0%	20.90%	0	0	21.4 °C
137	11:24:10 AM	0%	20.90%	0	0	21.3 °C
138	11:24:15 AM	0%	20.90%	0	0	21.4 °C
139	11:24:20 AM	0%	20.90%	0	0	21.4 °C
140	11:24:25 AM	0%	20.90%	0	0	21.4 °C
141	11:24:30 AM	0%	20.90%	0	0	21.4 °C
142	11:24:35 AM	0%	20.90%	0	0	21.4 °C
143	11:24:40 AM	0%	20.90%	0	3	21.4 °C
144	11:24:45 AM	0%	20.90%	0	4	21.4 °C
145	11:24:50 AM	0%	20.90%	0	4	21.4 °C
146	11:24:55 AM	0%	20.90%	0	3	21.4 °C
147	11:25:00 AM	0%	20.90%	0	4	21.4 °C
148	11:25:05 AM	0%	20.90%	0	5	21.4 °C
149	11:25:10 AM	0%	20.90%	0	5	21.4 °C
150	11:25:15 AM	0%	20.90%	0	4	21.4 °C
151	11:25:20 AM	0%	20.90%	0	2	21.4 °C
152	11:25:25 AM	0%	20.90%	0	0	21.4 °C
153	11:25:30 AM	0%	20.90%	0	0	21.4 °C
154	11:25:35 AM	0%	20.90%	0	0	21.3 °C
155	11:25:40 AM	0%	20.90%	0	0	21.3 °C
156	11:25:45 AM	0%	20.90%	0	0	21.3 °C
157	11:25:50 AM	0%	20.90%	0	0	21.3 °C
158	11:25:55 AM	0%	20.90%	0	0	21.3 °C
159	11:26:00 AM	0%	20.90%	0	0	21.3 °C
160	11:26:05 AM	0%	20.90%	0	0	21.3 °C
161	11:26:10 AM	0%	20.90%	0	0	21.3 °C
162	11:26:15 AM	0%	20.90%	0	0	21.2 °C
163	11:26:20 AM	0%	20.90%	0	0	21.2 °C
164	11:26:25 AM	0%	20.90%	0	0	21.2 °C
165	11:26:30 AM	0%	20.90%	0	0	21.2 °C
166	11:26:35 AM	0%	20.90%	0	0	21.2 °C
167	11:26:40 AM	0%	20.90%	0	0	21.1 °C
168	11:26:45 AM	0%	20.90%	0	0	21.1 °C
169	11:26:50 AM	0%	20.90%	0	0	21.1 °C
170	11:26:55 AM	0%	20.90%	0	0	21.1 °C
171	11:27:00 AM	0%	20.90%	0	0	21.1 °C
172	11:27:05 AM	0%	20.90%	0	0	21.0 °C
173	11:27:10 AM	0%	20.90%	0	0	21.0 °C
174	11:27:15 AM	0%	20.90%	0	0	21.0 °C
175	11:27:20 AM	0%	20.90%	0	0	21.0 °C
176	11:27:25 AM	0%	20.90%	0	0	20.9 °C
177	11:27:30 AM	0%	20.90%	0	0	20.9 °C
178	11:27:35 AM	0%	20.90%	0	0	20.9 °C
179	11:27:40 AM	0%	20.90%	0	0	20.9 °C
180	11:27:45 AM	0%	20.90%	0	0	20.9 °C
181	11:27:50 AM	0%	20.90%	0	0	20.9 °C
182	11:27:55 AM	0%	20.90%	0	0	20.8 °C
183	11:28:00 AM	0%	20.90%	0	0	20.8 °C

184	11:28:05 AM	0%	20.90%	0	0	20.8 °C
185	11:28:10 AM	0%	20.90%	0	0	20.8 °C
186	11:28:15 AM	0%	20.90%	0	0	20.8 °C
187	11:28:20 AM	0%	20.90%	0	0	20.8 °C
188	11:28:25 AM	0%	20.90%	0	0	20.7 °C
189	11:28:30 AM	0%	20.90%	0	0	20.7 °C
190	11:28:35 AM	0%	20.90%	0	0	20.7 °C
191	11:28:40 AM	0%	20.90%	0	0	20.7 °C
192	11:28:45 AM	0%	20.90%	0	0	20.7 °C
193	11:28:50 AM	0%	20.90%	0	0	20.7 °C
194	11:28:55 AM	0%	20.90%	0	0	20.7 °C
195	11:29:00 AM	0%	20.90%	0	0	20.6 °C
196	11:29:05 AM	0%	20.90%	0	0	20.6 °C
197	11:29:10 AM	0%	20.90%	0	0	20.6 °C
198	11:29:15 AM	0%	20.90%	0	0	20.6 °C
199	11:29:20 AM	0%	20.90%	0	0	20.6 °C
200	11:29:25 AM	0%	20.90%	0	0	20.6 °C
201	11:29:30 AM	0%	20.90%	0	0	20.6 °C
202	11:29:35 AM	0%	20.90%	0	0	20.6 °C
203	11:29:40 AM	0%	20.90%	0	0	20.5 °C
204	11:29:45 AM	0%	20.90%	0	0	20.6 °C
205	11:29:50 AM	0%	20.90%	0	0	20.5 °C
206	11:29:55 AM	0%	20.90%	0	0	20.5 °C
207	11:30:00 AM	0%	20.90%	0	0	20.5 °C
208	11:30:05 AM	0%	20.90%	0	0	20.5 °C
209	11:30:10 AM	0%	20.90%	0	0	20.5 °C
210	11:30:15 AM	0%	20.90%	0	0	20.5 °C
211	11:30:20 AM	0%	20.90%	0	0	20.5 °C
212	11:30:25 AM	0%	20.90%	0	0	20.5 °C
213	11:30:30 AM	0%	20.90%	0	0	20.5 °C
214	11:30:35 AM	0%	20.90%	0	0	20.5 °C
215	11:30:40 AM	0%	20.90%	0	0	20.4 °C
216	11:30:45 AM	0%	20.90%	0	0	20.4 °C
217	11:30:50 AM	0%	20.90%	0	0	20.4 °C
218	11:30:55 AM	0%	20.90%	0	0	20.4 °C
219	11:31:00 AM	0%	20.90%	0	0	20.4 °C
220	11:31:05 AM	0%	20.90%	0	0	20.4 °C
221	11:31:10 AM	0%	20.90%	0	0	20.4 °C
222	11:31:15 AM	0%	20.90%	0	0	20.4 °C
223	11:31:20 AM	0%	20.90%	0	0	20.4 °C
224	11:31:25 AM	0%	20.90%	0	0	20.4 °C
225	11:31:30 AM	0%	20.90%	0	0	20.4 °C
226	11:31:35 AM	0%	20.90%	0	0	20.4 °C
227	11:31:40 AM	0%	20.90%	0	0	20.4 °C
228	11:31:45 AM	0%	20.90%	0	0	20.4 °C
229	11:31:50 AM	0%	20.90%	0	0	20.3 °C
230	11:31:55 AM	0%	20.90%	0	0	20.3 °C
231	11:32:00 AM	0%	20.90%	0	0	20.3 °C
232	11:32:05 AM	0%	20.90%	0.3	0	20.3 °C

233	11:32:10 AM	0%	20.90%	0.4	0	20.3 °C
234	11:32:15 AM	0%	20.90%	0	0	20.3 °C
235	11:32:20 AM	0%	20.90%	0	0	20.3 °C
236	11:32:25 AM	0%	20.90%	0	0	20.3 °C
237	11:32:30 AM	0%	20.90%	0	0	20.3 °C
238	11:32:35 AM	0%	20.90%	0	0	20.3 °C
239	11:32:40 AM	0%	20.90%	0	0	20.3 °C
240	11:32:45 AM	0%	20.90%	0	0	20.3 °C
241	11:32:50 AM	0%	20.90%	0	0	20.3 °C
242	11:32:55 AM	0%	20.90%	0	0	20.3 °C
243	11:33:00 AM	0%	20.90%	0	0	20.3 °C
244	11:33:05 AM	0%	20.90%	0	0	20.3 °C
245	11:33:10 AM	0%	20.90%	0	0	20.3 °C
246	11:33:15 AM	0%	20.90%	0	0	20.3 °C
247	11:33:20 AM	0%	20.90%	0	0	20.3 °C
248	11:33:25 AM	0%	20.90%	0	0	20.3 °C
249	11:33:30 AM	0%	20.90%	0.3	0	20.3 °C
250	11:33:35 AM	0%	20.90%	0.4	0	20.3 °C
251	11:33:40 AM	0%	20.90%	0.4	0	20.3 °C
252	11:33:45 AM	0%	20.90%	0	0	20.3 °C
253	11:33:50 AM	0%	20.90%	0	0	20.2 °C
254	11:33:55 AM	0%	20.90%	0.3	0	20.3 °C
255	11:34:00 AM	0%	20.90%	0.6	0	20.3 °C
256	11:34:05 AM	0%	20.90%	0.8	0	20.2 °C
257	11:34:10 AM	0%	20.90%	0.8	0	20.2 °C
258	11:34:15 AM	0%	20.90%	0.6	0	20.2 °C
259	11:34:20 AM	0%	20.90%	0.5	0	20.2 °C
260	11:34:25 AM	0%	20.90%	0.6	0	20.2 °C
261	11:34:30 AM	0%	20.90%	0.4	0	20.3 °C
262	11:34:35 AM	0%	20.90%	0	0	20.2 °C
263	11:34:40 AM	0%	20.90%	0	0	20.2 °C
264	11:34:45 AM	0%	20.90%	0	0	20.2 °C
265	11:34:50 AM	0%	20.90%	0	0	20.3 °C
266	11:34:55 AM	0%	20.90%	0	0	20.2 °C
267	11:35:00 AM	0%	20.90%	0	0	20.2 °C
268	11:35:05 AM	0%	20.90%	0	0	20.2 °C
269	11:35:10 AM	0%	20.90%	0	0	20.2 °C
270	11:35:15 AM	0%	20.90%	0	0	20.2 °C
271	11:35:20 AM	0%	20.90%	0	0	20.2 °C
272	11:35:25 AM	0%	20.90%	0	0	20.2 °C
273	11:35:30 AM	0%	20.90%	0	0	20.2 °C
274	11:35:35 AM	0%	20.90%	0	0	20.2 °C
275	11:35:40 AM	0%	20.90%	0	0	20.3 °C
276	11:35:45 AM	0%	20.90%	0	0	20.3 °C
277	11:35:50 AM	0%	20.90%	0	0	20.2 °C
278	11:35:55 AM	0%	20.90%	0	0	20.3 °C
279	11:36:00 AM	0%	20.90%	0	0	20.3 °C
280	11:36:05 AM	0%	20.90%	0	0	20.3 °C
281	11:36:10 AM	0%	20.90%	0	0	20.3 °C

282	11:36:15 AM	0%	20.90%	0	0	20.3 °C
283	11:36:20 AM	0%	20.90%	0.3	0	20.3 °C
284	11:36:25 AM	0%	20.90%	0.4	0	20.3 °C
285	11:36:30 AM	0%	20.90%	0.5	0	20.3 °C
286	11:36:35 AM	0%	20.90%	0.5	0	20.3 °C
287	11:36:40 AM	0%	20.90%	0.3	0	20.3 °C
288	11:36:45 AM	0%	20.90%	0	0	20.3 °C
289	11:36:50 AM	2%	20.90%	1	0	20.3 °C
290	11:36:55 AM	2%	20.90%	1.1	0	20.3 °C
291	11:37:00 AM	2%	20.90%	1.1	0	20.3 °C
292	11:37:05 AM	1%	20.90%	1	0	20.3 °C
293	11:37:10 AM	2%	20.90%	0.7	0	20.3 °C
294	11:37:15 AM	2%	20.90%	1.3	0	20.3 °C
295	11:37:20 AM	3%	20.90%	1.4	0	20.3 °C
296	11:37:25 AM	1%	20.90%	1	0	20.3 °C
297	11:37:30 AM	0%	20.90%	0.4	0	20.3 °C
298	11:37:35 AM	0%	20.90%	0.4	0	20.3 °C
299	11:37:40 AM	0%	20.90%	0.4	0	20.3 °C
300	11:37:45 AM	0%	20.90%	0.3	0	20.3 °C
301	11:37:50 AM	0%	20.90%	0.3	0	20.3 °C
302	11:37:55 AM	0%	20.90%	0	0	20.3 °C
303	11:38:00 AM	0%	20.90%	0.5	0	20.3 °C
304	11:38:05 AM	0%	20.90%	0.5	0	20.3 °C
305	11:38:10 AM	0%	20.90%	0.4	0	20.3 °C
306	11:38:15 AM	0%	20.90%	0.5	0	20.3 °C
307	11:38:20 AM	0%	20.90%	0.6	0	20.3 °C
308	11:38:25 AM	0%	20.90%	0.5	0	20.3 °C
309	11:38:30 AM	0%	20.90%	0	0	20.3 °C
310	11:38:35 AM	0%	20.90%	0	0	20.3 °C
311	11:38:40 AM	0%	20.90%	0	0	20.3 °C
312	11:38:45 AM	0%	20.90%	0	0	20.4 °C
313	11:38:50 AM	0%	20.90%	0	0	20.4 °C
314	11:38:55 AM	0%	20.90%	0	0	20.4 °C
315	11:39:00 AM	0%	20.90%	0	0	20.4 °C
316	11:39:05 AM	0%	20.90%	0	0	20.4 °C
317	11:39:10 AM	0%	20.90%	0	0	20.4 °C
318	11:39:15 AM	0%	20.90%	0	0	20.4 °C
319	11:39:20 AM	0%	20.90%	0.3	0	20.4 °C
320	11:39:25 AM	0%	20.90%	0.3	0	20.4 °C
321	11:39:30 AM	0%	20.90%	0	0	20.4 °C
322	11:39:35 AM	0%	20.90%	0.3	0	20.4 °C
323	11:39:40 AM	0%	20.90%	0.3	0	20.4 °C
324	11:39:45 AM	0%	20.90%	0.4	0	20.4 °C
325	11:39:50 AM	0%	20.90%	0	0	20.4 °C
326	11:39:55 AM	0%	20.90%	0	0	20.4 °C
327	11:40:00 AM	0%	20.90%	0	0	20.4 °C
328	11:40:05 AM	0%	20.90%	0	0	20.4 °C
329	11:40:10 AM	1%	20.90%	0.3	0	20.4 °C
330	11:40:15 AM	1%	20.90%	0.3	0	20.4 °C

331	11:40:20 AM	1%	20.90%	0	0	20.4 °C
332	11:40:25 AM	0%	20.90%	0	0	20.4 °C
333	11:40:30 AM	0%	20.90%	0	0	20.4 °C
334	11:40:35 AM	0%	20.90%	0	0	20.4 °C
335	11:40:40 AM	0%	20.90%	0	0	20.4 °C
336	11:40:45 AM	0%	20.90%	0	0	20.5 °C
337	11:40:50 AM	0%	20.90%	0	0	20.5 °C
338	11:40:55 AM	1%	20.90%	0	0	20.5 °C
339	11:41:00 AM	1%	20.90%	0	0	20.5 °C
340	11:41:05 AM	0%	20.90%	0	0	20.5 °C
341	11:41:10 AM	0%	20.90%	0	0	20.5 °C
342	11:41:15 AM	0%	20.90%	0	0	20.5 °C
343	11:41:20 AM	0%	20.90%	0	0	20.5 °C
344	11:41:25 AM	0%	20.90%	0	0	20.5 °C
345	11:41:30 AM	0%	20.90%	0	0	20.5 °C
346	11:41:35 AM	0%	20.90%	0	0	20.5 °C
347	11:41:40 AM	0%	20.90%	0	0	20.5 °C
348	11:41:45 AM	0%	20.90%	0	0	20.5 °C
349	11:41:50 AM	0%	20.90%	0	0	20.5 °C
350	11:41:55 AM	0%	20.90%	0	0	20.5 °C
351	11:42:00 AM	0%	20.90%	0	0	20.5 °C
352	11:42:05 AM	0%	20.90%	0	0	20.5 °C
353	11:42:10 AM	0%	20.90%	0	0	20.5 °C
354	11:42:15 AM	0%	20.90%	0	0	20.5 °C
355	11:42:20 AM	0%	20.90%	0	0	20.5 °C
356	11:42:25 AM	0%	20.90%	0	0	20.5 °C
357	11:42:30 AM	0%	20.90%	0	3	20.5 °C
358	11:42:35 AM	0%	20.90%	0	2	20.5 °C
359	11:42:40 AM	0%	20.90%	0.3	0	20.5 °C
360	11:42:45 AM	1%	20.90%	0.3	15	20.6 °C
361	11:42:50 AM	10%	20.90%	0.3	20	20.5 °C
362	11:42:55 AM	10%	20.90%	0.3	9	20.5 °C
363	11:43:00 AM	6%	20.90%	0.6	6	20.6 °C
364	11:43:05 AM	6%	20.90%	0.6	16	20.6 °C
365	11:43:10 AM	11%	20.90%	0.6	26	20.6 °C
366	11:43:15 AM	11%	20.90%	0.4	19	20.6 °C
367	11:43:20 AM	7%	20.90%	1.2	6	20.6 °C
368	11:43:25 AM	6%	20.90%	1.2	3	20.6 °C
369	11:43:30 AM	6%	20.90%	1.3	0	20.6 °C
370	11:43:35 AM	6%	20.90%	1.2	0	20.6 °C
371	11:43:40 AM	6%	20.90%	0.7	0	20.6 °C
372	11:43:45 AM	2%	20.90%	0.3	0	20.6 °C
373	11:43:50 AM	0%	20.90%	0	2	20.6 °C
374	11:43:55 AM	1%	20.90%	0	6	20.6 °C
375	11:44:00 AM	6%	20.90%	0.3	8	20.6 °C
376	11:44:05 AM	6%	20.90%	0.4	2	20.6 °C
377	11:44:10 AM	8%	20.90%	2.5	0	20.6 °C
378	11:44:15 AM	10%	20.90%	3.2	0	20.6 °C
379	11:44:20 AM	14%	20.90%	3.8	0	20.6 °C

380	11:44:25 AM	15%	20.90%	4.1	0	20.6 °C
381	11:44:30 AM	15%	20.90%	3.7	0	20.6 °C
382	11:44:35 AM	10%	20.90%	1.8	0	20.6 °C
383	11:44:40 AM	4%	20.90%	0.8	0	20.6 °C
384	11:44:45 AM	4%	20.90%	1	0	20.6 °C
385	11:44:50 AM	4%	20.90%	0.9	0	20.6 °C
386	11:44:55 AM	1%	20.90%	0.5	0	20.6 °C
387	11:45:00 AM	2%	20.90%	0.7	0	20.6 °C
388	11:45:05 AM	2%	20.90%	0.6	0	20.6 °C
389	11:45:10 AM	1%	20.90%	0.3	0	20.6 °C
390	11:45:15 AM	0%	20.90%	0.5	0	20.7 °C
391	11:45:20 AM	5%	20.90%	1.5	0	20.7 °C
392	11:45:25 AM	10%	20.90%	3.4	0	20.7 °C
393	11:45:30 AM	10%	20.90%	3.8	0	20.7 °C
394	11:45:35 AM	10%	20.90%	2.7	0	20.7 °C
395	11:45:40 AM	7%	20.90%	2.2	0	20.7 °C
396	11:45:45 AM	7%	20.90%	2.3	0	20.7 °C
397	11:45:50 AM	10%	20.90%	3.5	0	20.7 °C
398	11:45:55 AM	10%	20.90%	3	0	20.7 °C
399	11:46:00 AM	5%	20.90%	1.5	0	20.7 °C
400	11:46:05 AM	5%	20.90%	1.4	0	20.7 °C
401	11:46:10 AM	0%	20.90%	0.6	0	20.7 °C
402	11:46:15 AM	0%	20.90%	0	0	20.7 °C
403	11:46:20 AM	0%	20.90%	0	0	20.7 °C
404	11:46:25 AM	0%	20.90%	0	0	20.7 °C
405	11:46:30 AM	0%	20.90%	0	0	20.7 °C
406	11:46:35 AM	0%	20.90%	0	0	20.7 °C
407	11:46:40 AM	0%	20.90%	0	0	20.7 °C
408	11:46:45 AM	0%	20.90%	0	0	20.7 °C
409	11:46:50 AM	0%	20.90%	0	0	20.7 °C
410	11:46:55 AM	0%	20.90%	0	0	20.7 °C
411	11:47:00 AM	0%	20.90%	1	0	20.7 °C
412	11:47:05 AM	2%	20.90%	1	0	20.7 °C
413	11:47:10 AM	2%	20.90%	1.2	0	20.7 °C
414	11:47:15 AM	5%	20.90%	2.2	0	20.7 °C
415	11:47:20 AM	6%	20.90%	2.3	0	20.7 °C
416	11:47:25 AM	9%	20.90%	3.1	0	20.7 °C
417	11:47:30 AM	10%	20.90%	3.2	0	20.7 °C
418	11:47:35 AM	7%	20.90%	2.5	0	20.7 °C
419	11:47:40 AM	7%	20.90%	2.8	0	20.7 °C
420	11:47:45 AM	10%	20.90%	4.3	0	20.7 °C
421	11:47:50 AM	12%	20.90%	4.4	0	20.7 °C
422	11:47:55 AM	12%	20.90%	3.9	0	20.7 °C
423	11:48:00 AM	9%	20.90%	4	0	20.7 °C
424	11:48:05 AM	9%	20.90%	1.6	0	20.7 °C
425	11:48:10 AM	1%	20.90%	0.6	0	20.7 °C
426	11:48:15 AM	0%	20.90%	0.4	0	20.7 °C
427	11:48:20 AM	0%	20.90%	0.3	0	20.7 °C
428	11:48:25 AM	0%	20.90%	0	0	20.7 °C

429	11:48:30 AM	0%	20.90%	0	0	20.7 °C
430	11:48:35 AM	0%	20.90%	0	0	20.7 °C
431	11:48:40 AM	0%	20.90%	0	0	20.7 °C
432	11:48:45 AM	0%	20.90%	0	0	20.7 °C
433	11:48:50 AM	0%	20.90%	0	0	20.7 °C
434	11:48:55 AM	0%	20.90%	0	0	20.7 °C
435	11:49:00 AM	0%	20.90%	0	0	20.7 °C
436	11:49:05 AM	0%	20.90%	0.5	0	20.7 °C
437	11:49:10 AM	0%	20.90%	0.6	0	20.7 °C
438	11:49:15 AM	1%	20.90%	1.2	0	20.7 °C
439	11:49:20 AM	1%	20.90%	1.1	0	20.7 °C
440	11:49:25 AM	0%	20.90%	0.6	0	20.7 °C
441	11:49:30 AM	0%	20.90%	0.8	0	20.7 °C
442	11:49:35 AM	1%	20.90%	1	0	20.7 °C
443	11:49:40 AM	1%	20.90%	0.8	0	20.7 °C
444	11:49:45 AM	0%	20.90%	0.5	0	20.7 °C
445	11:49:50 AM	0%	20.90%	0.4	0	20.7 °C
446	11:49:55 AM	0%	20.90%	0	0	20.7 °C
447	11:50:00 AM	0%	20.90%	0	0	20.7 °C
448	11:50:05 AM	0%	20.90%	0	0	20.7 °C
449	11:50:10 AM	0%	20.90%	0	0	20.7 °C
450	11:50:15 AM	0%	20.90%	0	0	20.7 °C
451	11:50:20 AM	0%	20.90%	0	0	20.7 °C
452	11:50:25 AM	0%	20.90%	0.4	0	20.7 °C
453	11:50:30 AM	12%	20.90%	3.9	0	20.7 °C
454	11:50:35 AM	12%	20.90%	6.6	0	20.7 °C
455	11:50:40 AM	16%	20.90%	6.1	0	20.7 °C
456	11:50:45 AM	11%	20.90%	4	0	20.7 °C
457	11:50:50 AM	9%	20.90%	3.1	0	20.7 °C
458	11:50:55 AM	6%	20.90%	2.6	0	20.7 °C
459	11:51:00 AM	8%	20.90%	2.9	0	20.7 °C
460	11:51:05 AM	8%	20.90%	2.7	0	20.7 °C
461	11:51:10 AM	3%	20.90%	1.6	0	20.7 °C
462	11:51:15 AM	0%	20.90%	0.9	0	20.7 °C
463	11:51:20 AM	1%	20.90%	1	0	20.7 °C
464	11:51:25 AM	0%	20.90%	0.7	0	20.7 °C
465	11:51:30 AM	0%	20.90%	0.5	0	20.7 °C
466	11:51:35 AM	0%	20.90%	0.5	0	20.7 °C
467	11:51:40 AM	0%	20.90%	0.3	0	20.7 °C
468	11:51:45 AM	0%	20.90%	0	0	20.7 °C
469	11:51:50 AM	0%	20.90%	0	0	20.7 °C
470	11:51:55 AM	0%	20.90%	0	0	20.7 °C
471	11:52:00 AM	0%	20.90%	0	0	20.7 °C
472	11:52:05 AM	0%	20.90%	0	0	20.7 °C
473	11:52:10 AM	0%	20.90%	0	0	20.7 °C
474	11:52:15 AM	0%	20.90%	0	0	20.7 °C
475	11:52:20 AM	0%	20.90%	0	0	20.7 °C
476	11:52:25 AM	0%	20.90%	0.5	0	20.7 °C
477	11:52:30 AM	0%	20.90%	0.3	0	20.7 °C

478	11:52:35 AM	0%	20.90%	0	0	20.7 °C
479	11:52:40 AM	0%	20.90%	0	0	20.7 °C
480	11:52:45 AM	0%	20.90%	0	0	20.7 °C
481	11:52:50 AM	0%	20.90%	0	0	20.7 °C
482	11:52:55 AM	0%	20.90%	0	0	20.6 °C
483	11:53:00 AM	0%	20.90%	0	0	20.7 °C
484	11:53:05 AM	0%	20.90%	0	0	20.6 °C
485	11:53:10 AM	0%	20.90%	0	0	20.6 °C
486	11:53:15 AM	0%	20.90%	0	0	20.6 °C
487	11:53:20 AM	0%	20.90%	0.4	0	20.6 °C
488	11:53:25 AM	2%	20.90%	0.9	0	20.6 °C
489	11:53:30 AM	3%	20.90%	0.9	0	20.6 °C
490	11:53:35 AM	3%	20.90%	0.9	0	20.6 °C
491	11:53:40 AM	3%	20.90%	1.2	0	20.5 °C
492	11:53:45 AM	3%	20.90%	1.1	0	20.5 °C
493	11:53:50 AM	1%	20.90%	0.6	0	20.5 °C
494	11:53:55 AM	0%	20.90%	0.3	0	20.5 °C
495	11:54:00 AM	1%	20.90%	0.5	0	20.5 °C
496	11:54:05 AM	1%	20.90%	0.5	0	20.5 °C
497	11:54:10 AM	0%	20.90%	0.3	0	20.5 °C
498	11:54:15 AM	0%	20.90%	0	0	20.5 °C
499	11:54:20 AM	0%	20.90%	0	0	20.5 °C
500	11:54:25 AM	0%	20.90%	0	0	20.4 °C
501	11:54:30 AM	0%	20.90%	0	0	20.4 °C
502	11:54:35 AM	0%	20.90%	0	0	20.4 °C
503	11:54:40 AM	0%	20.90%	0	0	20.4 °C
504	11:54:45 AM	0%	20.90%	0	0	20.4 °C
505	11:54:50 AM	0%	20.90%	0	0	20.4 °C
506	11:54:55 AM	0%	20.90%	0.3	0	20.4 °C
507	11:55:00 AM	0%	20.90%	0	0	20.4 °C
508	11:55:05 AM	0%	20.90%	0	0	20.3 °C
509	11:55:10 AM	0%	20.90%	0	0	20.3 °C
510	11:55:15 AM	0%	20.90%	0	0	20.3 °C
511	11:55:20 AM	0%	20.90%	0	0	20.3 °C
512	11:55:25 AM	0%	20.90%	0	0	20.3 °C
513	11:55:30 AM	0%	20.90%	0	0	20.3 °C
514	11:55:35 AM	0%	20.90%	0	0	20.3 °C
515	11:55:40 AM	0%	20.90%	0	0	20.3 °C
516	11:55:45 AM	0%	20.90%	0.3	0	20.2 °C
517	11:55:50 AM	0%	20.90%	0.3	0	20.2 °C
518	11:55:55 AM	0%	20.90%	0	0	20.2 °C
519	11:56:00 AM	0%	20.90%	0.8	0	20.2 °C
520	11:56:05 AM	2%	20.90%	1.3	0	20.2 °C
521	11:56:10 AM	2%	20.90%	1.1	0	20.2 °C
522	11:56:15 AM	0%	20.90%	1	0	20.2 °C
523	11:56:20 AM	0%	20.90%	0.6	0	20.2 °C
524	11:56:25 AM	0%	20.90%	0	0	20.1 °C
525	11:56:30 AM	0%	20.90%	0	0	20.1 °C
526	11:56:35 AM	0%	20.90%	0	0	20.1 °C

527	11:56:40 AM	0%	20.90%	0	0	20.1 °C
528	11:56:45 AM	0%	20.90%	0	0	20.1 °C
529	11:56:50 AM	0%	20.90%	0	0	20.1 °C
530	11:56:55 AM	0%	20.90%	0	0	20.1 °C
531	11:57:00 AM	0%	20.90%	0	0	20.1 °C
532	11:57:05 AM	0%	20.90%	0	0	20.0 °C
533	11:57:10 AM	0%	20.90%	0	0	20.0 °C
534	11:57:15 AM	0%	20.90%	0	0	20.0 °C
535	11:57:20 AM	0%	20.90%	0	0	20.0 °C
536	11:57:25 AM	0%	20.90%	0	0	20.0 °C
537	11:57:30 AM	0%	20.90%	0	0	20.0 °C
538	11:57:35 AM	0%	20.90%	0	0	20.0 °C
539	11:57:40 AM	0%	20.90%	0.6	0	20.0 °C
540	11:57:45 AM	3%	20.90%	1.4	0	19.9 °C
541	11:57:50 AM	3%	20.90%	1.2	0	19.9 °C
542	11:57:55 AM	0%	20.90%	0.5	0	19.9 °C
543	11:58:00 AM	0%	20.90%	0	0	19.9 °C
544	11:58:05 AM	0%	20.90%	0	0	19.9 °C
545	11:58:10 AM	0%	20.90%	0	0	19.9 °C
546	11:58:15 AM	0%	20.90%	0	0	19.9 °C
547	11:58:20 AM	0%	20.90%	0	0	19.9 °C
548	11:58:25 AM	0%	20.90%	0	0	19.9 °C
549	11:58:30 AM	0%	20.90%	0	0	19.8 °C
550	11:58:35 AM	0%	20.90%	0	0	19.8 °C
551	11:58:40 AM	0%	20.90%	0	0	19.8 °C
552	11:58:45 AM	0%	20.90%	0	0	19.8 °C
553	11:58:50 AM	0%	20.90%	0	0	19.8 °C
554	11:58:55 AM	0%	20.90%	0	0	19.8 °C
555	11:59:00 AM	0%	20.90%	0	0	19.8 °C
556	11:59:05 AM	0%	20.90%	0	0	19.8 °C
557	11:59:10 AM	0%	20.90%	0	0	19.8 °C
558	11:59:15 AM	0%	20.90%	0	0	19.7 °C
559	11:59:20 AM	0%	20.90%	0	0	19.7 °C
560	11:59:25 AM	0%	20.90%	0	0	19.7 °C
561	11:59:30 AM	0%	20.90%	0	0	19.7 °C
562	11:59:35 AM	0%	20.90%	0	0	19.7 °C
563	11:59:40 AM	0%	20.90%	0	0	19.7 °C
564	11:59:45 AM	0%	20.90%	0	0	19.7 °C
565	11:59:50 AM	0%	20.90%	0	0	19.7 °C
566	11:59:55 AM	0%	20.90%	0	0	19.7 °C
567	12:00:00 PM	0%	20.90%	0	0	19.6 °C
568	12:00:05 PM	0%	20.90%	0	0	19.6 °C
569	12:00:10 PM	0%	20.90%	0	0	19.6 °C
570	12:00:15 PM	0%	20.90%	0	0	19.6 °C
571	12:00:20 PM	0%	20.90%	0.3	0	19.6 °C
572	12:00:25 PM	0%	20.90%	0.5	0	19.6 °C
573	12:00:30 PM	0%	20.90%	0.6	0	19.6 °C
574	12:00:35 PM	0%	20.90%	0.5	0	19.6 °C
575	12:00:40 PM	0%	20.90%	0.3	0	19.6 °C

576	12:00:45 PM	0%	20.90%	0	0	19.5 °C
577	12:00:50 PM	0%	20.90%	0	0	19.5 °C
578	12:00:55 PM	0%	20.90%	0.3	0	19.5 °C
579	12:01:00 PM	0%	20.90%	0	0	19.5 °C
580	12:01:05 PM	0%	20.90%	0.4	0	19.5 °C
581	12:01:10 PM	0%	20.90%	0.5	0	19.5 °C
582	12:01:15 PM	0%	20.90%	0	0	19.5 °C
583	12:01:20 PM	0%	20.90%	0	0	19.5 °C
584	12:01:25 PM	0%	20.90%	0	0	19.5 °C
585	12:01:30 PM	0%	20.90%	0	0	19.5 °C
586	12:01:35 PM	0%	20.90%	0.4	0	19.4 °C
587	12:01:40 PM	0%	20.90%	0.4	0	19.4 °C
588	12:01:45 PM	0%	20.90%	0	0	19.4 °C
589	12:01:50 PM	0%	20.90%	0	0	19.4 °C
590	12:01:55 PM	0%	20.90%	0	0	19.4 °C
591	12:02:00 PM	0%	20.90%	0	0	19.4 °C
592	12:02:05 PM	0%	20.90%	0.3	0	19.4 °C
593	12:02:10 PM	0%	20.90%	0	0	19.4 °C
594	12:02:15 PM	0%	20.90%	0	0	19.4 °C
595	12:02:20 PM	0%	20.90%	0	0	19.3 °C
596	12:02:25 PM	0%	20.90%	0	0	19.3 °C
597	12:02:30 PM	0%	20.90%	0	0	19.3 °C
598	12:02:35 PM	0%	20.90%	0	0	19.3 °C
599	12:02:40 PM	0%	20.90%	0	0	19.3 °C
600	12:02:45 PM	0%	20.90%	0	0	19.3 °C
601	12:02:50 PM	0%	20.90%	0	0	19.3 °C
602	12:02:55 PM	0%	20.90%	0	0	19.3 °C
603	12:03:00 PM	0%	20.90%	0	0	19.3 °C
604	12:03:05 PM	0%	20.90%	0	0	19.3 °C
605	12:03:10 PM	0%	20.90%	0	0	19.2 °C
606	12:03:15 PM	0%	20.90%	0	0	19.2 °C
607	12:03:20 PM	0%	20.90%	0	0	19.2 °C
608	12:03:25 PM	0%	20.90%	0	0	19.2 °C
609	12:03:30 PM	0%	20.90%	0	0	19.2 °C
610	12:03:35 PM	0%	20.90%	0	0	19.2 °C
611	12:03:40 PM	0%	20.90%	0	0	19.2 °C
612	12:03:45 PM	0%	20.90%	0	0	19.2 °C
613	12:03:50 PM	0%	20.90%	0	0	19.2 °C
614	12:03:55 PM	0%	20.90%	0	0	19.1 °C
615	12:04:00 PM	0%	20.90%	0	0	19.1 °C
616	12:04:05 PM	0%	20.90%	0	0	19.1 °C
617	12:04:10 PM	0%	20.90%	0	0	19.1 °C
618	12:04:15 PM	0%	20.90%	0	0	19.1 °C
619	12:04:20 PM	0%	20.90%	0	0	19.1 °C
620	12:04:25 PM	0%	20.90%	0	0	19.1 °C
621	12:04:30 PM	0%	20.90%	0	0	19.1 °C
622	12:04:35 PM	0%	20.90%	0	0	19.1 °C
623	12:04:40 PM	0%	20.90%	0	0	19.1 °C
624	12:04:45 PM	0%	20.90%	0	0	19.0 °C

625	12:04:50 PM	0%	20.90%	0	0	19.0 °C
626	12:04:55 PM	0%	20.90%	0	0	19.0 °C
627	12:05:00 PM	0%	20.90%	0	0	19.0 °C
628	12:05:05 PM	0%	20.90%	0	0	19.0 °C
629	12:05:10 PM	0%	20.90%	0	0	19.0 °C
630	12:05:15 PM	0%	20.90%	0	0	19.0 °C
631	12:05:20 PM	0%	20.90%	0	0	19.0 °C
632	12:05:25 PM	0%	20.90%	0	0	19.0 °C
633	12:05:30 PM	0%	20.90%	0	0	19.0 °C
634	12:05:35 PM	0%	20.90%	0	0	19.0 °C
635	12:05:40 PM	0%	20.90%	0	0	19.0 °C
636	12:05:45 PM	0%	20.90%	0	0	18.9 °C
637	12:05:50 PM	0%	20.90%	0	0	18.9 °C
638	12:05:55 PM	0%	20.90%	0	0	18.9 °C
639	12:06:00 PM	0%	20.90%	0	0	18.9 °C
640	12:06:05 PM	0%	20.90%	0	0	18.9 °C
641	12:06:10 PM	0%	20.90%	0.6	0	18.9 °C
642	12:06:15 PM	0%	20.90%	0.4	0	18.9 °C
643	12:06:20 PM	0%	20.90%	0	0	18.9 °C
644	12:06:25 PM	0%	20.90%	0	0	18.9 °C
645	12:06:30 PM	0%	20.90%	0	0	18.9 °C
646	12:06:35 PM	0%	20.90%	0	0	18.9 °C
647	12:06:40 PM	0%	20.90%	0	0	18.9 °C
648	12:06:45 PM	0%	20.90%	0	0	18.9 °C
649	12:06:50 PM	0%	20.90%	0	0	18.8 °C
650	12:06:55 PM	0%	20.90%	0	0	18.8 °C
651	12:07:00 PM	0%	20.90%	0	0	18.8 °C
652	12:07:05 PM	0%	20.90%	0	0	18.8 °C
653	12:07:10 PM	0%	20.90%	0	0	18.8 °C
654	12:07:15 PM	0%	20.90%	0	0	18.8 °C
655	12:07:20 PM	0%	20.90%	0	0	18.8 °C
656	12:07:25 PM	0%	20.90%	0	0	18.8 °C
657	12:07:30 PM	0%	20.90%	0	0	18.8 °C
658	12:07:35 PM	0%	20.90%	0	0	18.8 °C
659	12:07:40 PM	0%	20.90%	0	0	18.8 °C
660	12:07:45 PM	0%	20.90%	0	0	18.7 °C
661	12:07:50 PM	0%	20.90%	0	0	18.7 °C
662	12:07:55 PM	0%	20.90%	0	0	18.7 °C
663	12:08:00 PM	0%	20.90%	0	0	18.7 °C
664	12:08:05 PM	0%	20.90%	0	0	18.7 °C
665	12:08:10 PM	0%	20.90%	0	0	18.7 °C
666	12:08:15 PM	0%	20.90%	0	0	18.7 °C
667	12:08:20 PM	0%	20.90%	0	0	18.7 °C
668	12:08:25 PM	0%	20.90%	0	0	18.7 °C
669	12:08:30 PM	0%	20.90%	0	0	18.6 °C
670	12:08:35 PM	0%	20.90%	0	0	18.6 °C
671	12:08:40 PM	0%	20.90%	0	0	18.6 °C
672	12:08:45 PM	0%	20.90%	0	0	18.6 °C
673	12:08:50 PM	0%	20.90%	0	0	18.6 °C

674	12:08:55 PM	0%	20.90%	0	0	18.6 °C
675	12:09:00 PM	0%	20.90%	0	0	18.6 °C
676	12:09:05 PM	0%	20.90%	0	0	18.6 °C
677	12:09:10 PM	0%	20.90%	0	0	18.6 °C
678	12:09:15 PM	0%	20.90%	0	0	18.6 °C
679	12:09:20 PM	0%	20.90%	0	0	18.6 °C
680	12:09:25 PM	0%	20.90%	0	0	18.5 °C
681	12:09:30 PM	0%	20.90%	0	0	18.5 °C
682	12:09:35 PM	0%	20.90%	0	0	18.5 °C
683	12:09:40 PM	0%	20.90%	0	0	18.5 °C
684	12:09:45 PM	0%	20.90%	0	0	18.5 °C
685	12:09:50 PM	0%	20.90%	0	0	18.5 °C
686	12:09:55 PM	0%	20.90%	0	0	18.5 °C
687	12:10:00 PM	0%	20.90%	0	0	18.5 °C
688	12:10:05 PM	0%	20.90%	0	0	18.5 °C
689	12:10:10 PM	0%	20.90%	0	0	18.5 °C
690	12:10:15 PM	0%	20.90%	0	0	18.4 °C
691	12:10:20 PM	0%	20.90%	0	0	18.4 °C
692	12:10:25 PM	0%	20.90%	0	0	18.4 °C
693	12:10:30 PM	0%	20.90%	0	0	18.4 °C
694	12:10:35 PM	0%	20.90%	0	0	18.4 °C
695	12:10:40 PM	0%	20.90%	0	0	18.4 °C
696	12:10:45 PM	0%	20.90%	0	0	18.4 °C
697	12:10:50 PM	0%	20.90%	0	0	18.4 °C
698	12:10:55 PM	0%	20.90%	0	0	18.4 °C
699	12:11:00 PM	0%	20.90%	0	0	18.4 °C
700	12:11:05 PM	0%	20.90%	0	0	18.4 °C
701	12:11:10 PM	0%	20.90%	0	0	18.3 °C
702	12:11:15 PM	0%	20.90%	0	0	18.3 °C
703	12:11:20 PM	0%	20.90%	0	0	18.3 °C
704	12:11:25 PM	0%	20.90%	0	0	18.3 °C
705	12:11:30 PM	0%	20.90%	0	0	18.3 °C
706	12:11:35 PM	0%	20.90%	0	7	18.3 °C
707	12:11:40 PM	0%	20.90%	0	9	18.3 °C
708	12:11:45 PM	0%	20.90%	0	4	18.3 °C
709	12:11:50 PM	0%	20.90%	0	2	18.3 °C
710	12:11:55 PM	0%	20.90%	0	3	18.3 °C
711	12:12:00 PM	0%	20.90%	0	3	18.3 °C
712	12:12:05 PM	0%	20.90%	0	3	18.2 °C
713	12:12:10 PM	0%	20.90%	0	2	18.2 °C
714	12:12:15 PM	0%	20.90%	0	0	18.2 °C
715	12:12:20 PM	0%	20.90%	0	0	18.2 °C
716	12:12:25 PM	0%	20.90%	0	0	18.2 °C
717	12:12:30 PM	0%	20.90%	0	2	18.2 °C
718	12:12:35 PM	0%	20.90%	0	2	18.2 °C
719	12:12:40 PM	0%	20.90%	0	2	18.2 °C
720	12:12:45 PM	0%	20.90%	0	2	18.2 °C

GX-3R Data Sample

Name	iv14092452_176023498RN
Sampling Date/Time	11/14/2024
Serial No.	176023498RN
Interval Time (sec)	300

Gas(FullScale)	Warning	Alarm	AlarmH	STEL
CH4(100%LEL)	10 %LEL	25 %LEL	50 %LEL	*****
O2(40.0%)	19.50%	18.00%	23.50%	*****
H2S(200.0ppm)	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm
CO(2000ppm)	25 ppm	50 ppm	1200 ppm	200 ppm

No	Date/Time	CH4(100%LEL)	O2(40.0%)	H2S(200.0ppm)
1	11/14/2024 9:29	0 %LEL	20.90%	0.0 ppm
2	11/14/2024 9:34	0 %LEL	20.90%	0.0 ppm
3	11/14/2024 9:39	0 %LEL	20.90%	0.0 ppm
4	11/14/2024 9:44	0 %LEL	20.90%	0.0 ppm
5	11/14/2024 9:49	0 %LEL	20.90%	0.0 ppm
6	11/14/2024 9:54	0 %LEL	20.90%	0.0 ppm
7	11/14/2024 9:59	0 %LEL	20.90%	0.0 ppm
8	11/14/2024 10:04	0 %LEL	20.90%	0.0 ppm
9	11/14/2024 10:09	0 %LEL	20.90%	0.0 ppm
10	11/14/2024 10:14	0 %LEL	20.90%	0.0 ppm
11	11/14/2024 10:19	0 %LEL	20.90%	0.0 ppm
12	11/14/2024 10:24	0 %LEL	20.90%	0.0 ppm
13	11/14/2024 10:29	0 %LEL	20.90%	0.0 ppm
14	11/14/2024 10:34	0 %LEL	20.90%	0.0 ppm
15	11/14/2024 10:39	0 %LEL	20.90%	0.0 ppm
16	11/14/2024 10:44	0 %LEL	20.90%	0.0 ppm
17	11/14/2024 10:49	0 %LEL	20.90%	0.0 ppm
18	11/14/2024 10:54	0 %LEL	20.90%	0.0 ppm
19	11/14/2024 10:59	0 %LEL	20.90%	0.0 ppm
20	11/14/2024 11:04	0 %LEL	21.00%	0.0 ppm
21	11/14/2024 11:09	0 %LEL	21.00%	0.0 ppm
22	11/14/2024 11:14	0 %LEL	21.00%	0.0 ppm
23	11/14/2024 11:19	0 %LEL	21.00%	0.0 ppm
24	11/14/2024 11:24	0 %LEL	21.00%	0.0 ppm
25	11/14/2024 11:29	0 %LEL	21.00%	0.0 ppm
26	11/14/2024 11:34	0 %LEL	21.00%	0.0 ppm
27	11/14/2024 11:39	0 %LEL	21.00%	0.0 ppm
28	11/14/2024 11:44	0 %LEL	21.00%	0.0 ppm
29	11/14/2024 11:49	0 %LEL	20.90%	0.0 ppm
30	11/14/2024 11:54	0 %LEL	21.00%	0.0 ppm
31	11/14/2024 11:59	0 %LEL	21.00%	0.0 ppm

32	11/14/2024 12:04	0 %LEL	21.00%	0.0 ppm
33	11/14/2024 12:09	0 %LEL	21.00%	0.0 ppm
34	11/14/2024 12:14	0 %LEL	20.90%	0.0 ppm
35	11/14/2024 12:19	0 %LEL	20.90%	0.0 ppm
36	11/14/2024 12:24	0 %LEL	21.00%	0.0 ppm
37	11/14/2024 12:29	0 %LEL	21.00%	0.0 ppm
38	11/14/2024 12:34	0 %LEL	20.90%	0.0 ppm
39	11/14/2024 12:39	0 %LEL	20.90%	0.0 ppm
40	11/14/2024 12:44	0 %LEL	20.90%	0.0 ppm
41	11/14/2024 12:49	0 %LEL	20.90%	0.0 ppm
42	11/14/2024 12:54	0 %LEL	20.90%	0.0 ppm
43	11/14/2024 12:59	0 %LEL	20.90%	0.0 ppm
44	11/14/2024 13:04	0 %LEL	20.90%	0.0 ppm
45	11/14/2024 13:09	0 %LEL	20.90%	0.0 ppm
46	11/14/2024 13:14	0 %LEL	20.90%	0.0 ppm
47	11/14/2024 13:19	0 %LEL	20.90%	0.0 ppm
48	11/14/2024 13:24	0 %LEL	20.90%	0.0 ppm
49	11/14/2024 13:29	0 %LEL	20.90%	0.0 ppm
50	11/14/2024 13:34	0 %LEL	20.90%	0.0 ppm
51	11/14/2024 13:39	0 %LEL	20.90%	0.0 ppm
52	11/14/2024 13:44	0 %LEL	20.90%	0.0 ppm
53	11/14/2024 13:49	0 %LEL	20.90%	0.0 ppm
54	11/14/2024 13:54	0 %LEL	20.90%	0.0 ppm
55	11/14/2024 13:59	0 %LEL	20.90%	0.0 ppm
56	11/14/2024 14:04	0 %LEL	20.90%	0.0 ppm
57	11/14/2024 14:09	0 %LEL	20.90%	0.0 ppm
58	11/14/2024 14:14	0 %LEL	20.90%	0.0 ppm
59	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
60	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
61	11/14/2024 14:29	0 %LEL	20.90%	0.0 ppm
62	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
63	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
64	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
65	11/14/2024 14:49	0 %LEL	20.90%	0.0 ppm
66	11/14/2024 14:54	0 %LEL	20.90%	0.0 ppm
67	11/14/2024 14:59	0 %LEL	20.90%	0.0 ppm
68	11/14/2024 15:04	0 %LEL	20.90%	0.0 ppm
69	11/14/2024 15:09	0 %LEL	20.90%	0.0 ppm
70	11/14/2024 15:14	0 %LEL	20.90%	0.0 ppm
71	11/14/2024 15:19	0 %LEL	20.90%	0.0 ppm
72	11/14/2024 15:24	0 %LEL	20.90%	0.0 ppm
73	11/14/2024 15:29	0 %LEL	20.90%	0.0 ppm
74	11/14/2024 15:34	0 %LEL	20.90%	0.0 ppm
75	11/14/2024 15:39	0 %LEL	20.90%	0.0 ppm

76	11/14/2024 15:44	0 %LEL	20.90%	0.0 ppm
77	11/14/2024 15:49	0 %LEL	20.90%	0.0 ppm
78	11/14/2024 15:54	0 %LEL	20.90%	0.0 ppm
79	11/14/2024 15:59	0 %LEL	20.90%	0.0 ppm
80	11/14/2024 16:04	0 %LEL	20.90%	0.0 ppm
81	11/14/2024 16:09	0 %LEL	20.90%	0.0 ppm
82	11/14/2024 16:14	0 %LEL	20.90%	0.0 ppm
83	11/14/2024 16:19	0 %LEL	20.90%	0.0 ppm
84	11/14/2024 16:24	0 %LEL	20.90%	0.0 ppm
85	11/14/2024 16:29	0 %LEL	20.90%	0.0 ppm
86	11/14/2024 16:34	0 %LEL	20.90%	0.0 ppm
87	11/14/2024 16:39	0 %LEL	20.90%	0.0 ppm
88	11/14/2024 16:44	0 %LEL	20.90%	0.0 ppm
89	11/14/2024 16:49	0 %LEL	20.90%	0.0 ppm
90	11/14/2024 16:54	0 %LEL	20.90%	0.0 ppm
91	11/14/2024 16:59	0 %LEL	20.90%	0.0 ppm

TWA
*****
*****
1.0 ppm
25 ppm

CO(2000ppm)	Temperature
0 ppm	12.7 ℃
0 ppm	14.2 ℃
0 ppm	15.3 ℃
0 ppm	16.3 ℃
0 ppm	16.9 ℃
0 ppm	17.2 ℃
0 ppm	18.9 ℃
0 ppm	20.5 ℃
0 ppm	21.8 ℃
0 ppm	22.8 ℃
0 ppm	23.5 ℃
0 ppm	24.3 ℃
0 ppm	25.1 ℃
0 ppm	26.0 ℃
0 ppm	26.7 ℃
0 ppm	27.4 ℃
0 ppm	27.9 ℃
0 ppm	28.5 ℃
0 ppm	29.0 ℃
0 ppm	29.3 ℃
0 ppm	29.5 ℃
0 ppm	29.5 ℃
0 ppm	29.4 ℃
0 ppm	29.4 ℃
0 ppm	29.5 ℃
0 ppm	29.5 ℃
0 ppm	29.4 ℃
0 ppm	29.4 ℃
0 ppm	29.4 ℃
0 ppm	29.4 ℃
0 ppm	29.6 ℃

0 ppm	29.8 °C
0 ppm	29.9 °C
0 ppm	29.6 °C
0 ppm	29.0 °C
0 ppm	28.6 °C
0 ppm	27.3 °C
0 ppm	26.7 °C
0 ppm	26.7 °C
0 ppm	27.0 °C
0 ppm	27.3 °C
0 ppm	27.5 °C
0 ppm	27.3 °C
0 ppm	27.6 °C
1 ppm	27.6 °C
0 ppm	27.5 °C
0 ppm	27.7 °C
0 ppm	27.9 °C
0 ppm	28.2 °C
1 ppm	26.4 °C
2 ppm	24.3 °C
3 ppm	24.3 °C
3 ppm	24.6 °C
2 ppm	25.0 °C
3 ppm	25.4 °C
3 ppm	25.8 °C
3 ppm	25.8 °C
0 ppm	25.6 °C
0 ppm	25.4 °C
0 ppm	25.0 °C
1 ppm	24.6 °C
0 ppm	24.3 °C
0 ppm	24.0 °C
0 ppm	23.9 °C
0 ppm	24.0 °C
0 ppm	24.2 °C
2 ppm	24.4 °C
2 ppm	24.5 °C
0 ppm	24.6 °C
0 ppm	24.7 °C
0 ppm	25.2 °C
0 ppm	25.4 °C
2 ppm	25.3 °C
0 ppm	25.2 °C
0 ppm	25.1 °C

0 ppm	25.1 °C
0 ppm	25.1 °C
0 ppm	25.3 °C
0 ppm	25.8 °C
0 ppm	26.3 °C
0 ppm	25.5 °C
0 ppm	23.9 °C
0 ppm	22.4 °C
0 ppm	21.8 °C
0 ppm	21.4 °C
0 ppm	21.3 °C
0 ppm	21.3 °C
0 ppm	21.6 °C
0 ppm	22.0 °C
0 ppm	22.5 °C
0 ppm	22.7 °C

GX-3R Data Sample

Name	al14142725_014040897RN
Alarm Date/Time	11/14/2024 14:27
Serial No.	014040897RN
Interval Time (sec)	5

Gas(FullScale)	Warning	Alarm	AlarmH	STEL
CH4(100%LEL)	10 %LEL	25 %LEL	50 %LEL	*****
O2(40.0%)	19.50%	18.00%	23.50%	*****
H2S(200.0ppm)	5.0 ppm	30.0 ppm	100.0 ppm	5.0 ppm
CO(2000ppm)	25 ppm	50 ppm	1200 ppm	200 ppm

No	Date/Time	CH4(100%LEL)	O2(40.0%)	H2S(200.0ppm)
208	11/14/2024 14:14	0 %LEL	20.90%	0.0 ppm
209	11/14/2024 14:14	0 %LEL	20.90%	0.0 ppm
210	11/14/2024 14:14	0 %LEL	20.90%	0.0 ppm
211	11/14/2024 14:14	0 %LEL	20.90%	0.0 ppm
212	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
213	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
214	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
215	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
216	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
217	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
218	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
219	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
220	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
221	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
222	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
223	11/14/2024 14:15	0 %LEL	20.90%	0.0 ppm
224	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
225	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
226	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
227	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
228	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
229	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
230	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
231	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
232	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
233	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
234	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
235	11/14/2024 14:16	0 %LEL	20.90%	0.0 ppm
236	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
237	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
238	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm

239	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
240	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
241	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
242	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
243	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
244	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
245	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
246	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
247	11/14/2024 14:17	0 %LEL	20.90%	0.0 ppm
248	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
249	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
250	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
251	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
252	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
253	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
254	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
255	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
256	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
257	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
258	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
259	11/14/2024 14:18	0 %LEL	20.90%	0.0 ppm
260	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
261	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
262	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
263	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
264	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
265	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
266	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
267	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
268	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
269	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
270	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
271	11/14/2024 14:19	0 %LEL	20.90%	0.0 ppm
272	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
273	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
274	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
275	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
276	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
277	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
278	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
279	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
280	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
281	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
282	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm

283	11/14/2024 14:20	0 %LEL	20.90%	0.0 ppm
284	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
285	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
286	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
287	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
288	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
289	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
290	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
291	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
292	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
293	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
294	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
295	11/14/2024 14:21	0 %LEL	20.90%	0.0 ppm
296	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
297	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
298	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
299	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
300	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
301	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
302	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
303	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
304	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
305	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
306	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
307	11/14/2024 14:22	0 %LEL	20.90%	0.0 ppm
308	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
309	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
310	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
311	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
312	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
313	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
314	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
315	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
316	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
317	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
318	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
319	11/14/2024 14:23	0 %LEL	20.90%	0.0 ppm
320	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
321	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
322	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
323	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
324	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
325	11/14/2024 14:24	0 %LEL	19.70%	0.0 ppm
326	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm

327	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
328	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
329	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
330	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
331	11/14/2024 14:24	0 %LEL	20.90%	0.0 ppm
332	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
333	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
334	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
335	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
336	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
337	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
338	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
339	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
340	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
341	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
342	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
343	11/14/2024 14:25	0 %LEL	20.90%	0.0 ppm
344	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
345	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
346	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
347	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
348	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
349	11/14/2024 14:26	1 %LEL	20.90%	0.5 ppm
350	11/14/2024 14:26	7 %LEL	20.90%	0.9 ppm
351	11/14/2024 14:26	7 %LEL	20.90%	0.7 ppm
352	11/14/2024 14:26	1 %LEL	20.90%	0.3 ppm
353	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
354	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
355	11/14/2024 14:26	0 %LEL	20.90%	0.0 ppm
356	11/14/2024 14:27	0 %LEL	20.90%	0.0 ppm
357	11/14/2024 14:27	0 %LEL	20.90%	0.0 ppm
358	11/14/2024 14:27	0 %LEL	20.90%	0.3 ppm
359	11/14/2024 14:27	0 %LEL	20.90%	0.3 ppm
360	11/14/2024 14:27	9 %LEL	20.90%	2.5 ppm
361	11/14/2024 14:27	13 %LEL	20.90%	2.8 ppm
362	11/14/2024 14:27	13 %LEL	20.90%	2.1 ppm
363	11/14/2024 14:27	6 %LEL	20.90%	1.6 ppm
364	11/14/2024 14:27	1 %LEL	20.90%	0.9 ppm
365	11/14/2024 14:27	0 %LEL	20.90%	0.5 ppm
366	11/14/2024 14:27	0 %LEL	20.90%	0.3 ppm
367	11/14/2024 14:27	0 %LEL	20.90%	0.3 ppm
368	11/14/2024 14:28	0 %LEL	20.90%	0.4 ppm
369	11/14/2024 14:28	0 %LEL	20.90%	0.4 ppm
370	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm

371	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
372	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
373	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
374	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
375	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
376	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
377	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
378	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
379	11/14/2024 14:28	0 %LEL	20.90%	0.0 ppm
380	11/14/2024 14:29	0 %LEL	20.90%	0.0 ppm
381	11/14/2024 14:29	0 %LEL	20.90%	0.0 ppm
382	11/14/2024 14:29	0 %LEL	20.90%	0.0 ppm
383	11/14/2024 14:29	0 %LEL	20.90%	0.0 ppm
384	11/14/2024 14:29	0 %LEL	20.90%	0.0 ppm
385	11/14/2024 14:29	0 %LEL	20.90%	1.1 ppm
386	11/14/2024 14:29	4 %LEL	20.90%	1.6 ppm
387	11/14/2024 14:29	4 %LEL	20.90%	1.1 ppm
388	11/14/2024 14:29	0 %LEL	20.90%	1.2 ppm
389	11/14/2024 14:29	0 %LEL	20.90%	1.2 ppm
390	11/14/2024 14:29	2 %LEL	20.90%	2.4 ppm
391	11/14/2024 14:29	7 %LEL	20.90%	3.0 ppm
392	11/14/2024 14:30	7 %LEL	20.90%	4.0 ppm
393	11/14/2024 14:30	12 %LEL	20.90%	4.9 ppm
394	11/14/2024 14:30	12 %LEL	20.90%	4.0 ppm
395	11/14/2024 14:30	7 %LEL	20.90%	1.9 ppm
396	11/14/2024 14:30	1 %LEL	20.90%	0.8 ppm
397	11/14/2024 14:30	0 %LEL	20.90%	0.6 ppm
398	11/14/2024 14:30	6 %LEL	20.90%	2.5 ppm
399	11/14/2024 14:30	6 %LEL	20.90%	2.3 ppm
400	11/14/2024 14:30	2 %LEL	20.90%	1.0 ppm
401	11/14/2024 14:30	0 %LEL	20.90%	0.7 ppm
402	11/14/2024 14:30	0 %LEL	20.90%	0.3 ppm
403	11/14/2024 14:30	0 %LEL	20.90%	0.0 ppm
404	11/14/2024 14:31	0 %LEL	20.90%	0.3 ppm
405	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
406	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
407	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
408	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
409	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
410	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
411	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
412	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
413	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
414	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm

415	11/14/2024 14:31	0 %LEL	20.90%	0.0 ppm
416	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
417	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
418	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
419	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
420	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
421	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
422	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
423	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
424	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
425	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
426	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
427	11/14/2024 14:32	0 %LEL	20.90%	0.0 ppm
428	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
429	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
430	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
431	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
432	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
433	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
434	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
435	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
436	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
437	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
438	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
439	11/14/2024 14:33	0 %LEL	20.90%	0.0 ppm
440	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
441	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
442	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
443	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
444	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
445	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
446	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
447	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
448	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
449	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
450	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
451	11/14/2024 14:34	0 %LEL	20.90%	0.0 ppm
452	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
453	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
454	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
455	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
456	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
457	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
458	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm

459	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
460	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
461	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
462	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
463	11/14/2024 14:35	0 %LEL	20.90%	0.0 ppm
464	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
465	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
466	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
467	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
468	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
469	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
470	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
471	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
472	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
473	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
474	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
475	11/14/2024 14:36	0 %LEL	20.90%	0.0 ppm
476	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
477	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
478	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
479	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
480	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
481	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
482	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
483	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
484	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
485	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
486	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
487	11/14/2024 14:37	0 %LEL	20.90%	0.0 ppm
488	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
489	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
490	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
491	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
492	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
493	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
494	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
495	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
496	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
497	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
498	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
499	11/14/2024 14:38	0 %LEL	20.90%	0.0 ppm
500	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
501	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
502	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm

503	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
504	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
505	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
506	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
507	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
508	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
509	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
510	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
511	11/14/2024 14:39	0 %LEL	20.90%	0.0 ppm
512	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
513	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
514	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
515	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
516	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
517	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
518	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
519	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
520	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
521	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
522	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
523	11/14/2024 14:40	0 %LEL	20.90%	0.0 ppm
524	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
525	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
526	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
527	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
528	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
529	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
530	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
531	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
532	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
533	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
534	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
535	11/14/2024 14:41	0 %LEL	20.90%	0.0 ppm
536	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
537	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
538	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
539	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
540	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
541	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
542	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
543	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
544	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
545	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
546	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm

547	11/14/2024 14:42	0 %LEL	20.90%	0.0 ppm
548	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
549	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
550	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
551	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
552	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
553	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
554	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
555	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
556	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
557	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
558	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
559	11/14/2024 14:43	0 %LEL	20.90%	0.0 ppm
560	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
561	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
562	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
563	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
564	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
565	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
566	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
567	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
568	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
569	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
570	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
571	11/14/2024 14:44	0 %LEL	20.90%	0.0 ppm
572	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
573	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
574	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
575	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
576	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
577	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
578	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
579	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
580	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
581	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
582	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
583	11/14/2024 14:45	0 %LEL	20.90%	0.0 ppm
584	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
585	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
586	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
587	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
588	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
589	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
590	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm

591	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
592	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
593	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
594	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm
595	11/14/2024 14:46	0 %LEL	20.90%	0.0 ppm

TWA
*****
*****
1.0 ppm
25 ppm

CO(2000ppm)	Temperature
0 ppm	21.8 ℃
0 ppm	21.8 ℃
0 ppm	21.8 ℃
0 ppm	21.8 ℃
0 ppm	21.8 ℃
0 ppm	21.9 ℃
0 ppm	21.9 ℃
0 ppm	21.9 ℃
0 ppm	21.9 ℃
0 ppm	21.9 ℃
0 ppm	21.9 ℃
0 ppm	21.9 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.0 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃
0 ppm	22.1 ℃

0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.1 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	22.0 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.9 °C
0 ppm	21.8 °C
0 ppm	21.8 °C
0 ppm	21.8 °C
0 ppm	21.8 °C
0 ppm	21.8 °C
0 ppm	21.8 °C
0 ppm	21.7 °C
0 ppm	21.7 °C
0 ppm	21.7 °C

0 ppm	21.7 °C
0 ppm	21.7 °C
0 ppm	21.6 °C
0 ppm	21.6 °C
0 ppm	21.6 °C
0 ppm	21.6 °C
0 ppm	21.5 °C
0 ppm	21.5 °C
0 ppm	21.5 °C
0 ppm	21.5 °C
0 ppm	21.4 °C
0 ppm	21.4 °C
0 ppm	21.4 °C
0 ppm	21.3 °C
0 ppm	21.3 °C
0 ppm	21.3 °C
0 ppm	21.2 °C
0 ppm	21.2 °C
0 ppm	21.2 °C
0 ppm	21.2 °C
0 ppm	21.1 °C
0 ppm	21.1 °C
0 ppm	21.1 °C
0 ppm	21.0 °C
0 ppm	21.0 °C
2 ppm	21.0 °C
0 ppm	20.9 °C
0 ppm	20.9 °C
0 ppm	20.9 °C
0 ppm	20.8 °C
0 ppm	20.8 °C
0 ppm	20.8 °C
0 ppm	20.7 °C
0 ppm	20.7 °C
2 ppm	20.7 °C
2 ppm	20.6 °C
2 ppm	20.6 °C
0 ppm	20.6 °C
0 ppm	20.6 °C
0 ppm	20.5 °C
0 ppm	20.5 °C
0 ppm	20.5 °C
0 ppm	20.4 °C
0 ppm	20.4 °C

0 ppm	20.4 °C
0 ppm	20.4 °C
0 ppm	20.3 °C
0 ppm	20.3 °C
0 ppm	20.3 °C
0 ppm	20.3 °C
0 ppm	20.2 °C
0 ppm	20.2 °C
0 ppm	20.2 °C
0 ppm	20.1 °C
0 ppm	20.1 °C
0 ppm	20.1 °C
0 ppm	20.1 °C
0 ppm	20.1 °C
0 ppm	20.0 °C
0 ppm	20.0 °C
0 ppm	20.0 °C
0 ppm	20.0 °C
0 ppm	20.0 °C
0 ppm	19.9 °C
0 ppm	19.9 °C
0 ppm	19.9 °C
0 ppm	19.9 °C
0 ppm	19.8 °C
0 ppm	19.8 °C
0 ppm	19.8 °C
0 ppm	19.8 °C
0 ppm	19.8 °C
0 ppm	19.8 °C
0 ppm	19.7 °C
2 ppm	19.7 °C
2 ppm	19.7 °C
2 ppm	19.7 °C
2 ppm	19.6 °C
0 ppm	19.6 °C
0 ppm	19.6 °C
0 ppm	19.6 °C
2 ppm	19.6 °C
2 ppm	19.6 °C
0 ppm	19.5 °C
0 ppm	19.5 °C
0 ppm	19.5 °C
0 ppm	19.5 °C
0 ppm	19.5 °C

0 ppm	19.5 °C
0 ppm	19.4 °C
0 ppm	19.4 °C
0 ppm	19.4 °C
0 ppm	19.4 °C
0 ppm	19.4 °C
0 ppm	19.3 °C
0 ppm	19.3 °C
0 ppm	19.3 °C
0 ppm	19.3 °C
0 ppm	19.3 °C
0 ppm	19.3 °C
0 ppm	19.2 °C
0 ppm	19.2 °C
0 ppm	19.2 °C
0 ppm	19.2 °C
0 ppm	19.2 °C
0 ppm	19.1 °C
0 ppm	19.1 °C
0 ppm	19.1 °C
0 ppm	19.1 °C
0 ppm	19.1 °C
0 ppm	19.0 °C
0 ppm	19.0 °C
0 ppm	19.0 °C
0 ppm	19.0 °C
0 ppm	19.0 °C
0 ppm	18.9 °C
0 ppm	18.9 °C
0 ppm	18.9 °C
0 ppm	18.9 °C
0 ppm	18.9 °C
0 ppm	18.8 °C
0 ppm	18.8 °C
0 ppm	18.8 °C
0 ppm	18.8 °C
0 ppm	18.8 °C
0 ppm	18.8 °C
0 ppm	18.7 °C
0 ppm	18.7 °C
0 ppm	18.7 °C
0 ppm	18.7 °C
0 ppm	18.7 °C
0 ppm	18.7 °C

0 ppm	18.6 °C
0 ppm	18.6 °C
0 ppm	18.6 °C
0 ppm	18.6 °C
0 ppm	18.6 °C
0 ppm	18.6 °C
0 ppm	18.5 °C
0 ppm	18.5 °C
0 ppm	18.5 °C
0 ppm	18.5 °C
0 ppm	18.5 °C
0 ppm	18.5 °C
2 ppm	18.5 °C
2 ppm	18.4 °C
0 ppm	18.4 °C
0 ppm	18.4 °C
0 ppm	18.4 °C
0 ppm	18.4 °C
0 ppm	18.4 °C
0 ppm	18.4 °C
2 ppm	18.4 °C
2 ppm	18.4 °C
2 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.3 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.2 °C
0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.1 °C

0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.1 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	18.0 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.9 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.8 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.7 °C
0 ppm	17.6 °C
0 ppm	17.6 °C
0 ppm	17.6 °C
0 ppm	17.6 °C
0 ppm	17.6 °C
0 ppm	17.6 °C
0 ppm	17.6 °C

0 ppm	17.6 °C
0 ppm	17.6 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.5 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.4 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.3 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.2 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C

0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.1 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	17.0 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.9 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C

0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C
0 ppm	16.8 °C

APPENDIX 5
Future Monitoring Records
Exhibit 40
Page 211 of 211

ENVIRONMENTAL METHANE COMPLIANCE REPORT OF FINDINGS

Coffin Butte Landfill

28972 Coffin Butte Road
Corvallis, OR 97330

Prepared for:
Bret Davis
General Manager
Coffin Butte Landfill
BDavis220203@republicservices.com

January 2025
2024-377D

GuziWest
INSPECTION & CONSULTING

Signatory Page

Environmental Methane Compliance - Report of Findings
Coffin Butte Landfill

Prepared by:

Clay Guzi, 2-3-25
President/CEO Date

GUZIWEST INSPECTION & CONSULTING

Reviewed and approved by:

Ashley Giesa, 2-4-2025
Senior Industrial Hygienist Date

GHD

Reviewed and approved by:

Tamara House-Knight 2-3-25
Senior Toxicologist Date

GHD

Table of Contents

I. Introduction 1
II. Regulatory Background 1
III. Landfill Gas Collection & Control System (GCCS) 3
IV. CBL Methane Monitoring and Regulatory Compliance Record Review 4
V. Potential Health Effects of Methane, Carbon Dioxide, and Other Landfill Gases. 8
VI. Conclusions and Recommendations. 10
VII. References. 12

Appendix A **Figures**
Appendix B **Title V Operating Permit (Coffin Butte Landfill)**
Appendix C **Energyneering Solutions 2021 Gas Collection Control System Design Plan**
Appendix D **Instantaneous and Integrated Monitoring Flowcharts**
Appendix E **Table 1 - Instantaneous & Integrated Exceedances - Methane Surface Emissions**
Table 2 – Roseburg Landfill & CBL – Methane Exceedance Comparison
Appendix F **Roseburg Landfill Q2 2024 Surface Emissions Monitoring Report**
Appendix G **Corrective Actions/System Expansion Documentation**

I. Introduction

Guzi-West Inspection and Consulting, LLC (Guzi-West) was retained in May 2024 to provide environmental consulting services for the subject facility, Coffin Butte Landfill (CBL). CBL is located at 28972 Coffin Butte Road, Corvallis, OR 97330; see Figure 1, Appendix A. The CBL is owned and operated by Valley Landfills, Inc. (VLI). This report of findings presents the results of an independent review of the facility's management and permitting compliance of the landfill gas, methane, as well as if methane generation is likely to pose health concerns for the surrounding community. As explained in further detail below, our review focuses on monitoring events and corresponding reports from the third quarter of 2022 to the second quarter of 2024. Total methane production by the landfill and modeling of methane dispersement throughout the site and beyond are outside our scope of work. The report's findings, conclusions, and recommendations will not be submitted to regulatory agencies and/or other parties outside of VLI, unless Guzi-West is specifically authorized to do so by VLI. Guzi-West prepared the report in conjunction with GHD, a global, multidisciplinary professional services firm with expertise in the environmental, engineering, architecture, and design and construction fields. The Sections below present the air quality regulations governing the landfill; how the landfill controls, manages, and monitors methane and other landfill gases; the regulatory compliance record of CBL specific to methane; potential health effects of methane, carbon dioxide, and other landfill gases; and finally conclusions and recommendations. Again, this report primarily focuses on methane alone, but other landfill gases are briefly discussed where appropriate.

II. Regulatory Background

The facility began accepting waste in 1978, has a design capacity of approximately 39.7 million tons, and a projected closure date of 2041. The subject facility is regulated under numerous regulatory permits and as such numerous Plans, Manuals, and Documents go into varying levels of details based upon their specific topics; the additional Plans, Manuals, and Documents are available under separate cover by request. The primary regulations specific to air quality and the subject scope of work are as follows: the Clean Air Act (CAA), the National Emission Standards for Hazardous Air Pollutants (NESHAPs), the New Source Performance Standards (NSPS), and the landfill gas emission requirements specified within Oregon Administrative Rules (OAR) Chapter 340, Division 239. Title V of the CAA requires each state to develop a comprehensive operating permit program for major industrial sources of air pollution. Oregon's Department of Environmental Quality (DEQ) is the governing body responsible for enforcing facilities subject to Title V within the state of Oregon. CBL is an active municipal solid waste landfill (MSWLF) operating under Oregon DEQ Title V Operating Permit No. 02-9502-TV-01. CBL's Title V Permit was issued October 30, 2009 and was set to expire October 1, 2014 but has been administratively extended by Oregon DEQ to date; a copy of the permit is provided in Appendix B. The facility's Title V Permit imposes emission limits and standards, testing, monitoring, and recordkeeping requirements specified under the CAA, NESHAPs, and NSPS.

On March 10th, 2020, Oregon Governor, Kate Brown, signed Executive Order No. 20-04 which directed state agencies to reduce and regulate greenhouse gas emissions. In an effort to meet the Governor's directive, the Oregon Environmental Quality Commission (EQC) and DEQ subsequently conducted a formal Landfill Gas Emissions rulemaking where they evaluated regulations in effect in neighboring states and their approaches to regulating and reducing greenhouse gas emissions. This led to the adoption of Oregon-specific landfill gas emission rules.

CBL maintains greater than or equal to 200,000 tons of waste-in-place and as such is required to adhere to the emission limits and standards, testing, monitoring, and recordkeeping requirements specified within OAR Chapter 340 Division 239 (OAR 340-239), the conditions specified within OAR 340-239 are notably more stringent than federal regulations specified under the CAA, NESHAPs, and NSPS. Due to the increased requirements, CBL retained SCS Field Services (SCS-FS) in the Fall of 2022 to complete the required Surface Emissions Monitoring (SEM). As detailed in SCS-FS's quarterly reports and summarized immediately below, the following requirements are stricter than the NESHAP regulations and require additional compliance.

SURFACE EMISSION METHANE CONCENTRATION LIMITS

340-239-0200 (1) Surface Emission Methane Concentration Limits. Except as provided in OAR 340-239-0110(4), 340-239-0110(5), 340-239-0300, and 340-239-0600(1), beginning August 1, 2022, or upon commencing operation of a newly installed gas collection and control system or modification of an existing gas collection and control system pursuant to OAR 340-239-0110(1), whichever is later, no location on the landfill surface may exceed either of the following methane concentration limits:

> *(a) 500 parts per million by volume (ppmv), other than nonrepeatable, momentary readings, as determined by instantaneous surface emissions monitoring conducted in accordance with OAR 340-239-0800(3)(b);*
>
> *(b) An average methane concentration limit of 25 ppmv as determined by integrated surface emissions monitoring conducted in accordance with OAR 340-239-800(3)(c).*

The 500 ppmv limit is an existing requirement under Federal regulations, however the average methane concentration limit of 25 ppmv is unique to OAR 340-239.

SURFACE EMISSION RECORDKEEPING

340-239-0700 A landfill owner or operator subject to this division must maintain the following records for at least five years:

- *340-239-0700(2)(a)(C) All instantaneous surface readings of 100 ppmv methane or greater. All exceedances of the limits in OAR 340-239-0100(6)(b) and 340-239-0200, including the location of the leak (or affected grid), leak concentration in ppmv methane, date and time of measurement, the action taken to repair the leak, date of repair, any required remonitoring and the remonitored concentration in ppmv methane, wind speed during surface sampling, and the installation date and location of each well installed as part of a gas collection system expansion;*

The Federal regulations only require monitored surface emissions over 500 ppmv to be documented, thus recordkeeping is now kept on emission points 100 ppmv or over. All repeatable instantaneous records of 100 ppmv or higher (taken during SEM) must be kept for 5 years AND recorded in the semi-annual reports.

Guzi-West's compliance review for the subject facility is presented in Section IV and focuses on CBL's compliance record when the more stringent rules under OAR 340-239 became effective in the third quarter of 2022.

III. Landfill Gas Collection & Control System (GCCS)

All municipal waste landfills produce landfill gases and must utilize engineering controls to manage and control their production. Typically, landfill gases comprise a mixture of methane 45%-60% and carbon dioxide 40%-60% by volume. Common contaminant gases and the processes by which they are generated include:

- methane generated from the decomposition of organic materials by bacterial action under anaerobic conditions;
- carbon dioxide typically generated by oxidation of methane in aerobic layers surrounding the landfill;
- other gases, including sulphur dioxide, helium, hydrogen, and gaseous alkanes and alkenes associated with wastes and degradation products within the landfill;
- and organic vapours associated with the presence of petroleum and other hydrocarbon products.

CBL maintains landfill gases (LFG) via the utilization of a gas collection and control system (GCCS). A new GCCS Design Plan was prepared by Energyneering Solutions and submitted to CBL on December 9, 2021 in order to meet new requirements specified within OAR 340-239. A copy of the Plan is included in Appendix C, and the description presented herein is based upon the information presented within the Plan. Generally speaking, a network of extraction wells and vertical and horizontal piping are utilized to capture LFG and route it to the nearby electrical generation plant owned and operated by the Pacific Northwest Generating Cooperative (PNGC); see Figure 2, Appendix A. A Master Design Plan exists for the facility's GCCS in order to accommodate placement of additional components as additional waste is placed into new landfill cells, see Appendix C.

The operation of CBL's GCCS has been designed in accordance with 340-239-0110(1)(c)(C) in order to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment. Because CBL already had an established GCCS, it was capable of calculating the actual maximum gas flow rate using the equation from 40 CFR 60.755(a)(1)(ii). The maximum expected LFG flow rate for the site was used for sizing the GCCS. The LFG generation rate calculations were performed using the United States Environmental Protection Agency (EPA) Landfill Gas Emission Model (LandGEM) (values - k=0.04/year and L0=80 m3/Mg), historical waste receipts and the permitted design capacity of the facility. The maximum LFG generation rate is projected to be approximately 6900 standard cubic feet per minute (SCFM). The LandGEM emissions model is a design tool which uses the information available to project future operating conditions. This model was developed based upon operating conditions at a cross-section of landfills within the United States and is approved for use by the EPA. Actual operating parameters may dictate changes in the system flow characteristics and process equipment as the system is developed. The LandGEM model meets the requirements of OAR 340-239-0110(2).

As of 2021, the GCCS specifically consisted of 312 active vertical extraction wells and horizontal collectors that each adhere to a 55 feet minimum depth and 15 feet minimum spacing between wells. The GCCS includes LFG piping capable of maintaining an adequate vacuum even under maximum load of gases, trenching & sloping that consists of a 3% grade to ensure proper drainage of liquids towards the landfill, and wellheads equipped with positive closing throttle valves, and two sampling ports to measure oxygen and nitrogen concentrations. All aspects of the GCCS have

been constructed using PVC, high density polyethylene (HDPE) pipe, fiberglass, corrosion resistant steel, neoprene gaskets, and other non-porous corrosion resistant materials. Condensate that forms in the GCCS piping is discharged to the leachate collection system (LCS) via direct connections to LCS clean/access riser or to condensate pump stations located around the perimeter of the disposal area. Condensates are disposed of with landfill leachate in accordance with the requirements of the facility Solid Waste Permit. Again, collected LFG is directed to an electrical generation plant owned and operated by the Pacific Northwest Generating Cooperative (PNGC) which consists of three 3516 Caterpillar engines and two 3520 Caterpillar engines; the engines are respectively capable of combusting approximately 287 SCFM and 527 SCFM each. PNGC's system also includes two backup utility flares to handle excess LFG totaling 3,000 SCFM. Essentially, LFG is captured by the GCCS and routed to the PNCG power plant where it's utilized to generate power; excess LFG, if present, is routed to the facility utility flares. Flare exhaust and LFG flow rates are continuously monitored using a thermocouple installed at the flare tip and an orifice plate along LFG pipes downstream of the flare system in accordance with OAR 340-239-0110 (2)(c)(A)(ii)(I).

IV. CBL Methane Monitoring and Regulatory Compliance Record Review

CBL is required to adhere to the Clean Air Act (CAA), the National Emission Standards for Hazardous Air Pollutants (NESHAPs), the New Source Performance Standards (NSPS), and the landfill gas emission requirements specified within OAR 340-239. The most stringent standards must be adhered to and at this time the conditions specified within OAR 340-239 are equally or more stringent than the conditions specified in the CAA, NESHAPs, and the NSPS. OAR 340-239 references three primary types of surface emission measurements for methane: instantaneous, integrated, and pressurized piping and/or components. Instantaneous measurements are collected at a specific location and time, while integrated measurements are averages of several measurements across an area or grid. Concentration limits for instantaneous and integrated measurements are specified within OAR 340-239 where additional monitoring requirements and corresponding corrective actions are imposed based upon exceedances of the established limits. The flowchart presented in Appendix D depicts how exceedances over given limits trigger additional follow-up monitoring, tighter monitoring grids, and requirements for GCCS system expansion if the follow-up monitoring identifies remaining exceedances. For instance, should any measurements from instantaneous or integrated routine monitoring be in exceedance of the instantaneous methane limit of 500 ppmv and/or the integrated methane limit of 25 ppmv, the first re-monitoring event must occur 10-days from the initial exceedance. If the first re-monitoring event finds a second exceedance over the 500 ppmv or 25 ppmv threshholds, a second re-monitoring must be performed within 10 days. If the second re-monitoring identifies exceedances over the 25 ppmv integrated threshholds, GCCS system expansion must be performed no later than 120 days after the date the third exceedance was identified. Instantaneous exceedances are re-monitored in an initial 10-day monitoring period, 2nd 10-day monitoring period, as well as a 1-month follow-up monitoring period; GCCS system expansion must be performed no later than 120 days after the date the fourth exceedance was identified. Similarly, GCCS pressurized piping and/or components containing landfill gas under positive pressure must also be monitored for leaks. If a component leak is found exceeding 500 ppmv methane, it must be tagged and repaired within 10 days. The flowchart provided in Appendix D identifies additional requirements/actions for methane concentrations found between 100-499 ppmv, <100 ppmv. <25 ppmv and provides a visual representation of the instantaneous and integrated monitoring process.

As previously noted, Surface Emissions Monitoring (SEM) at CBL is conducted by SCS Field Services (SCS-FS) and in accordance with OAR 340-239 requirements. Per SCS-FS documentation, the subject facility is divided into a grid of 105 separate 50,000 square foot areas; see Figure 3, Appendix A for an aerial photograph of the landfill with an overlay of the 105 separate grids. Surface emissions readings are recorded every five seconds while SCS-FS personnel walk monitoring pathways through the 105 grids. Meanwhile, instantaneous measurements are collected from cracks, holes, and other cover penetrations in the surface. Any instantaneous measurements exceeding the 100 or 500 ppmv standards (reporting and compliance levels, respectively) are GPS tagged and stake-marked for onsite personnel to perform remediation or repairs. The integrated averages for each grid are based on the readings collected every 5 seconds and stored on the instrument. The readings are downloaded, and the averages calculated for each grid using SCS eTools®. The most recent SCS-FS quarterly SEM report (Q2 2024) specifies monitoring is being performed on 25-foot pathways based on a prior inspection, in which exceedances were observed. As stipulated in OAR, if uncorrectable exceedances within the 10-day limitation are detected or emissions are discovered during an inspection by Regulatory Agencies, the landfill must perform monitoring on a 25-foot pathway on a quarterly basis for active disposal sites. Upon completion of four consecutive SEM events without an uncorrectable exceedance of the 25 ppmv or 500 ppmv standards, other than non-repeatable momentary readings, the landfill may perform the quarterly monitoring on a 100-foot spacing. Figure 4, Appendix A, depicts the monitoring pathway utilized by SCS-FS during the most recent field monitoring events conducted on June 11, 16, 18, 24, 26, and July 6, 16, and 26, 2024. The monitoring equipment includes a Thermo Scientific TVA 2020 Portable Flame Ionization Detector (FID) and a Weather Anemometer. The FID measures airborne methane between 1-50,000 ppmv and is calibrated in accordance with EPA Method 21. The Weather Anemometer records the weather conditions onsite, ensuring accurate measurement conditions (monitoring cannot be performed in wind exceeding 10mph or rain). To collect measurements, the FID inlet is held within 2 inches of the landfill surface while walking the grid in parallel paths. During monitoring for the pressurized pipe and components, the FID inlet is held a half inch from the component. Instantaneous monitoring results are recorded onsite if a reading above the 100 ppmv reporting threshold or the 500 ppmv compliance threshold is noted. Again, integrated monitoring results are calculated from the measurements collected every five seconds while SCS-FS traverses monitoring paths within each established grid; the measurements are stored on the FID and subsequently averaged to determine an integrated average for each of the 105 grids. The compliance summary presented below focuses on CBL's compliance record when the more stringent rules under OAR 340-239 became effective in the third quarter of 2022. Table 1, Appendix E, identifies the monitoring period, instantaneous, integrated, and pressurized piping and/or component monitoring results broken down by 'initial', '1st 10-day re-monitoring', '2nd 10-day re-monitoring', '1-month re-monitoring' (instantaneous only), as well as any notes made during Guzi-West's review.

Monitoring and determining compliance for an active landfill is uniquely challenging in that new material is constantly being added, settling, and decaying, which results in the generation of increasing amounts of landfill gas. OAR 340-239 appears to provide a structure for more frequent and stringent monitoring of landfill gas generation where initial exceedances are warning signs that trigger tighter monitoring pathways, frequency, recordkeeping, etc. Close follow-up is required for re-monitoring to determine if the landfill was able to implement corrective actions to reduce the initial exceedance below regulatory thresholds. In the event the exceedances remain above the thresholds for consecutive monitoring events, then corrective actions, ultimately involving system expansion, must be implemented. Thus, exceedances appear to be a relatively

expected outcome when operating an active municipal solid waste landfill. In our interpretation, the goal of OAR 340-239 is to cumulatively reduce landfill gas generation within the State of Oregon, thereby reducing greenhouse gas emissions within the state, by requiring landfill operators to more closely monitor and manage landfill gas generation. In that sense, we expect CBL's 'compliance' to be measured as much by the implementation of corresponding corrective actions after an exceedance, as by the record of compliance/exceedance of emission measurements alone.

As depicted on Table 1, Appendix E, eight individual quarters were evaluated for CBL during our review (Q3 2022 – Q2 2024) and instantaneous and/or integrated exceedances were identified in each of the eight quarterly monitoring events. Five quarters had individual exceedances which remained above regulatory threshold from the initial monitoring, 1st 10-day re-monitoring, 2nd 10-day re-monitoring, and 1-month re-monitoring events thereby requiring system expansion. Six quarters had integrated exceedances which remained above regulatory threshold from the initial monitoring, 1st 10-day re-monitoring, and the 2nd 10-day re-monitoring events thereby requiring system expansion. CBL, in turn, performed gas collection and control system expansions within 120 days following each individual and/or integrated exceedance during the subject review period (Q3 2022 – Q2 2024).

Due to the previously mentioned challenge of assessing landfill gas production for an active landfill, Guzi-West felt comparisons to other Oregon landfills would give the best representation of if CBL's methane exceedances and accompanying corrective actions were typical in the industry or not. Guzi-West submitted a freedom of information act request to the Oregon DEQ on October 31, 2024 for quarterly SEM reports from the third quarter of 2022 to the second quarter of 2024 for the Columbia Ridge, Knott, and Roseburg Landfills; all of which are representative landfills for comparison. Initially, a single quarterly SEM report was provided for Q2 2024 for the Roseburg Landfill; all other reports provided were annual and semi-annual summary reports. Unfortunately, the annual and semi-annual reports do not contain the level of detail quarterly reports do and thus statistical comparisons were generally not possible. Specifically, the annual and semi-annual reports do not include, and are not required to, the total number of integrated and instantaneous measurements for a given monitoring event, definitions for single measurements, etc. (i.e. the reports typically provide summaries of the number of total exceedances, but not how many overall measurements were collected for a given monitoring event where statistical analyses could be calculated and compared between landfills). Guzi-West made numerous additional requests for quarterly reports for the additional landfills; ultimately, Oregon DEQ Air Quality Permit Coordinator, Cynthia Ferris, explained that, "Generally, the SEM reports are hidden within the annual and semi-annual reports. We don't receive separate reports from the facilities each quarter. The permit only requires reporting of instantaneous surface methane readings greater than 100 ppm (Condition 51.a.i) and says nothing of reporting the integrated measurements, so we may not have that information, but the source is required to keep those records." Essentially, what is contained in the annual and semi-annual reports is all that is required to be kept by Oregon DEQ and by extension all that can be requested from them. Nevertheless, the one quarterly SEM report that was provided was the Q2 2024 report from the Roseburg Landfill does provide a direct comparison for a randomly selected snapshot in time; a copy of the report is provided in Appendix F. Both CBL and Roseburg Landfill are municipal solid waste landfills, with Roseburg Landfill being roughly a fifth of the size of CBL. Further, SCS Engineers performs the surface emissions monitoring at the Roseburg Landfill, the same firm that performs surface emissions monitoring for CBL, making it ideal for comparison as similar or identical equipment, employees, and standard operating procedures were utilized. We recognize and acknowledge comparison of a single

quarterly event is insufficient to determine compliance over time between the two facilities; however, the goal of making the comparison is to gauge what is typical in the industry. Even comparison of a single monitoring event can provide the general public, report readers, and CBL staff a valuable assessment of how CBL compares against industry peers. It should be noted the EPA collected instantaneous measurements for the CBL during the second quarter of 2024, but did not for the Roseburg Landfill. The most representative method of comparing the landfills is to utilize data only collected by SCS-FS due to the reasons specified above regarding the same employees, standard operating procedures, etc.; regardless, the data is presented and analyzed both including and excluding the EPA data. As shown in Table 2, Appendix E, 63% of the instantaneous measurements collected from the Roseburg Landfill exceeded the 500 ppmv methane limit in the initial monitoring event (12 of the 19 instantaneous measurements) compared to 56% of the CBL for the same period (22 of the 39 instantaneous measurements). If the EPA measurements are included for CBL, 78% of the instantaneous measurements exceeded the 500 ppm methane limit (63 of the 80 measurements). The Roseburg Landfill did not have any exceedances of the integrated methane limit, 25 ppm, and 42 grids were monitored out of the total 54 grids present. Grids are not monitored, or required to be, if active landfill operations are occurring in a given grid. Meanwhile, 7% of the CBL integrated grids monitored exceeded the integrated methane limit (3 of the 42 grids monitored). No integrated measurements were collected/calculated by the EPA.

The second component analyzed was how quickly were the instantaneous and integrated exceedances able to be corrected by either facility. The Roseburg Landfill was able to implement corrective actions wherein the first 10-day re-monitoring event showed no exceedances of the instantaneous limit remained; CBL was unable to implement successful corrective actions for 16 of the 17 instantaneous exceedances and system expansion was required in those areas. CBL was able to implement corrective actions for the integrated exceedances and all 3 integrated exceedances returned to below methane limits within the first 10-day monitoring event. Generally speaking, the number of exceedances between the two facilities is comparable, while the Roseburg Landfill was able to implement corrective actions more quickly to resolve the issues identified in the instantaneous exceedances. CBL was able to implement corrective actions to resolve the exceedances of the integrated limit, but the instantaneous exceedances identified led to the expansion of the gas collection and control system as corrective actions were unable to be implemented within one month. In summary, we expect this comparison to be typical of the industry where some landfills will have more exceedances than others in given quarters; corrective actions will be quickly and easily implemented for some areas where exceedances are required while other exceedances will identify areas wherein system expansion is required. Our interpretation remains that the regulation, by design, is meant to encourage continuous adaptive solutions to identified problems as the need arises. The triggers for re-monitoring and eventually system expansion are in place to allow a facility to attempt to rectify exceedances with small scale solutions until it becomes apparent that the system itself needs additional resources to handle the amount of gas that the landfill is producing. The purpose of the regulation is not to prevent exceedances, it is to use the identification of exceedances as a guide to address the facility's gas collection and control needs.

V. Potential Health Effects of Methane, Carbon Dioxide, and Other Landfill Gases

CBL requested Guzi-West objectively review the site's generation of the landfill gas, methane, and any potential health effects it could pose to the community surrounding the facility. Presented below is a discussion of the typical health effects associated with landfill gases, regulatory limits and health-based goals for the primary landfill gases (methane and carbon dioxide), the exposure paths landfill gases typically follow, and finally an evaluation of the subject facility's potential impacts to the community.

The primary gases produced by a landfill are methane and carbon dioxide making up 99%, or greater, of gases typically produced. In addition to methane and carbon dioxide, landfill gases can also contain trace amounts of other gases, including volatile organic compounds (VOCs) and hazardous air pollutants. According to the Agency for Toxic Substances & Disease Registry (ATSDR) (a federal public health agency of the U.S. Department of Health and Human Services), the short-term and long-term effects associated with landfill gases can include the following:

1. **Short-Term Effects**:
    - Odors: Unpleasant odors from sulfur compounds can cause headaches, nasal congestion, eye, nose, and throat irritation, cough, and nausea.
    - Respiratory Issues: Exposure to landfill gas can exacerbate asthma and other respiratory conditions.
    - Direct Exposure: People living near landfills may experience skin irritation or dermatitis from contact with contaminated soil or water.
    - Eye Irritation: Gases like H_2S can cause eye irritation, redness, and watering.
2. **Long-Term Effects:**
    - Mental Health: Persistent odors and health concerns can lead to stress and anxiety among community members.
    - Carcinogenic Risks: Though they are normally only present in landfill gas in small quantities and therefore unlikely to cause any community health effects, it is well known that VOCs such as benzene and other non-methane organic compounds pose a carcinogenic hazard to human health.
    - Chronic Exposure: Prolonged exposure to low levels of certain VOCs can lead to more serious neurological effects, including cognitive impairments.

Methane and carbon dioxide are both classified as simple asphyxiants meaning that, within enclosed areas, either gas can build up and displace oxygen creating an oxygen deficient atmosphere. Further, methane is considered a flammable gas while carbon dioxide is not. Regulatory limits and health-based values for both gases are discussed immediately below. The Occupational Safety and Health Administration (OSHA) defines an oxygen deficient atmosphere as an oxygen content below 19.5% by volume. OSHA has not established a Permissible Exposure

Limit (PEL) for methane; however, OR-OSHA has an established methane PEL of 1,000 parts per million (ppm) when evaluated as an 8-hour time weighted average, a 30-minute excursion limit of 3,000 ppm (3x the PEL), and a ceiling limit of 5,000 ppm (5x the PEL). Federal OSHA and OR-OSHA have established the same PEL for carbon dioxide at 5,000 ppm (0.5% CO2 in air) averaged over an 8-hour workday, and OR-OSHA has further established 15,000 ppm as a 30-minute excursion limit (3x the PEL), and a ceiling limit of 25,000 ppm (5x the PEL). Per the National Institute for Occupational Safety and Health (NIOSH), methane is considered a flammable gas with a lower explosive limit (LEL) of 5% by volume and an upper explosive limit (UEL) of 15% by volume. NIOSH has established health-based immediately dangerous to life or health (IDLH) values which are set at 10% of the LEL for specific air contaminants, including methane, because the explosive hazards are deemed a greater risk; the IDLH for methane is 5,000 ppm (10% of the LEL for methane, which is 50,000 ppm). Carbon dioxide has an established IDLH of 40,000 ppm.

There are generally considered two main exposure paths that landfill gases can take to affect community health:

1. **Subsurface Migration**: Gases can move through the soil and enter structures or utility corridors adjacent to the landfill. These exposure routes can be mitigated and reduced by appropriate design of landfill gas collection systems and equipment as well as regular air quality monitoring. The 2021 Gas Collection and Control System Design Plan prepared by Energyneering Solutions (Appendix C) depicts and describes how landfill gases are captured, monitored, and reported in detail.

2. **Ambient Air**: Gases can migrate from the landfill surface into the surrounding air, carried by the wind. Figure 5, Appendix A, identifies the parcels owned by CBL, as well as parcels of surrounding property owners.

Subsurface migration of methane is a well-known concern for landfill facilities; again, the facility's gas collection and control system (Appendix C) addresses the engineering design for collection of landfill gases facility-wide, specifies how subsurface methane migration is monitored and reported, and identifies future expansion of the system. Each month CBL personnel measure methane concentrations down to 0.1% in six landfill gas probes installed in-ground to monitor any subsurface migration of landfill gases. As depicted in Figure 6, Appendix A, the sub surface gas probes are located along the south-southwestern portion of the landfill wherein CBL has gas and leachate collection lines are routed throughout the landfill to the PNGC power facility. No other power lines or other public utilities are present within the footprint of the CBL facility (i.e. the only subsurface utilities on-site are those associated with CBL's landfill gas and leachate collection system). In addition to the probe monitoring, each month CBL personnel measure methane concentrations down to 0.1% in the interiors of eight site buildings and structures owned and utilized by CBL. The monitoring results for landfill gas monitoring, including those associated with landfill gas probes around the perimeter of the landfill, are reported annually in the facility's Annual Environmental Monitoring Report. Based upon electronic records from 2006 to 2023, as well as an anecdotal information provided by Ian Macnab, CBL Environmental Manager, methane has not been detected in any monthly monitoring event within the six probes, nor within the interiors of the eight buildings and structures since at least 2006. Records prior to 2006 were not reviewed.

The second potential route of community exposure is migration through ambient air wherein landfill gases can escape from the landfill surface and be carried by the wind into the community.

This appears to be a significant concern in the community based upon local reporting where references to instantaneous measurements with concentrations exceeding 100,000 ppm have been identified on-site. Evaluating potential community impacts with instantaneous readings is inferior in our opinion to utilizing integrated readings. Instantaneous readings are typically collected from a given area of concern (i.e. a hole in a landfill liner, below temporary tarps and cover, etc.) and represent 'hot spots' wherein measurements are collected to determine if immediate corrective actions are required. This is demonstrated in the previously referenced CBL Q2 2024 SEM report where the EPA identified a methane concentration of 118,265 ppm in an instantaneous reading collected on June 26, 2024, from location A20 (this measurement is the highest single measurement ever identified from Q3 2022 to Q2 2024). As required by OAR 340-239, the same location was subsequently remeasured on July 6, 2024, following implementation of corrective actions and a methane concentration of 27 ppm identified. Similarly, the EPA identified 41 instantaneous readings above 500 ppm in their June 26, 2024 field inspection, all but 2 of those locations had fallen below 500 ppm when remeasured on July 6, 2024. In contrast, the integrated monitoring utilizes 105 separate grids divided evenly across the landfill, and methane measurements are automatically collected every five seconds with an FID as field personnel systematically traverse across the defined grids collecting measurements within 2-inches of the landfill surface. Averages are then calculated for each grid utilizing thousands of individual methane measurements and each grid average then compared against the 25 ppmv methane limit. By averaging thousands of measurements, the high measurements are still included but their significance can be seen as a whole for the entire grid, as well as for the landfill as a whole. For these reasons we believe the integrated monitoring measurements are the superior data set to evaluate the landfill's cumulative methane generation and potential impacts to the community. The modeling of landfill gas migration is beyond our scope of work; however, landfill gases are well known to dissipate in ambient air the further away one travels from the landfill/source. Therefore, to provide a general understanding of the likelihood of impacts to the community, Guzi-West identified the highest integrated methane level identified for a given grid to date and subsequently compared that grid to the regulatory limits and health-based goals in order to provide a worst case scenario analysis specific to methane. That is, comparing the highest integrated methane concentrations identified on-site provides a worst-case scenario analysis as the concentrations are known to dissipate in ambient air as you move away from the landfill itself and toward the property boundary and the surrounding community. Since integrated monitoring began to be required under OAR 340-239 (third quarter of 2022), the highest average measurement for any single grid was 217.64 ppmv as measured during the second quarter of 2023; this is 4.5 times below the OR-OSHA PEL for methane (1,000 ppm), 22 times below the IDLH for methane (5,000 ppm), and 229 times below the lower explosive limit for methane (50,000 ppm).

VI. Conclusions and Recommendations

Guzi-West's scope of work focused on evaluating the subject facility's permitting compliance specific to the landfill gas, methane, in addition to evaluating if methane gas production from the facility is posing a health risk to the surrounding community. Our evaluation was done against the backdrop of a relatively newly implemented Oregon rule (OAR 340-239), which imposed more stringent requirements specific to landfills and methane production, monitoring, recordkeeping and reporting. As previously mentioned, monitoring and determining compliance for an active landfill is uniquely challenging in that new material is constantly being added, settling, and decaying, resulting in the generation of increasing amounts of landfill gas. Eight consecutive

quarterly reports were reviewed for the subject site starting in quarter three of 2022 and ending in quarter two of 2024; CBL had repeated individual exceedances in five quarters and repeated integrated exceedances in six quarters, which collectively triggered corrective actions and/or system expansion to be performed. As required by OAR 340-239, CBL implemented corrective actions within 120 days for each area wherein exceedances were identified. Guzi-West felt comparisons to other Oregon landfills would give the best representation of if CBL's methane exceedances and accompanying corrective actions were typical in the industry or not. Although obtaining quarterly reports for numerous landfills for the same monitoring period proved impossible, a quarterly SEM report from Roseburg Landfill was able to be obtained and provided a direct comparison for a representative facility. The number of exceedances between the two facilities was comparable, while the Roseburg Landfill was able to implement corrective actions more quickly to resolve the issues identified in the instantaneous exceedances for the subject monitoring period. In the end, we anticipate this comparison to be typical of the industry wherein some landfills will have more exceedances than others in given quarters; corrective actions will be quickly and easily implemented for some areas where exceedances are required while other exceedances will identify areas wherein system expansion is required. Our interpretation remains that the purpose of the regulation is not to prevent exceedances, it is to use the identification of exceedances as a guide to address the facility's gas collection and control needs. CBL is operating in compliance with OAR 340-239, and we expect their monitoring, reporting, and overall compliance record to be similar to that of their industry peers.

In the evaluation of landfill gases and potential impacts to the community surrounding the CBL facility, Guzi-West first assessed the potential exposure pathways landfill gases could follow. No measurable methane concentrations have been identified migrating in the subsurface since at least 2006 in the closest and most likely areas where landfill gases would be expected to migrate. Therefore, we conclude it is very unlikely subsurface migration of landfill gases is occurring and potentially impacting the surrounding community. A methane concentration of 100,000 ppm or greater was identified at the facility and is well above the lower explosive limit for methane (50,000 ppm), however re-monitoring of the same location following implementation of corrective actions resulted in a concentration of 27 ppm. These measurements were taken during instantaneous monitoring which, while useful for identifying precise locations of methane release, is not representative of the broader system, a metric that integrated monitoring captures more accurately. Further, methane and carbon dioxide can cause potential hazards within confined spaces (either due to the creation of an oxygen deficient atmosphere, and/or in the case of methane, due to the creation of an explosive risk); that said, neither gas is expected to pose asphyxiation or explosive concerns in ambient air to the community surrounding CBL. This opinion is largely based upon the results of the integrated monitoring conducted at the subject facility, which began to be required under OAR 340-239 at the start of the third quarter of 2022. The highest average methane emission for any single CBL grid was 217.64 ppm measured during the second quarter of 2023; this is 4.5 times below the OR-OSHA PEL for methane (1,000 ppm), 22 times below the IDLH for methane (5,000 ppm), and 229 times below the lower explosive limit for methane (50,000 ppm). This risk is further reduced in ambient air the farther one travels away from the landfill. In conclusion, it doesn't appear methane or carbon dioxide are likely to be present at concentrations that pose any immediate health concerns to the surrounding community. Community concerns regarding increasing greenhouse gas emissions from landfills and all sources is outside the scope of this project.

Although OAR 340-239 does not specifically require mapping and a detailed description of what the system expansion consisted of, we recommend CBL personnel keep a log of the components making up the system expansion, implementation date/s, along with mapping of what was added. Appendix G serves as a placeholder for this documentation. We recommend CBL consider implementation/expansion of continuous air monitoring devices around the property boundary to monitor and guide corrective actions on-site in regards to air quality, as well as to demonstrate to the local community CBL's commitment to continuous compliance with applicable air quality regulations. This, along with consistent community engagement. appear to be the key in developing/re-establishing community trust, and showing that CBL is now, and will continue to operate within compliance of all regulatory permits at the site.

VII. References

1. Oregon Department of Environmental Quality, Chapter 340 Division 239 Landfill Gas Emissions, Oregon Secretary of State Website, Oregon State Government, https://secure.sos.state.or.us/oard/displayDivisionRules.action;JSESSIONID_OARD=vLBhHxWySNDU4cA9c9f3TBy7UG2rlPassQ563SVBaem2TLpUJavH!-211748414?selectedDivision=6533
2. The Agency for Toxic Substances & Disease Registry 2001, ATSDR Website, U.S. Health and Human Services Department, U.S. Government, accessed 9/25/2024, https://www.atsdr.cdc.gov/HAC/landfill/html/intro.html

3. The National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards, NIOSH website, U.S. Centers for Disease Control (CDC), U.S. Government, accessed 9/25/2024, https://www.cdc.gov/niosh/npg/default.html

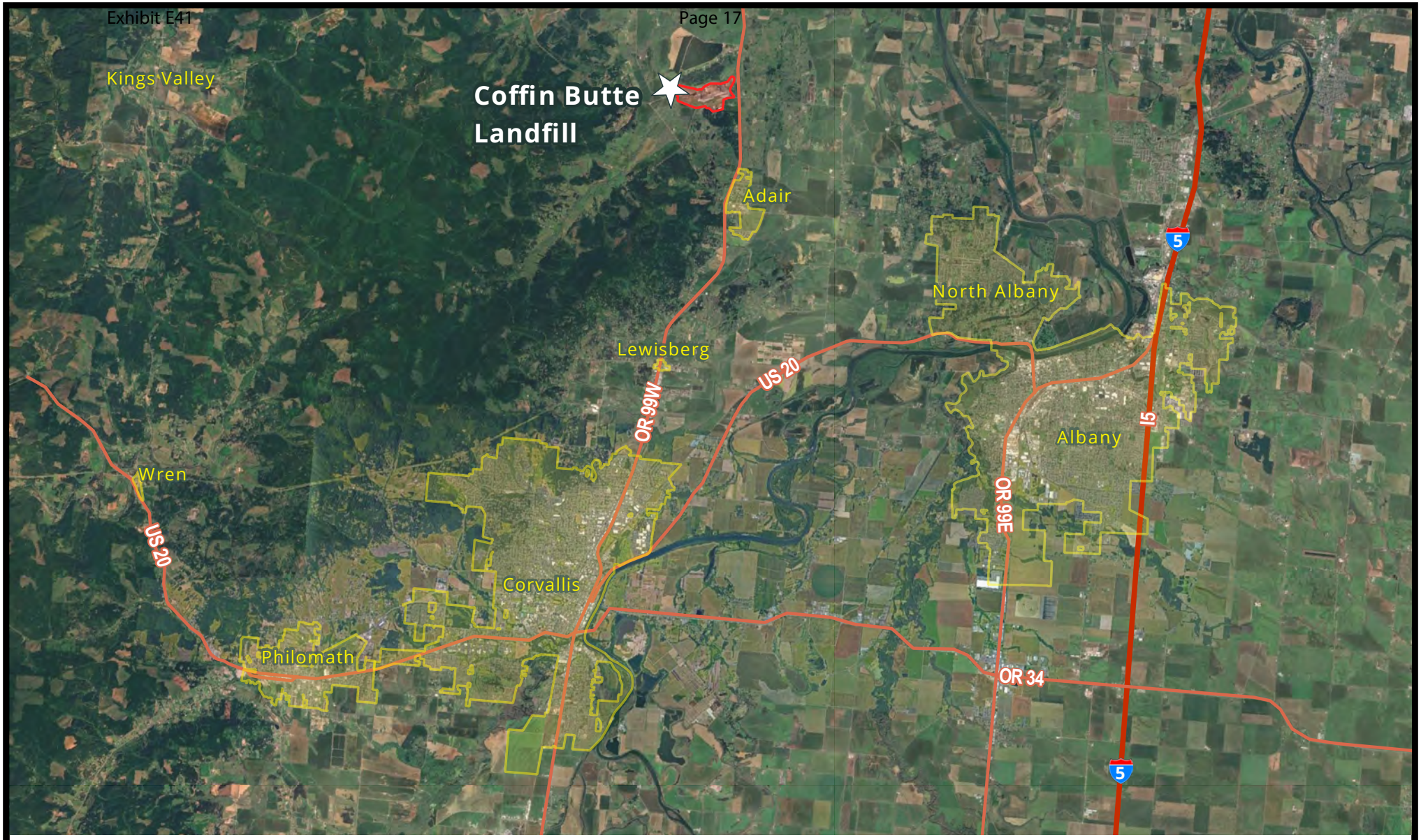
4. SCS Field Services, Oregon Landfill Gas Emissions Rule (OAR) and Surface Emissions Monitoring Q3 & Q4 2022, Q1, Q2, Q3, & Q4 2023, Q1 & Q2 2024, Coffin Butte Landfill. 1/6/2023, 1/23/2023, 5/19/2023, 8/17/2023, 11/15/2023, 1/16/2024, 5/15/2024, 8/19/2024

5. Energyneering Solutions, 2021 Gas Collection and Control System Design Plan, Coffin Butte Landfill. 12/9/2021

6. Ian Macnab, Republic Services – Coffin Butte Landfill Environmental Manager, personal communication, 11/13/2024

APPENDIX A

Figures



0 1 2 mi

NOT TO SCALE - FOR APPROXIMATION ONLY

Datum: North American Datum 1983
Projection: StatePlane California I
FIPS 0401 Feet
Cartographer: Taylor Bradley

North

GuziWest INSPECTION & CONSULTING

Last Modified On: 8/22/2024
Job Number: 2024-377B

Figure 1 - Vicinity Map

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

Disclaimer: Sample locations on map are estimated. They do not represent all homogenous areas where this material may be found. Map is not intended to function as architectural or engineering plans.

0 400 800 1,200 Feet

NOT TO SCALE - FOR APPROXIMATION ONLY

Datum: North American Datum 1983
Projection: StatePlane California I
FIPS 0401 Feet
Cartographer: Taylor Bradley

North

GuziWest INSPECTION & CONSULTING

Last Modified On: 9/18/2024
Job Number: 2024-377B

Figure 2 - Proximity to Power Station

Coffin Butte Landfill
28972 Coffin Butte Road
Corvallis, OR 97330

Disclaimer: Sample locations on map are estimated. They do not represent all homogenous areas where this material may be found. Map is not intended to function as architectural or engineering plans.

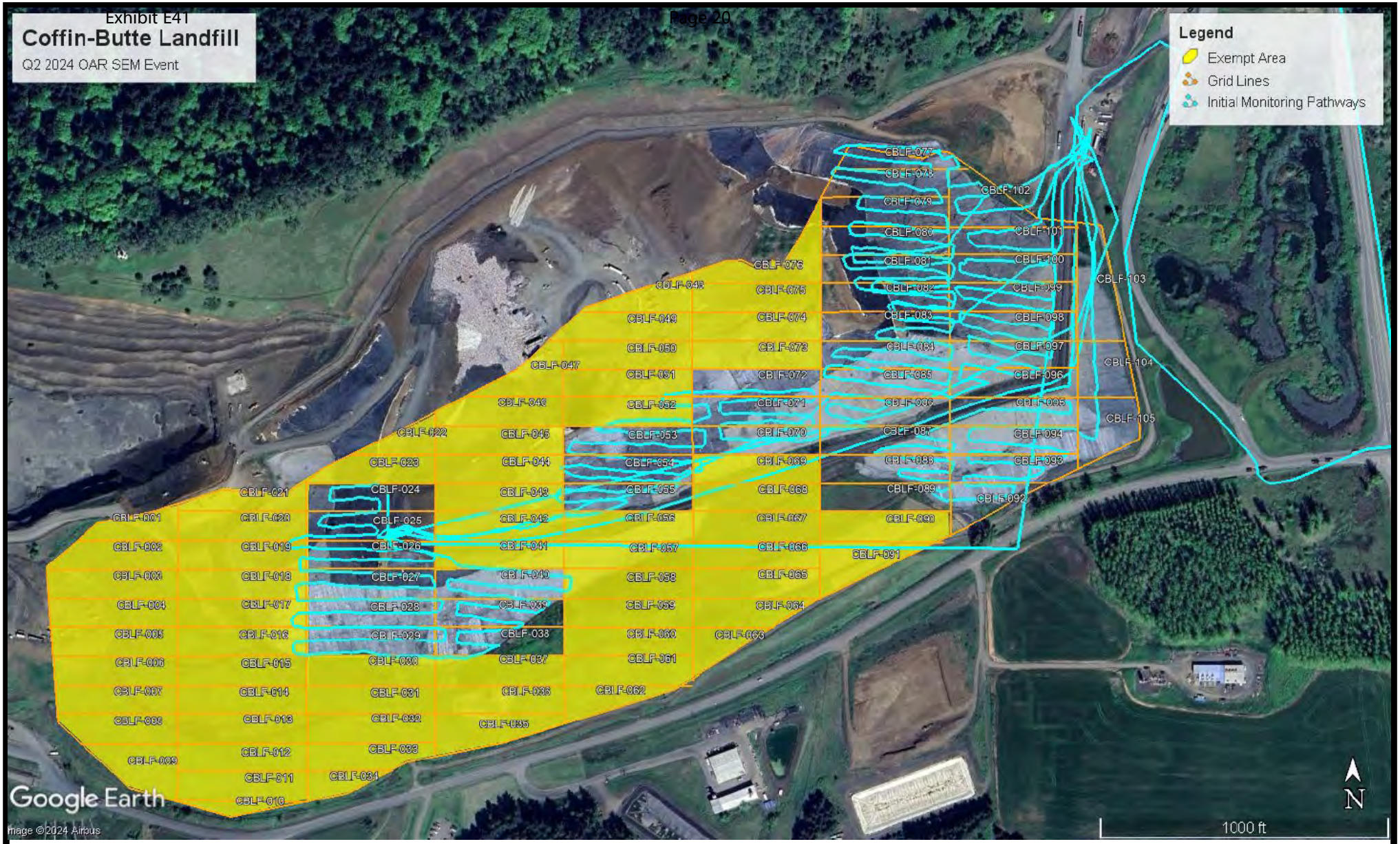
Originial map created by:
SCS - Field Services
Original map name: Surface Emissions Monitoring Site Grid Map

GüziWesT INSPECTION & CONSULTING

Last Modified On: 9/19/2024
Job Number: 2024-377B

Figure 3 - SCS Monitoring Grid Map

Coffin Butte Landfill
28972 Coffin Butte Road, Corvallis, OR 97330



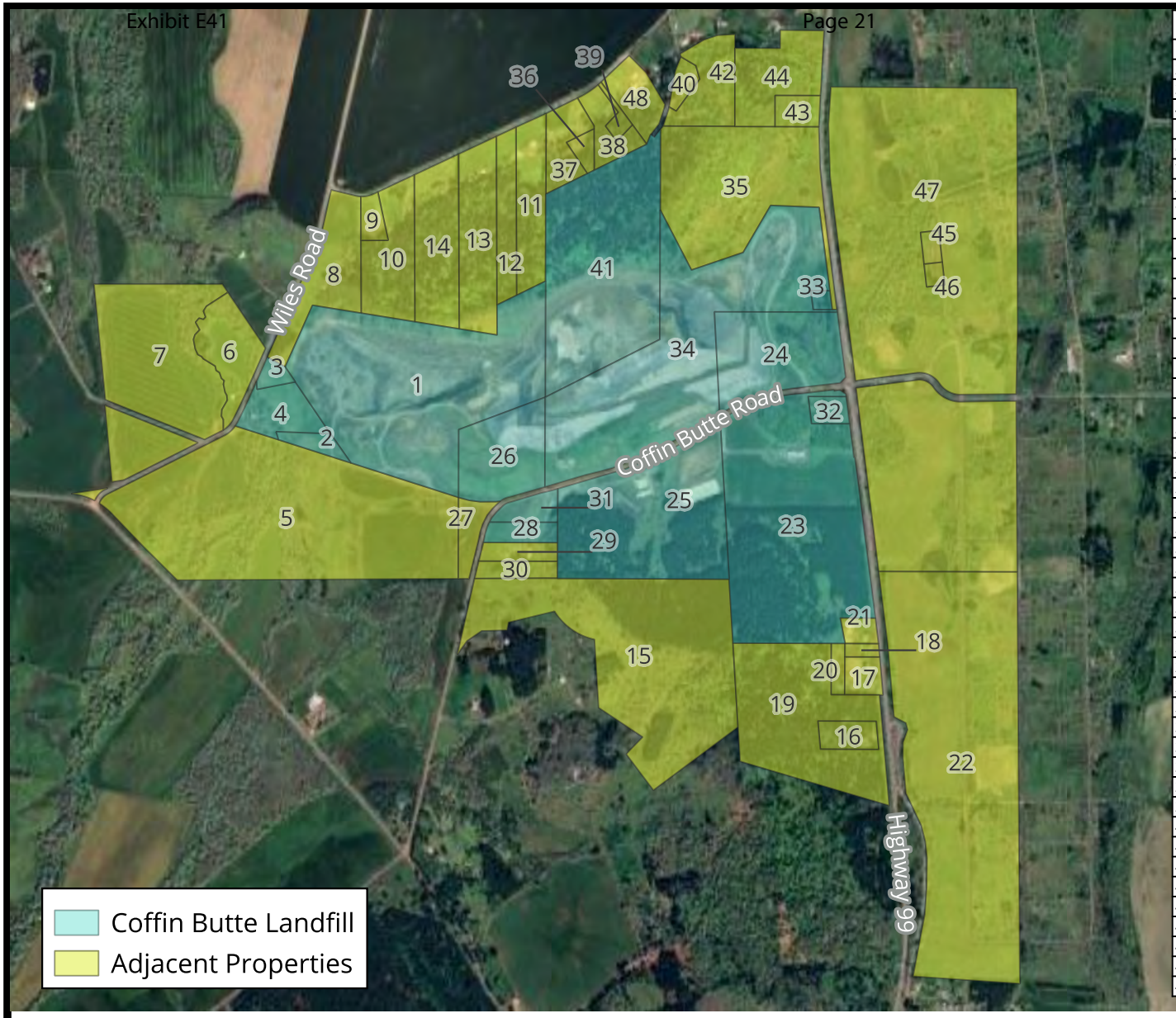
Originial map created by:
SCS - Field Services
Original map name: Second Quarter 2024
Initial Surface Emissions Monitoring Pathway

GüziWesT
INSPECTION & CONSULTING

Last Modified On: 9/19/2024
Job Number: 2024-377B

Figure 4 - SCS Emission Monitoring Pathway

Coffin Butte Landfill
28972 Coffin Butte Road, Corvallis, OR 97330



No.	Taxlot Number	Party Name
1	105130001000	VALLEY LANDFILLS INC
2	105130000902	VALLEY LANDFILLS INC
3	105130000901	VALLEY LANDFILLS INC
4	105130000900	VALLEY LANDFILLS INC
5	105130000800	VALLEY LANDFILLS INC
6	105130000601	GOETZINGER DALE L & MONA G
7	105130000600	WINN TERRILL JAMES & APRIL DOVE
8	105130000400	BRISKEY JOINT REVOCABLE LIVING TRUST
9	105130000301	SEARS ROLLIN & DONNA JEANNE
10	105130000300	DENOMA JOHN T JR & SEARS DONNA J
11	105130000203	HARRISUE BERKLUND REV LIVING TRUST
12	105130000202	HARRISUE BERKLUND REV LIVING TRUST
13	105130000201	DAVID & DEBRA HACKLEMAN TRUST
14	105130000200	HACKLEMAN DAVID E & DEBRA M, TR
15	10419B001600	VALLEY LANDFILLS INC
16	104190000700	MORRELL JEFFREY J & PATRICIA D
17	104190000600	CRESS MERRILL
18	104190000500	GEIER JOEL E & REBECCA S SHERMAN
19	104190000402	ROBERT J & JULIE A KIPPER TRUST
20	104190000401	SEARLS JAMES CLUETT
21	104190000200	BRADLEY LOWELL THOMAS & MARY ERIN
22	104190000100	OREGON STATE GAME COMMISSION
23	104180001200	VALLEY LANDFILLS INC
24	104180001108	VALLEY LANDFILLS INC
25	104180001107	VALLEY LANDFILLS INC
26	104180001106	VALLEY LANDFILLS INC
27	104180001105	PELTIER REAL ESTATE CO
28	104180001104	VALLEY LANDFILLS INC
29	104180001103	PHILLIPS SAMUEL F & CHERYL G
30	104180001102	VALLEY LAND FILLS INC
31	104180001101	VALLEY LANDFILLS INC
32	104180001000	VALLEY LANDFILLS INC
33	104180000900	VALLEY LANDFILLS INC
34	104180000801	VALLEY LANDFILLS INC
35	104180000800	OREGON STATE FISH & WILDLIFE
36	104180000701	HOCKEMA JOSEPH E & JASMINE L
37	104180000700	HOCKEMA JOSEPH E & JASMINE L
38	104180000600	YOUNG CAROLYN
39	104180000500	YOUNG CAROLYN
40	104180000400	DUBIKIN ALEXANDRE & POLUSHKIN GLIKERIA
41	104180000301	VALLEY LANDFILLS INC
42	104180000300	DUBIKIN ALEXANDRE & POLUSHKIN GLIKERIA
43	104180000201	POWELL LYNN MAY & HEALD NATHAN LESLIE
44	104180000200	PELTIER REAL ESTATE CO
45	104180000102	BUREAU OF LAND MANAGEMENT
46	104180000101	CONSUMERS POWER INC
47	104180000100	OREGON STATE GAME COMMISSION
48	104070000900	WHITE JASON BYRON & JULIE B

0 0.25 0.5 0.75 1 mi

NOT TO SCALE - FOR APPROXIMATION ONLY

Datum: North American Datum 1983
Projection: StatePlane California I FIPS 0401 Feet
Cartographer: Taylor Bradley
Disclaimer: Map is not intended to function as architectural or engineering plans.

GuziWest INSPECTION & CONSULTING

Last Modified On: 11/6/2024
Job Number: 2024-377B

Figure 5 - Adjacent Properties

Coffin Butte Landfill
28972 Coffin Butte Road, Corvallis, OR 97330

APPENDIX B

Title V Operating Permit (Coffin Butte Landfill)

Permit number: 02-9502-TV-01
Expiration date: 10/01/14
Page 1 of 29

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OREGON TITLE V OPERATING PERMIT

Western Region-Salem Office
750 Front Street NE, Suite 120
Salem, OR 97301-1039
Telephone (503) 378-8240

Issued in accordance with the provisions of ORS 468A.040
and based on the land use compatibility findings included in the permit record.

ISSUED TO:

Valley Landfills, Inc.
28972 Coffin Butte Road
Corvallis, OR 97330

INFORMATION RELIED UPON:

Application Number: 23594
Received: 01/30/09

PLANT SITE LOCATION:

Coffin Butte Landfill
Highway 99 & Coffin Butte Road
Corvallis, OR 97330

LAND USE COMPATIBILITY STATEMENT:

Issued by: Benton County
Dated: 03/06/97

ISSUED BY THE DEPARTEMENT OF ENVIRONMENTAL QUALITY

Claudia Davis

Claudia Davis, Western Region Air Quality Manager

OCT 3 0 2009
Date

Nature of Business: Municipal Solid Waste Landfill
SIC: 4953

RESPONSIBLE OFFICIAL

Title: General Manager
Alternate: Vice President

FACILITY CONTACT PERSON

Name: Brian May
Title: General Manager
Phone: (541) 745-2018

TABLE OF CONTENTS

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT....3

PERMITTED ACTIVITIES....4

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION....4

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING, AND RECORDKEEPING REQUIREMENTS....4

- Facility-wide Requirements....4
- Emissions Units PIR and UPR Requirements....14
- Emissions Unit TIP Requirements....15
- Insignificant Activities Requirements....15

PLANT SITE EMISSION LIMITS....15

GENERAL TESTING REQUIREMENTS....18

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS....19

REPORTING REQUIREMENTS....20

EMISSION FEES....22

NON-APPLICABLE REQUIREMENTS....23

GENERAL CONDITIONS....24

LIST OF ABBREVIATIONS THAT MAY BE USED IN THIS PERMIT

ACDP	Air Contaminant Discharge Permit
Act	Federal Clean Air Act
ASTM	American Society of Testing and Materials
Btu	British thermal unit
CFR	Code of Federal Regulations
CO	Carbon monoxide
CPMS	Continuous parameter monitoring system
DEQ	Department of Environmental Quality
dscf	Dry standard cubic feet
EF	Emission factor
EPA	US Environmental Protection Agency
EU	Emissions unit
FCAA	Federal Clean Air Act
FSA	Fuel sampling and analysis
gr/dscf	Grain per dry standard cubic feet (1 pound = 7000 grains)
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040
HCFC	Halogenated Chloro-Fluoro-Carbons
H_2S	Hydrogen sulfide
ID	Identification number or label
I&M	Inspection and maintenance
LFG	Landfill gas
NA	Not applicable
NESHAP	National Emission Standard for Hazardous Air Pollutants
NMOC	Nonmethane organic compounds
NO_x	Nitrogen oxides
NSPS	New Source Performance Standards
O_2	Oxygen
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ORS	Oregon Revised Statutes
O&M	Operation and maintenance
Pb	Lead
PCD	Pollution control device
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in size
ppm	Parts per million
PSEL	Plant Site Emission Limit
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SSM	Startup, shutdown, malfunction
ST	Source test
VE	Visible emissions
VMT	Vehicle miles traveled
VOC	Volatile organic compounds

Modified EPA Method 9: As used in this permit "Modified EPA Method 9" is defined as follows:

> Opacity must be measured in accordance with EPA Method 9. For all standards, the minimum observation period must be six minutes, though longer periods may be required by a specific rule or permit condition. Aggregate times (e.g., 3 minutes in any one hour) consist of the total duration of all readings during the observation period that are equal to or greater than the opacity percentage in the standard, whether or not the readings are consecutive. Each EPA Method 9 reading represents 15 seconds of time. [See also the definition of "Opacity" in OAR 340-208-0010]

PERMITTED ACTIVITIES

1. Until such time as this permit expires or is modified or revoked, the permittee is allowed to discharge air contaminants from those processes and activities directly related to or associated with air contaminant source(s) in accordance with the requirements, limitations, and conditions of this permit. [OAR 340-218-0010 and 340-218-0120(2)]

2. All conditions in this permit are federally enforceable except as specified below:

   2.a. Conditions 6 through 12, G5, and G9 (OAR 340-248-0005 through 0180) are only enforceable by the state. [OAR 340-218-0060]

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION

3. The emissions units regulated by this permit are the following [OAR 340-218-0040(3)]:

Table 1. EU and PCD IDENTIFICATION

Emission Unit Description	EU ID	Pollution Control Device Description	PCD ID
Landfill Gas Control System	Control	Open Flare	FL
Fugitive Landfill Gas, Cell 0	F-LFG1	None	NA
Fugitive Landfill Gas, Cells 1 to 4	F-LFG2	Landfill gas collection and extraction system	LFGCES-1
Vehicle traffic on paved roads	PIR	Water application	NA
Vehicle traffic on unpaved roads	UPR	Chemical suppressant and water application	NA
Tipper	TIP	None	NA
Petroleum contaminated soils	PCS	None	NA
Aggregate Insignificant activities:	AI		
Cell development, operation, and closing		None	NA
Wastewater treatment system operation		Baghouse	DC-1
Leachate collection and wastewater treatment		None	NA
Portable light plant		None	NA
Trash pumps		None	NA
Generator		None	NA

EMISSION LIMITS AND STANDARDS, TESTING, MONITORING, AND RECORDKEEPING REQUIREMENTS

The following tables and conditions contain the applicable requirements along with the testing, monitoring, and recordkeeping requirements for the emissions units to which those requirements apply.

Facility-wide Requirements

Table 2. Facility wide emission limits and standards

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0210(2)	4	Fugitive emissions	Minimize	NA	NA	5
340-208-0300	6	Air contaminants	No nuisance	NA	NA	8
340-208-0450	7	PM >250μ	No fallout	NA	NA	8
340-248-0280(10)	9	Asbestos disposal	Handling procedures	Recordkeeping	NA	10
340-248-0280(11)	11	Asbestos cover	Maintain cover	Recordkeeping	NA	12

Fugitive Emissions

4. Applicable Requirement: The permittee must not allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. Such reasonable precautions must include, but not be limited to the following: [OAR 340-208-0210(2)]

   4.a. use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land;
   4.b. application of asphalt, oil, water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts;
   4.c. full or partial enclosure of materials stockpiles in cases where application of oil, water, or chemicals are not sufficient to prevent particulate matter from becoming airborne;
   4.d. installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
   4.e. adequate containment during sandblasting or other similar operations; and,
   4.f. covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne.

5. Monitoring Requirement: At least once each week for a minimum period of 30 minutes, the permittee must visually survey the plant for any sources of excess fugitive emissions using EPA Method 22. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions generated by fugitive sources that leave the plant site boundaries. The person conducting the observation does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including using the proper location to observe visible emissions. If sources of visible emissions are identified, the permittee must: [OAR 340-218-0050(3)(a)]

   5.a. immediately take corrective action to minimize the fugitive emissions, including but not limited to those actions identified in Condition 4; or,
   5.b. conduct a Modified EPA Method 9 test within 24 hours;
   5.c. Recordkeeping: The permittee must maintain records of the fugitive emissions surveys, corrective actions (if necessary), and/or the results of any modified EPA Method 9 tests.

Nuisance Conditions

6. Applicable Requirement: The permittee must not cause or allow air contaminants from any source to cause a nuisance. Nuisance conditions will be verified by Department personnel. [OAR 340-208-0300] This condition is enforceable only by the State.

7. Applicable Requirement: The permittee must not cause or permit the emission of any particulate matter larger than 250 microns in size at sufficient duration or quantity, as to create an observable deposition upon the real property of another person. The Department will verify that the deposition exists and will notify the permittee that the deposition must be controlled. [OAR 340-208-0450] This condition is enforceable only by the State.

8. Monitoring Requirement: The permittee must maintain a log of each air quality complaint received by the permittee during the operation of the facility and must provide the Western Region-Salem Office of the Department with written notification within 5 days of all nuisance complaints regarding fugitive dust, odors, or particulate deposition received. Documentation shall include date of contact, time of observed nuisance condition, description of nuisance condition, location of receptor, status of plant operation during the observed period, and time of response to complainant. A plant representative must immediately investigate the condition following the receipt of the nuisance complaint and a plant representative must provide a response to the complainant within 24 hours, if possible. This condition is only enforceable by the State. [OAR 340-218-0050(3)(a)]

Asbestos Disposal and Cover

9. Applicable Requirement: The permittee must meet the asbestos-containing material handling and disposal requirements and procedures specified in OAR 340-248-0280(10) for active waste disposal sites. This condition is only enforceable by the state.

10. Monitoring Requirement: The permittee must monitor the asbestos-containing material handling and disposal procedures, provide notifications, and record the information required as specified in OAR 340-248-0280(10) for active waste disposal sites. This condition is only enforceable by the State.

11. Applicable Requirement: The permittee must meet the asbestos-containing material disposal and cover standards specified in OAR 340-248-0280(11) for inactive waste disposal sites. This condition is only enforceable by the State.

12. Monitoring Requirement: The permittee must monitor the asbestos-containing disposal and cover requirements and provide notifications as specified in OAR 340-248-0280(11) for inactive waste disposal sites. This condition is only enforceable by the State.

Facility Wide Requirements

13. The following requirements apply facility wide, including, but not limited to, the solid municipal waste landfill, unless an alternate requirement is specifically stated for a particular emissions unit.

Table 3. Summary of NSPS and NESHAP requirements:

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.1	40 CFR 60.7(a)(4); 40 CFR 60.7(b); 40 CFR 60.7(f)	Notification and recordkeeping.	Maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of the affected facility. Maintain a file of all measurements and performance testing measurements and all other information required by this part recorded in a permanent form suitable for inspection.	Permittee shall furnish prior written or e-mail notification of any physical or operational change which may increase the emission rate of any air pollutant (such as taking operating gas collection wells off line) to which a standard applies to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 [40 CFR 60.4(a)]
13.2	40 CFR 60.11(d)	Maintain and operate any affected emission unit with good air pollution control practice for minimizing emissions.	None specified.	No additional monitoring required.
13.3	40 CFR 60.12	Circumvention.	None specified.	No additional monitoring required.
13.4	40 CFR 60.752(b)(2)(ii)(A); 40 CFR 60.753(a); 40 CFR 60.755(b) (Landfill NSPS Subpart WWW)	Install, within 60 days, and operate active collection system wells that collect gas from each area, cell, or group of cells in the landfill in which solid waste has been placed for: (1) 5 years or more if active, OR (2) 2 years or more if closed or at final grade.	None specified.	No additional monitoring required.

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.5	40 CFR 60.752(b)(2)(ii)(A) (Landfill NSPS Subpart WWW)	Install an active collection system that is designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment.	To calculate maximum expected gas flow rate: $Q_m = \sum_{i=1}^{n} 2kL_o M_i \left(e^{-kt_i}\right)$ where, Q_m=maximum expected gas generation flow rate, m^3/yr k=methane generation rate constant, $year^{-1}$ L_o=methane generation potential, m^3/Mg solid waste M_i=mass of solid waste in the ith section, Mg t_i=age of the ith section, years [40 CFR 60.755(a)(1)(ii)]	Submit monthly report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 Monthly report shall include the date of installation and the location of each well or collection system expansion added. [40 CFR 60.757(f)]
13.6	40 CFR 60.752(b); 40 CFR 60.754(a); 40 CFR 60.757(b); 40 CFR 60.4(a) (Landfill NSPS Subpart WWW)	Calculate the NMOC emission rate for the landfill. If the calculated NMOC emission rate is less than 50 Mg/yr, the permittee shall recalculate the NMOC emission rate and submit emission reports to the Department until such time as the calculated NMOC emission rate is ≥ 50 Mg/yr, or the landfill is closed.	Calculate the NMOC emission rate: $M_{NMOC} = \sum_{i=1}^{n} 2kL_oM_i(e^{-kt_i})(C_{NMOC})(3.6x10^{-9})$ where, M_{NMOC}=Total NMOC emission rate from the landfill (Mg/yr) k=methane generation rate constant=0.05 yr^{-1} or as determined using Tier 3 per 40 CFR 60.754 (a)(4) L_o=methane generation potential=170 m^3/Mg solid waste M_i=mass of solid waste in the ith section (Mg) t_i=age of the ith section (yr) C_{NMOC}=4000 ppm per 40 CFR 60.754(a)(3) $3.6x10^{-9}$=conversion factor The mass of the nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if properly documented. [40 CFR 60.754(a)(1)(i)]	The permittee shall submit an NMOC emission rate report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 (1) annually, OR (2) if the estimated NMOC emission rate as reported in the annual report is less than 50 Mg/yr in each of the next 5 consecutive years, the permittee may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. If option (2) is chosen, this estimate shall be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate shall be submitted to ODEQ at the address given above. The revised estimate shall cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate. The NMOC emission rate report shall include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. The NMOC emission rate report shall include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions. ODEQ may request such additional information as may be necessary to verify the reported NMOC emission rate. [40 CFR 60.4(a); 40 CFR 60.757(b)]
13.7	40 CFR 60.752(b)(2)(ii)(A); 40 CFR 60.759(a); 40 CFR 60.759(b) (Landfill NSPS Subpart WWW)	Install an active collection system that is designed to collect gas at a sufficient extraction rate, sited at a sufficient density throughout all gas producing areas, and designed to minimize off-site migration of subsurface gas.	None specified.	Keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector. Keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors. [40 CFR 60.758(d)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.8	40 CFR 60.753(b) (Landfill NSPS Subpart WWW)	Operate the LFG control system with negative pressure at each well-head except under the following conditions: (1) fire or increased well temperature; OR, (2) use of a geomembrane or synthetic cover; OR, (3) a decommissioned well. Passive gas collection wells do not have to meet this condition when approved in writing by the Department. Gas collection wells operating under an Alternative Operating and Monitoring Plan approved in writing by the Department do not have to meet this condition.	None specified.	Measure gauge pressure in the gas collection header at each individual well, monthly. If a positive pressure exists, action shall be initiated to correct the exceedance within 5 calendar days. If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial measurement of positive pressure. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. [40 CFR 60.755(a)(3)] The annual report shall include record of instances when positive pressure occurred. [40 CFR 60.753(b)(1)]
13.9	40 CFR 60.753(c) (Landfill NSPS Subpart WWW)	Operate each interior wellhead in the LFG collection system with: (1) LFG temperature <55°C; AND, (2) either: (a) N_2 < 20%; OR, (b) O_2 < 5%. Passive gas collection wells do not have to meet this condition when approved in writing by the Department. Gas collection wells receiving a variance in writing from the Department concerning temperature do not have to meet this condition. Gas collection wells operating under an Alternative Operating and Monitoring Plan approved in writing by the Department do not have to meet this condition.	N_2 by RM 3C; O_2 by RM 3A, except that: (1) regulatory limit is between 20% and 50% of the span; AND, (2) data recorder not required; AND, (3) only 2 calibration gases are required; AND, (4) calibration error check not required; AND, (5) allowable sample bias, zero drift, and calibration draft are ±10%. Install a sampling port and a thermometer or other temperature measuring device at each wellhead. [40 CFR 60.756(a)]	Measure the N_2 or O_2 concentration in the LFG, and the temperature of the LFG at each individual well, on a monthly basis. If a well exceeds one of the operating parameters, action shall be initiated to correct the exceedance within 5 calendar days. If correction of the exceedance cannot be achieved within 15 calendar days of the first measurement, the gas collection system shall be expanded to correct the exceedance within 120 days of the initial exceedance. Any attempted corrective measure shall not cause exceedances of other operational or performance standards. [40 CFR 60.756(a); 40 CFR 60.755(a)(5)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.10	40 CFR 60.753(d) (Landfill NSPS Subpart WWW)	Operate LFG collection system so that the methane concentration is <500 ppm above background at the surface of the landfill.	Conduct surface testing around the perimeter of the collection area along a pattern that traverses the landfill at 30 meter intervals and where visual observations indicate elevated concentrations of LFG, such as distressed vegetation and cracks or seeps in the cover per the surface monitoring design plan and topographical map of the monitoring route. Instrument specifications and procedures for surface monitoring devices: (1) portable analyzer shall meet the instrument specifications provided in section 3 of RM 21, except that "methane" shall replace all references to VOC; AND, (2) calibration gas shall be methane, diluted to a nominal concentration of 500 ppm in air; AND, (3) instrument evaluation procedures of section 4.4 of RM 21 shall be used; AND, (4) calibration procedures provided in section 4.2 of RM 21 shall be followed immediately before commencing a surface monitoring survey. [40 CFR 60.755(d)] Conduct surface monitoring with a portable monitor meeting the specifications provided. The background concentration shall be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells. Surface emission monitoring shall be performed in accordance with section 4.3.1 of RM 21, except that the probe inlet shall be placed within 5 to 10 cm of the ground. Monitoring shall be performed during typical meteorological conditions. [40 CFR 60.755(c)]	Monitor for cover integrity on a monthly basis. Implement cover repairs as necessary. [40 CFR 60.755(c)(5)] Conduct surface monitoring on a quarterly basis. Any reading of ≥500 ppm above background at any location shall be recorded as a monitored exceedance and actions below taken. As long as the specified actions are taken, the exceedance is not a violation of these operational requirements. The location of each monitored exceedance shall be marked and the location recorded. Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance shall be made and the location shall be re-monitored within 10 calendar days of detecting the exceedance. Any location that initially showed an exceedance but has a methane concentration <500 ppm methane above background at the 10-day re-monitoring, shall be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration <500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the re-monitoring of the location shows a second exceedance, additional corrective action shall be taken and the location shall be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, a new well or other collection device shall be installed within 120 calendar days of the initial exceedance, OR an alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval. No further monitoring of that location is required until remedy has been taken. [40 CFR 60.755(c)] Submit monthly report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 Monthly report shall include the location of each exceedance of the 500 ppm methane concentration and the concentration recorded at each location for which an exceedance was recorded in the previous month. [40 CFR 60.757(f)]
13.11	40 CFR 60.753(e) (Landfill NSPS Subpart WWW)	Operate the collection system such that all collected gases are vented to the control system. In the event the LFG collection and control is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within 1 hour.	None specified.	Records shall be kept of all periods when the LFG collection and control system is inoperable, the gas mover system is shut down, or the valves in the collection and control system are closed.

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.12	40 CFR 60.753(f) (Landfill NSPS Subpart WWW)	Operate the LFG control and treatment system at all times when the collected gas is routed to the system.	None specified.	No additional monitoring required.
13.13	40 CFR 60.755(e) (Landfill NSPS Subpart WWW)	The provisions of the NSPS apply at all times, except during periods of start-up, shutdown, or malfunction, provided that the duration of start-up, shutdown, or malfunction shall not exceed 5 days for collection systems.	None specified.	No additional monitoring required.
13.14	40 CFR 60.757(a)(3); 40 CFR 60.4(a) (Landfill NSPS Subpart WWW)	An amended design capacity report shall be submitted to the Department providing notification of any increase in the design capacity of the landfill.	None specified.	If triggered, the permittee shall submit an amended design capacity report to: ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 [40 CFR 60.4(a)]
13.15	40 CFR 60.758(a) (Landfill NSPS Subpart WWW)	Keep, for at least 5 years, up-to-date, readily accessible, on-site records of: (1) the maximum design capacity; AND, (2) the current amount of solid waste in-place; AND, (3) the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.	None specified.	No additional monitoring required.
13.16	40 CFR 60.758(b) (Landfill NSPS Subpart WWW)	Keep up-to-date, readily accessible records for the life of the control equipment of the following data, as measured during the initial performance test or compliance determination: (1) maximum expected gas generation flow rate as calculated in condition 15.5, AND, (2) the density of wells, horizontal collectors, surface collectors, or other gas extraction devices; And, (3) the average combustion temperature measured at least every 15 minutes and averaged over the same time period of the performance test; AND, (4) the percent reduction of NMOC determined as specified in conditions 16 and 17. Records of subsequent tests or monitoring shall be maintained for a minimum of 5 years. Records of the control device vendor specifications shall be maintained until removed.	None specified.	No additional monitoring required.
13.17	40 CFR 60.758(c) (Landfill NSPS Subpart WWW)	Keep for 5 years, up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in the NSPS as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.	None specified.	No additional monitoring required.

<table>
<tr><th>Condition</th><th>Applicable Requirement</th><th>Description (for clarification purposes only, enforceable as listed under 'applicable requirement')</th><th>Monitoring and Analysis Procedure or Test Method</th><th>Monitoring, Recordkeeping, and Reporting Requirement</th></tr>
<tr><td>13.18</td><td>40 CFR 61.154(a), (c), (d)

(Asbestos NESHAP Subpart M)</td><td>In any active waste disposal site where asbestos-containing waste material has been deposited: (1) no visible emissions to the outside air; OR, (2) cover with ≥6 inches of compacted nonasbestos-containing material at the end of each operating day; OR, (3) cover with a chemical dust suppression agent (not to include any used, spent, or other waste oil) at the end of each operating day.</td><td>None specified.</td><td>No additional monitoring required.</td></tr>
<tr><td>13.19</td><td>40 CFR 61.154(b)

(Asbestos NESHAP Subpart M)</td><td>Areas of disposal of asbestos-containing waste material must: (1) have a natural barrier that adequately deters access by the general public; OR, (2) cover with ≥6 inches of compacted nonasbestos-containing material at the end of each operating day; OR, (3) install warning signs and fencing that meet the following: (a) display signs at all entrances and at intervals of ≤330 feet; AND, (b) signs posted such that legend is easily read; AND, (c) 20" x 14" upright format signs; AND, (d) sign legend, size, and style at least equal to (spacing between lines must be at least equal to the height of the upper text line):
<table>
<tr><th>Legend</th><th>Notation</th></tr>
<tr><td>Asbestos Waste Disposal Site.</td><td>1 inch Sans Serif, Gothic, or Block</td></tr>
<tr><td>Do Not Create Dust</td><td>¾ inch Sans Serif, Gothic, or Block</td></tr>
<tr><td>Breathing Asbestos is Hazardous to Your Health.</td><td>14 point Gothic</td></tr>
</table>
AND, (e) fenced in a manner adequate to deter access by the general public.</td><td>None specified.</td><td>No additional monitoring required.</td></tr>
</table>

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.20	40 CFR 61.154(e) (Asbestos NESHAP Subpart M)	Maintain waste shipment records for all asbestos-containing waste material received.	None specified.	Waste shipment records shall include: (1) name, address, and telephone number of the waste generator; AND, (2) name, address, and telephone number of the transporter(s); AND, (3) volume of waste; AND, (4) presence of improperly enclosed (leak-tight containers) or uncovered; AND, (5) date of waste receipt. Send a copy of the signed waste shipment record to the waste generator within 30 days of receipt of the waste. If significant amount of improperly enclosed or uncovered waste, report in writing (with copy of waste shipment record) to the Department for the waste generator (as indicated in the waste shipment record), ODEQ, Western Region – Salem Office 750 Front Street NE, Suite 120 Salem, OR 97301-1039 by the following working day. Submit reports (with copy of waste shipment record) of unreconciled waste quantity discrepancies within 15 days of waste receipt to ODEQ, at the address listed above. [40 CFR 61.154(e)(1), (2)]
13.21	40 CFR 61.154(f) (Asbestos NESHAP Subpart M)	Maintain, until closure, records of the location, depth and area, and quantity in cubic meters (cubic yards) of asbestos-containing waste material within the disposal area on a map or diagram of the disposal area.	None specified.	No additional monitoring required.
13.22	40 CFR 61.154(i) (Asbestos NESHAP Subpart M)	Furnish upon request, and make available during normal business hours for inspection by ODEQ, all records required by the Asbestos NESHAP.	None specified.	No additional monitoring required.
13.23	40 CFR 61.154(j) (Asbestos NESHAP Subpart M)	Notify ODEQ in writing at least 45 days prior to excavating or otherwise disturbing any asbestos-containing waste material that has been deposited at the site and is covered.	None specified.	Notification shall include: (1) scheduled starting and completion dates; AND, (2) reason for disturbing waste; AND, (3) emission control procedures to be implemented; AND, (4) location of any temporary storage site and the final disposal site. [40 CFR 61.154(j)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.24	40 CFR 60.752(b)(2)(iii)(A) and 40 CFR 60.18 (Landfill NSPS Subpart WWW)	1. Route excess landfill gas not utilized by IC engines to an open flare (Emissions Unit Control) designed and operated in accordance with 40 CFR 60.18. 2. The flare shall be designed for and operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. [40 CFR 60.18(c)(1)] 3. The flare shall be operated with a flame present at all times. [40 CFR 60.18(c)(2)] 4. The flare shall be designed for and operated with an exit velocity less than 60 ft/sec. [40 CFR 60.18(c)(4)(i)] 5. The flare shall be operated at all times when excess landfill gas not utilized by IC engines is being vented to it. [40 CFR 60.18(e)]	Install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment: (1) a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame; and (2) a device that records flow to or bypass of the flare. The owner or operator shall either: (i) install, calibrate, and maintain a gas flow measuring device that shall record the flow to the flare at least every 15 minutes; or (ii) secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. [40 CFR 60.756(c)] Reference Method 22 shall be used to determine the compliance with the visible emissions standard. The observation period is 2 hours. [40 CFR 60.18(f)(1)] The net heating value of the gas being combusted in the flare shall be calculated by the equation in 40 CFR 60.18 (f)(3). The actual exit velocity of the flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure) as determined by Reference Methods 2, 2A, 2C,or 2D as appropriate by the unobstructed (free) cross sectional area of the flare tip. [40 CFR 60.18(f)(4)]	Monitoring 1. Operate the heat sensing device or thermocouple. [40 CFR 60.756(c)(1)] 2. Record the gas flow to the flare at least every 15 minutes or visually inspect the seal or closure mechanism at least monthly. [40 CFR 60.756(c)(2)] Recordkeeping 1. Records of the flare vendor specifications until removal of the flare. [40 CFR 60.758(b)] 2. Up-to-date, readily accessible records for the life of the flare of: a. visible emissions readings b. heat content determinations c. flow rate or bypass flow rate measurements d. exit velocity determinations e. continuous records of the flare pilot flame or flare flame monitoring f. all periods of operations during which the pilot flame or the flare flame is absent [40 CFR 60.758(b((4) and (c)(4)]

Condition	Applicable Requirement	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting Requirement
13.25	40 CFR 63.6(e)(3) (Landfill NESHAP Subpart AAAA)	Develop and implement a written Startup, Shutdown, and Malfunction Plan (SSM Plan) by no later than January 16, 2004.	None specified.	Maintain written SSM Plan on site. If the SSM Plan fails to address, or inadequately addresses, a malfunction, revise the SSM Plan within 45 days after the event to include procedures for operating and maintaining the source during similar malfunctions, and a program of corrective actions for similar malfunctions. [40 CFR 63.6(e)((3)(viii)] Recordkeeping 1. Maintain records for each SSM Plan event which occurs. [40 CFR 63.10(b)(2)(i)] 2. Retain a copy of each previous (superceded) version of the SSM Plan for at least 5 years. [40 CFR 63.6(e)(3)(v)] Reporting 1. Report semiannually all SSM Plan actions that are consistent with the SSM Plan. [40 CFR 63.10(d)(5)(i)] 2. Notify DEQ within 2 days if an SSM event is not consistent with the SSM Plan and follow up with a letter within 7 days of the event. [40 CFR 63.6(e)(3)iv)]

EMISSIONS UNITS PIR AND UPR

Table 4. Summary of requirements for Emissions Units PIR and UPR:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0110(2)	14	Visible emissions	20% opacity	3 min. aggregate in 60 minutes	NA	15

14. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is equal to or greater than 20% opacity, excluding uncombined water, from emissions units PIR and UPR. [OAR 340-208-0110(2) and 340-208-0110(3)(a)]

15. Monitoring Requirement: At least weekly, the permittee must visually survey the facility using EPA Method 22 for any sources of excess fugitive emissions. For the purpose of this survey, excess fugitive emissions are considered to be any visible emissions that leave the down wind plant site boundaries. The person conducting this survey does not have to be EPA Method 9 certified. However, the individual should be familiar with the procedures of EPA Method 9, including using the proper location to observe visible emissions. If sources of excess fugitive emissions are identified during the survey, the permittee shall perform one of the following:

15.a. immediately take corrective action to minimize the fugitive emissions; or,

15.b. conduct a modified EPA Method 9 test on the device(s) causing the opacity problem within 24 hours.

15.c. Recordkeeping: The permittee must maintain records of all inspections and any corrective action performed.

EMISSIONS UNIT TIP

Table 5. Summary of requirements for Emissions Unit TIP:

Applicable Requirement	Condition Number	Pollutant/ Parameter	Limit/Standard	Averaging Time	Testing Condition	Monitoring Condition
340-208-0110(2)	16	Visible emissions	20% opacity	3 min. aggregate in 60 minutes	NA	20
340-226-0210(1)(b)	17	PM/PM_{10}	0.1 gr/dscf	Avg. of 3 test runs	NA	20

16. Applicable Requirement: The permittee must not cause or allow the emissions of any air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is equal to or greater than 20% opacity, excluding uncombined water, from emissions unit TIP. [OAR 340-208-0110(2) and 340-208-0110(3)(a)]

17. Applicable Requirement: The permittee must not cause or allow the emission of particulate matter in excess of 0.1 grain per standard cubic foot from emissions unit TIP. [OAR 340-226-0210(1)(b)]

Insignificant Activities Requirements

18. The Department acknowledges that insignificant emissions units (IEUs) identified by rule as either categorically insignificant activities or aggregate insignificant emissions as defined in OAR 340-200-0020 exist at facilities required to obtain an Oregon Title V Operating Permit. IEUs must comply with all applicable requirements. In general, the requirements that could apply to IEUs are incorporated as follows:

18.a. OAR 340-208-0110 (20% opacity)
18.b. OAR 340-228-0210 (0.1 gr/dscf corrected to 12% CO_2 or 50% excess air for fuel burning equipment)
18.c. OAR 340-226-0210 (0.1 gr/dscf for non-fugitive, non-fuel burning equipment)
18.d. OAR 340-226-0310 (process weight limit for non-fugitive, non-fuel burning process equipment).

Unless otherwise specified in this permit or an applicable requirement, the Department is not requiring any testing, monitoring, recordkeeping, or reporting for the applicable emissions limits and standards that apply to IEUs. However, if testing were performed for compliance purposes, the permittee would be required to use the test methods identified in the definitions of "opacity" and "particulate matter" in OAR 340-208-0010 and perform the testing in accordance with the Department's Source Sampling Manual.

PLANT SITE EMISSION LIMITS

19. Applicable Requirement: The plant site emissions must not exceed the following limits for any 12 consecutive calendar month period: [OAR 340-222-0040 through OAR 340-222-0043]

Pollutant	Plant Site Emission Limit (Tons/yr)
PM	24
PM_{10}	14
CO	99
NO_x	39
SO_2	39
VOC	39
NMOC	49

19.a. The PSEL is based on the actual predicted emissions for the current operating conditions at the facility. A permit modification is required before the PSEL may be increased.

20. Monitoring Requirement: The permittee must determine compliance with the Plant Site Emission Limits established in Condition 19 of this permit by conducting monitoring in accordance with the following procedures, test methods, and frequencies: [OAR 340-218-0050(3)]

20.a. The permittee must monitor and maintain records of the following process parameters:

Table 6. PSEL Monitoring

Emissions Unit(s)	Process Parameter	Units	Measurement Frequency	Measurement Method
F-LFG1	Municipal solid waste in place in Cell 0	Mg or tons	Annually	Records
F-LFG2	Municipal solid waste in place in Cells 1, 2A/2B, 2C/2D, and 3	Mg or tons	Annually	Records
Landfill	Municipal solid waste accepted at landfill	Mg or tons	Annually	Records
F-LFG1 & F-LFG2	Landfill gas generated in each system	$MMft^3$/month, $MMft^3$/yr	Annually using EPA model calculation	Records
F-LFG2	Landfill gas collected and sent to IC engines and % methane	$MMft^3$/month, $MMft^3$/yr	Monthly/Annually	Records
PIR	Number of total vehicles on paved roads	Number	Monthly/Annually	Records
UPR 1	Number of total vehicles on unpaved road 1	Number	Monthly/Annually	Records
UPR 2	Number of commercial vehicles on unpaved road 2	Number	Monthly/Annually	Records
TIP	Number of hours operated	Hours	Monthly/Annually	Records
PCS	Petroleum contaminated soil received	Tons	Monthly/Annually	Records
Open Flare	Landfill gas collected and sent to open flare and % methane	$MMft^3$/month, $MMft^3$/yr	Monthly/Annually	Records

20.b. Emission factors for calculating pollutant emissions:

Table 7. Emission Factors

Emission Units(s)	Pollutant	Emission Factor	Emission Factor Units	Emission Factor Verification Testing	
				Yes/no	Test Method
F-LFG1	CO	10.3	lb/MMft^3 fugitive landfill gas	No	NA
	VOC	51.9	lb/MMft^3 fugitive landfill gas	No	NA
	NMOC	133.2	lb/MMft^3 fugitive landfill gas	No	NA
F-LFG2	CO	10.3	lb/MMft^3 fugitive landfill gas	No	NA
	VOC	51.9	lb/MMft^3 fugitive landfill gas	No	NA
	NMOC	133.2	lb/MMft^3 fugitive landfill gas	No	NA
PIR	PM	0.140	lb/vehicle	No	NA
	PM_{10}	0.027	lb/vehicle	No	NA
UPR 1	PM	0.010	lb/vehicle	No	NA
	PM_{10}	0.004	lb/vehicle	No	NA
UPR 2	PM	0.098	lb/vehicle	No	NA
	PM_{10}	0.021	lb/vehicle	No	NA
Open Flare	PM/PM_{10}	8.5	lb/MMft^3 combusted landfill gas	No	NA
	CO	110.0	lb/MMft^3 combusted landfill gas	No	NA
	NO_x	20.0	lb/MMft^3 combusted landfill gas	No	NA
	SO_2	8.4	lb/MMft^3 combusted landfill gas	No	NA
	VOC	1.16	lb/MMft^3 combusted landfill gas	No	NA
	NMOC	2.71	lb/MMft^3 combusted landfill gas	No	NA
TIP	PM/PM_{10}	0.253	lb/hr	No	NA
	CO	0.768	lb/hr	No	NA
	NO_x	3.57	lb/hr	No	NA
	SO_2	0.236	lb/hr	No	NA
	VOC/ NMOC	0.289	lb/hr	No	NA
PCS	VOC/ NMOC	0.033	lb/ton PCS	No	NA

20.c. For the emissions unit F-LFG1 listed in Table 8, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (F-LFG1 generated) * EF *K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.d. For the emissions unit F-LFG2 listed in Table 8, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (F-LFG2 generated – F-LFG2 collected to IC engines and flare) * EF * K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.e. For the emissions unit Open Flare listed in Table 7, the permittee must determine monthly and 12-month rolling emissions by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = (Open flare collected) * EF *K

where:

E = Emissions, tons
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.f. For the emissions units PIR, UPR 1, UPR 2, TIP, and PCS listed in Table 7, the permittee must calculate monthly and 12-month rolling emission by multiplying the Process Parameter by the emission factor listed above for each pollutant. Calculations must be completed within 30 days of the end of each month.

E = MP * EF * K

where:

E = Emissions, tons
MP = Monitored parameter, units/month or units/year
EF = Emission factor, pounds/units
K = conversion constant: 1 ton/2000 lbs

20.g. The emission factors listed in Condition 20.b. are not enforceable limits unless otherwise specified in this permit. Compliance with PSELs must only be determined by the calculations contained in Conditions 20.c. through 20.f of this permit using the measured process parameters recorded during the reporting period and the emission factors contained in Condition 20.b.

21. The permittee must determine compliance with Condition 19 (Plant Site Emission Limits) by summing the emissions calculated in Condition 20 for each emissions unit for each month and each 12-month rolling period, and adding the Aggregate Insignificant emissions of 1 ton per year by pollutant, and comparing the resulting emissions to the Plant Site Emission Limits in Condition 19.

GENERAL TESTING REQUIREMENTS

22. Unless otherwise specified in this permit, the permittee must conduct all testing in accordance with the Department's Source Sampling Manual. [OAR 340-212-0120 and 40 CFR 60.8]

22.a. Unless otherwise specified by a state or federal regulation, the permittee must submit a source test plan to the Department at least 30 days prior to the date of the test. The test plan must be prepared in accordance with the Source Sampling Manual and address any planned variations or alternatives to prescribed test methods. The permittee should be aware that if significant variations are requested, it may require more than 30 days for the Department to grant approval and may require EPA approval in addition to approval by the Department.

22.b. Only regular operating staff may adjust the processes or emission control device parameters during a compliance source test and within two (2) hours prior to the tests. Any operating adjustments made during a compliance source test, which are a result of consultation during the tests with source testing personnel, equipment vendors, or consultants, may render the source test invalid.

22.c. Unless otherwise specified by permit condition or Department approved source test plan, all compliance source tests must be performed as follows:

22.c.i. at least 90% of the design capacity for new or modified equipment;
22.c.ii at least 90% of the maximum operating rate for existing equipment; or
22.c.iii. at 90 to 110% of the normal maximum operating rate for existing equipment. For purposes of this permit, the normal maximum operating rate is defined as the 90th percentile of the average hourly operating rates during a 12 month period immediately preceding the source test. Data supporting the normal maximum operating rate must be included with the source test report.

22.d. Each source test must consist of at least three (3) test runs and the emissions results must be reported as the arithmetic average of all valid test runs. If for reasons beyond the control of the permittee a test run is invalid, the Department may accept two (2) test runs for demonstrating compliance with the emission limit or standard.

22.e. Source test reports prepared in accordance with the Department's Source Sampling Manual must be submitted to the Department within 45 days of completing any required source test, unless a different time period is approved in the source test plan submitted prior to the source test.

GENERAL MONITORING AND RECORDKEEPING REQUIREMENTS

General Monitoring Requirements:

23. The permittee must not knowingly render inaccurate any required monitoring device or method. [OAR 340-218-0050(3)(a)(E)]

24. Methods used to determine actual emissions for fee purposes must also be used for compliance determination and can be no less rigorous than the requirements of OAR 340-218-0080. [OAR 340-218-0050(3)(a)(F)]

25. Monitoring requirements must commence on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(a)(G)]

General Recordkeeping Requirements

26. The permittee must maintain the following general records of testing and monitoring required by this permit: [OAR 340-218-0050(3)(b)(A)]

26.a. the date, place as defined in the permit, and time of sampling or measurements;
26.b. the date(s) analyses were performed;
26.c. the company or entity that performed the analyses;
26.d. the analytical techniques or methods used;
26.e. the results of such analyses;
26.f. the operating conditions as existing at the time of sampling or measurement; and
26.g. the records of quality assurance for continuous monitoring systems (including but not limited to quality control activities, audits, calibration drift checks).

27. Unless otherwise specified by permit condition, the permittee must make every effort to maintain 100 percent of the records required by the permit. If information is not obtained or recorded for legitimate reasons (e.g., the monitor or data acquisition system malfunctions due to a power outage), the missing record(s) will not be considered a permit deviation provided the amount of data lost does not exceed 10% of the averaging periods in a reporting period or 10% of the total operating hours in a reporting period, if no averaging time is specified. Upon discovering that a required record is missing, the permittee must document the reason for the missing record. In addition, any missing record that can be recovered from other available information will not be considered a missing record. [OAR 340-214-0110, 340-212-0160, and 340-218-0050(3)(b)]

28. Recordkeeping requirements must commence on the date of permit issuance unless otherwise specified in the permit or an applicable requirement. [OAR 340-218-0050(3)(b)(C)]

29. Unless otherwise specified, the permittee must retain records of all required monitoring data and support information for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records and all original strip-chart recordings (or other original data) for continuous monitoring instrumentation, and copies of all reports required by the permit. All existing records required by the previous Oregon Title V Operating Permit must also be retained for five (5) years from the date of the monitoring sample, measurement, report, or application. [OAR 340-218-0050(b)(B)]

REPORTING REQUIREMENTS

General Reporting Requirements

30. Excess Emissions Reporting The permittee must report all excess emissions as follows: [OAR 340-214-0300 through 340-214-0360]

30.a. Immediately (within 1 hour of the event) notify the Department of an excess emission event by phone, e-mail, or facsimile; and

30.b. Within 15 days of the excess emissions event, submit a written report that contains the following information: [OAR 340-214-0340(1)]

30.b.i. The date and time of the beginning of the excess emissions event and the duration or best estimate of the time until return to normal operation;

30.b.ii. The date and time the owner or operator notified the Department of the event;

30.b.iii. The equipment involved;

30.b.iv. Whether the event occurred during planned startup, planned shutdown, scheduled maintenance, or as a result of a breakdown, malfunction, or emergency;

30.b.v. Steps taken to mitigate emissions and corrective action taken, including whether the approved procedures for a planned startup, shutdown, or maintenance activity were followed;

30.b.vi. The magnitude and duration of each occurrence of excess emissions during the course of an event and the increase over normal rates or concentrations as determined by continuous monitoring or best estimate (supported by operating data and calculations);

30.b.vii. The final resolution of the cause of the excess emissions; and

30.b.viii. Where applicable, evidence supporting any claim that emissions in excess of technology-based limits were due to any emergency pursuant to OAR 340-214-0360.

30.c. In the event of any excess emissions which are of a nature that could endanger public health and occur during non-business hours, weekends, or holidays, the permittee must immediately notify the Department by calling the Oregon Accident Response System (OARS). The current number is 1-800-452-0311.

30.d. If startups, shutdowns, or scheduled maintenance may result in excess emissions, the permittee must submit startup, shutdown, or scheduled maintenance procedures used to minimize excess

emissions to the Department for prior authorization, as required in OAR 340-214-0310 and 340-214-0320. New or modified procedures must be received by the Department in writing at least 72 hours prior to the first occurrence of the excess emission event. The permittee must abide by the approved procedures and have a copy available at all times.

30.e. The permittee must notify the Department of planned startup/shutdown or scheduled maintenance events.

30.f. The permittee must continue to maintain a log of all excess emissions in accordance with OAR 340-214-0340(3). However, the permittee is not required to submit the detailed log with the semi-annual and annual monitoring reports. The permittee is only required to submit a brief summary listing the date, time, and the affected emissions units for each excess emission that occurred during the reporting period. [OAR 340-218-0050(3)(c)]

31. Permit Deviations Reporting: The permittee must promptly report deviations from permit requirements that do not cause excess emissions, including those attributable to upset conditions, as defined in the permit, the probable cause of such deviations, and any corrective actions or preventive measures taken. "Prompt" means within 15 days of the deviation. Deviations that cause excess emissions, as specified in OAR 340-214-0300 through 340-214-0360 must be reported in accordance with Condition 23.

32. All required reports must be certified by a responsible official consistent with OAR 340-218-0040(5);[OAR 340-218-0050(3)(c)(D)]

33. Reporting requirements must commence on the date of permit issuance unless otherwise specified in the permit. [OAR 340-218-0050(3)(c)(E)]

Addresses of regulatory agencies are the following, unless otherwise instructed:

DEQ – Western Region
750 Front Street NE, Suite 120
Salem, OR 97310
(503) 378-8240

DEQ – Air Quality Division
811 SW Sixth Avenue
Portland, OR 97204
(503) 229-5359

Air Operating Permits
US Environmental Protection Agency
Mail Stop OAQ-108
1200 Sixth Avenue
Seattle, WA 98101

Semi-annual and Annual Reports

34. The permittee must submit three (3) copies of reports of any required mon ring at least every 6 months, completed on forms approved by the Department. Six month periods are uary 1 to June 30, and July 1 to December 31. One copy of the report must be submitted to the EPA a two copies to the DEQ regional office. All instances of deviations from permit requirements must be cl rly identified in such reports: [OAR 340-218-0050(3)(c)(A) and 340-218-0080(6)(d)]]

34.a. The first semi-annual report is be due on July 30 and must include the semi-annual compliance certification, OAR 340-218-0080.

34.b. The annual report is due on February 15 and must consist of the following:

34.b.i. the emission fee report; [OAR 340-220-0100]
34.b.ii. a summary of the excess emissions upset log; [OAR 340-214-0340]
34.b.iii. the second semi-annual compliance certification; [OAR 340-218-0080]
34.b.iv. the annual emission inventory report for the prior calendar year;
34.b.v. greenhouse gas emissions in accordance with Division 215 of OAR Chapter 340. [OAR 340-215-0040(3)(a)]

35. The semi-annual compliance certification must include the following (provided that the identification of applicable information may cross-reference the permit or previous reports, as applicable): [OAR 340-218-0080(6)(c)]

35.a. The identification of each term or condition of the permit that is the basis of the certification;

35.b. The identification of the method(s) or other means used by the owner or operator for determining the compliance status with each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means must include, at a minimum, the methods and means required under OAR 340-218-0050(3). *Note: Certification of compliance with the monitoring conditions in the permit is sufficient to meet this requirement, except when the permittee must certify compliance with new applicable requirements that are incorporated by reference into the permit. When certifying compliance with new applicable requirements that are not yet in the permit, the permittee must provide the information required by this condition.* If necessary, the owner or operator also must identify any other material information that must be included in the certification to comply with section 113(c)(2) of the FCAA, which prohibits knowingly making a false certification or omitting material information;

35.c. The status of compliance with terms and conditions of the permit for the period covered by the certification, including whether compliance during the period was continuous or intermittent. The certification must be based on the method or means designated in OAR 340-218-0040(6)(c)(B). The certification must identify each deviation and take it into account in the compliance certification. The certification must also identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance, as defined under OAR 340-200-0020, occurred; and

35.d. Such other facts as the Department may require to determine the compliance status of the source.

36. Notwithstanding any other provision contained in any applicable requirement, the owner or operator may use monitoring as required under OAR 340-218-0050(3) and incorporated into the permit, in addition to any specified compliance methods, for the purpose of submitting compliance certifications. [OAR 340-218-0080(6)(e)]

Monthly Reports

37. The permittee must report the following information for the preceding month within 30 days of the end of each calendar month to the Western Region-Salem office of the Department:

37.a. The cover integrity monitoring results and repairs, if necessary, as required by Condition 13.10;

37.b. The results of the quarterly surface methane monitoring, if conducted during the month, and corrective actions taken as required by Condition 13.10;

37.c. Any other information regarding upsets, maintenance required, or operational problems encountered during the month on the landfill gas collection or control systems;

37.d. Information concerning the installation date and location of any newly installed wells or expansion of the landfill gas collection system as required by Condition 13.7;

37.e. The amount of landfill gas collected and treated in both the IC engines and the flare;

37.f. The total operating hours of the IC engines and flare during the month; and,

37.g. Log of air quality complaints received during the month under Condition 8.

EMISSION FEES

38. Emission fees will be based on the Plant Site Emission Limits in Condition 19, unless the permittee elects to report actual emissions for one or more permitted processes/pollutants using the procedures in OAR 340 Division 220. If the permittee reports actual emissions for one or more permitted processes/pollutants, the permitted emissions for the remaining permitted processes/pollutants will be based on the following table: [OAR 340-220-0090]

Emission Source Description	Permitted Process Code (DEQ Codes)	PM_{10} (tons)	SO_2 (tons)	NO_x (tons)	VOC (tons
Roads	FS-1	3.1			
Open Flare	GS-1	2.2	2.2	5.2	0.3
Fugitive LFG	FS-2				11.0
Petroleum Cont. Soil	FS-2				0.8
Tipper	GS-1	0.3	0.2	3.6	0.3
AI	GS-1	1.0	1.0	1.0	1.0

NON-APPLICABLE REQUIREMENTS

39. State and Federal air quality requirements (e.g., rules and regulations) currently determined not applicable to the permittee are listed below along with the reason for the non-applicability: [OAR 340-218-0110]

Applicable Requirement	Reason Code
OAR Chapter 340:	
Division 202	
All rules	I
Division 204	
All rules	I
Division 206	
0050	C
0060 through 0070	I
Division 208	
0500 through 0610	D
Division 210	
0100 through 0120	B
Division 212	
0200 through 0280	J
Division 214	
0200 and 0220	C
0400 through 0430	B
Division 218	
0050(4)	B
0050(8)	H
0060	I
0070	I
0090	B
0100	B
0250	I
Division 222	
0042	C
0060	H
Division 224	
0050	C
0060	C
Division 225	
0045	C
Division 226	
0400	H
Division 228	
0100 through 0130	F
0300 through 0530	B
0600 through 0678	B
Division 230	
All rules	E
Division 232	
All rules	C
Division 234	
All rules	B
Division 236	
All rules	B
Division 240	
All rules	C
Division 242	
All rules	C
Division 248	
0210 through 0230	B
Division 250	
All rules	I
Division 252	
All rules	I
Division 254	
All rules	E
Division 256	
All rules	B
Division 257	
All rules	E
Division 258	
All rules	B
Division 260	
All rules	B
Division 262	
All rules	B
Division 264	
0100	D
0120 through 0170	D
0190	E
Division 266	
All rules	B
40 CFR	
Part 55	B
Part 57	B
Part 60, except subparts A, WWW, and appendixes	B
Part 61, except subparts A, M, and appendices	B
Part 63, except subparts A, AAAA, and appendices	B
Part 68	B
Part 72 through 76	B
Part 77	B
Part 78	B
Part 82, except subpart F	B
Part 85 through 89	B

Reason code definitions:

A this pollutant is not emitted by the facility
B the facility is not in this source category
C the facility is not in a special control/nonattainment area
D the facility is not in this county
E the facility does not have this emissions unit
F the facility does not use this fuel type

G the rule does not apply because no changes have been made at the facility that would trigger these procedural requirements
H this method/procedure is not used by the facility
I this rule applies only to DEQ and regional authorities
J there are no emissions units with add-on control devices or the pre-controlled potential emissions are less than 100 tons per year or the emissions units with add-on control devices and pre-controlled emissions greater than 100 tons per year are subject to emissions standards promulgated after November of 1990

GENERAL CONDITIONS

G1. General Provision

Terms not otherwise defined in this permit have the meaning assigned to such terms in the referenced regulation.

G2. Reference materials

Where referenced in this permit, the versions of the following materials are effective as of the dates noted unless otherwise specified in this permit:

a. Source Sampling Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A4;
b. Continuous Monitoring Manual; January 23, 1992 - State Implementation Plan Volume 3, Appendix A6; and
c. All state and federal regulations as in effect on the date of issuance of this permit.

G3. Applicable Requirements [OAR 340-218-0010(3)(b)]

Oregon Title V Operating Permits do not replace requirements in Air Contaminant Discharge Permits (ACDP) issued to the source even if the ACDP(s) have expired. For a source operating under a Title V permit, requirements established in an earlier ACDP remain in effect notwithstanding expiration of the ACDP or Title V permit, unless a provision expires by its terms or unless a provision is modified or terminated following the procedures used to establish the requirement initially. Source specific requirements, including, but not limited to TACT, RACT, BACT, and LAER requirements, established in an ACDP must be incorporated into the Oregon Title V Operating Permit and any revisions to those requirements must follow the procedures used to establish the requirement initially.

G4. Compliance [OAR 340-218-0040(3)(n)(C), 340-218-0050(6), and 340-218-0080(4)]

a. The permittee must comply with all conditions of this permit. Any permit condition noncompliance constitutes a violation of the Federal Clean Air Act and/or state rules and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application. Any noncompliance with a permit condition specifically designated as enforceable only by the state constitutes a violation of state rules only and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application.
b. Any schedule of compliance for applicable requirements with which the source is not in compliance at the time of permit issuance is supplemental to, and does not sanction noncompliance with the applicable requirements on which it is based.
c. For applicable requirements that will become effective during the permit term, the source must meet such requirements on a timely basis unless a more detailed schedule is expressly required by the applicable requirement.

G5. Masking Emissions:

The permittee must not install or use any device or other means designed to mask the emission of an air contaminant that causes or is likely to cause detriment to health, safety, or welfare of any person or otherwise violate any other regulation or requirement. [OAR 340-208-0400] This condition is enforceable only by the State.

G6. Credible Evidence:

Notwithstanding any other provisions contained in any applicable requirement, any credible evidence may be used for the purpose of establishing whether a person has violated or is in violation of any such applicable requirements. [OAR 340-214-0120]

G7. Certification [OAR 340-214-0110, 340-218-0040(5), 340-218-0050(3)(c)(D), and 340-218-0080(2)]

Any document submitted to the Department or EPA pursuant to this permit must contain certification by a responsible official of truth, accuracy and completeness. All certifications must state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and, complete. The permittee must promptly, upon discovery, report to the Department a material error or omission in these records, reports, plans, or other documents.

G8. Open Burning [OAR Chapter 340, Division 264]

The permittee is prohibited from conducting open burning, except as may be allowed by OAR 340-264-0020 through 340-264-0200.

G9. Asbestos [40 CFR Part 61, Subpart M (federally enforceable), OAR Chapter 340-248-0005 through 340-248-0180 (state-only enforceable) and 340-248-0205 through 340-248-0280]

The permittee must comply with OAR Chapter 340, Division 248, and 40 CFR Part 61, Subpart M when conducting any renovation or demolition activities at the facility.

G10. Stratospheric Ozone and Climate Protection [40 CFR 82 Subpart F, OAR 340-260-0040]

The permittee must comply with the standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F, Recycling and Emissions Reduction.

G11. Permit Shield [OAR 340-218-0110]

a. Compliance with the conditions of the permit is deemed compliance with any applicable requirements as of the date of permit issuance provided that:

   i. such applicable requirements are included and are specifically identified in the permit, or
   ii. the Department, in acting on the permit application or revision, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

b. Nothing in this rule or in any federal operating permit alters or affects the following:

   i. the provisions of ORS 468.115 (enforcement in cases of emergency) and ORS 468.035 (function of department);
   ii. the liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;

iii. the applicable requirements of the national acid rain program, consistent with section 408(a) of the FCAA; or
iv. the ability of the Department to obtain information from a source pursuant to ORS 468.095 (investigatory authority, entry on premises, status of records).

c. Sources are not shielded from applicable requirements that are enacted during the permit term, unless such applicable requirements are incorporated into the permit by administrative amendment, as provided in OAR 340-218-0150(1)(h), significant permit modification, or reopening for cause by the Department.

G12. Inspection and Entry [OAR 340-218-0080(3)]

Upon presentation of credentials and other documents as may be required by law, the permittee must allow the Department of Environmental Quality, or an authorized representative (including an authorized contractor acting as a representative of the EPA Administrator), to perform the following:

a. enter upon the permittee's premises where an Oregon Title V Operating Permit program source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;
b. have access to and copy, at reasonable times, any records that must be kept under conditions of the permit;
c. inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
d. as authorized by the FCAA or state rules, sample or monitor, at reasonable times, substances or parameters, for the purposes of assuring compliance with the permit or applicable requirements.

G13. Fee Payment [OAR 340-220-0010, and 340-220-0030 through 340-220-0190]

The permittee must pay an annual base fee and an annual emission fee for particulates, sulfur dioxide, nitrogen oxides, and volatile organic compounds. The permittee must submit payment to the Department of Environmental Quality, Business Office, 811 SW 6th Avenue, Portland, OR 97204, within 30 days of the date the Department mails the fee invoice or August 1 of the year following the calendar year for which emission fees are paid, whichever is later. Disputes must be submitted in writing to the Department of Environmental Quality. Payment must be made regardless of the dispute. User-based fees will be charged for specific activities (e.g., computer modeling review, ambient monitoring review, etc.) requested by the permittee.

G14. Off-Permit Changes to the Source [OAR 340-218-0140(2)]

a. The permittee must monitor for, and record, any off-permit change to the source that:

i. is not addressed or prohibited by the permit;
ii. is not a Title I modification;
iii. is not subject to any requirements under Title IV of the FCAA;
iv. meets all applicable requirements;
v. does not violate any existing permit term or condition; and
vi. may result in emissions of regulated air pollutants subject to an applicable requirement but not otherwise regulated under this permit or may result in insignificant changes as defined in OAR 340-200-0020.

b. A contemporaneous notification, if required under OAR 340-218-0140(2)(b), must be submitted to the Department and the EPA.

c. The permittee must keep a record describing off-permit changes made at the facility that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those off-permit changes.
d. The permit shield of Condition G9 does not extend to off-permit changes.

G15. Section 502(b)(10) Changes to the Source [OAR 340-218-0140(3)]

a. The permittee must monitor for, and record, any section 502(b)(10) change to the source, which is defined as a change that would contravene an express permit term but would not:

i. violate an applicable requirement;
ii. contravene a federally enforceable permit term or condition that is a monitoring, recordkeeping, reporting, or compliance certification requirement; or
iii. be a Title I modification.

b. A minimum 7-day advance notification must be submitted to the Department and the EPA in accordance with OAR 340-218-0140(3)(b).
c. The permit shield of Condition G9 does not extend to section 502(b)(10) changes.

G16. Administrative Amendment [OAR 340-218-0150]

Administrative amendments to this permit must be requested and granted in accordance with OAR 340-218-0150. The permittee must promptly submit an application for the following types of administrative amendments upon becoming aware of the need for one, but no later than 60 days of such event:

a. legal change of the registered name of the company with the Corporations Division of the State of Oregon, or
b. sale or exchange of the activity or facility.

G17. Minor Permit Modification [OAR 340-218-0170]

The permittee must submit an application for a minor permit modification in accordance with OAR 340-218-0170.

G18. Significant Permit Modification [OAR 340-218-0180]

The permittee must submit an application for a significant permit modification in accordance with OAR 340-218-0180

G19. Staying Permit Conditions [OAR 340-218-0050(6)(c)]

Notwithstanding conditions G16 and G17, the filing of a request by the permittee for a permit modification, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

G20. Construction/Operation Modification [OAR 340-218-0190]

The permittee must obtain approval from the Department prior to construction or modification of any stationary source or air pollution control equipment in accordance with OAR 340-210-0200 through OAR 340-210-0250.

G21. New Source Review Modification [OAR 340-224-0010]

The permittee may not begin construction of a major source or a major modification of any stationary source without having received an air contaminant discharge permit (ACDP) from the Department and having satisfied the requirements of OAR 340, Division 224.

G22. Need to Halt or Reduce Activity Not a Defense [OAR 340-218-0050(6)(b)]

The need to halt or reduce activity will not be a defense. It will not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G23. Duty to Provide Information [OAR 340-218-0050(6)(e) and OAR 340-214-0110]

The permittee must furnish to the Department, within a reasonable time, any information that the Department may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee must also furnish to the Department copies of records required to be retained by the permit or, for information claimed to be confidential, the permittee may furnish such records to the Department along with a claim of confidentiality.

G24. Reopening for Cause [OAR 340-218-0050(6)(c) and 340-218-0200]

a. The permit may be modified, revoked, reopened and reissued, or terminated for cause as determined by the Department.
b. A permit must be reopened and revised under any of the circumstances listed in OAR 340-218-0200(1)(a).
c. Proceedings to reopen and reissue a permit must follow the same procedures as apply to initial permit issuance and affect only those parts of the permit for which cause to reopen exists.

G25. Severability Clause [OAR 340-218-0050(5)]

Upon any administrative or judicial challenge, all the emission limits, specific and general conditions, monitoring, recordkeeping, and reporting requirements of this permit, except those being challenged, remain valid and must be complied with.

G26. Permit Renewal and Expiration [OAR 340-218-0040(1)(a)(D) and 340-218-0130]

a. This permit expires at the end of its term, unless a timely and complete renewal application is submitted as described below. Permit expiration terminates the permittee's right to operate.
b. Applications for renewal must be submitted at least 12 months before the expiration of this permit, unless the Department requests an earlier submittal. If more than 12 months is required to process a permit renewal application, the Department must provide no less than six (6) months for the owner or operator to prepare an application.
c. Provided the permittee submits a timely and complete renewal application, this permit will remain in effect until final action has been taken on the renewal application to issue or deny the permit.

G27. Permit Transference [OAR 340-218-0150(1)(d)]

The permit is not transferable to any person except as provided in OAR 340-218-0150(1)(d).

G28. Property Rights [OAR 340-200-0020 and 340-218-0050(6)(d)]

The permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations, except as provided in OAR 340-218-0110.

G29. Permit Availability [OAR 340-200-0020 and 340-218-0120(2)]

The permittee must have available at the facility at all times a copy of the Oregon Title V Operating Permit and must provide a copy of the permit to the Department or an authorized representative upon request.

ALL INQUIRIES SHOULD BE DIRECTED TO:

Department of Environmental Quality
Air Quality Division
Western Region-Salem Office
750 Front Street NE, Suite 120
Salem, OR 97301-1039
(503) 378-8240

APPENDIX C

Energyneering Solutions 2021 Gas Collection Control System Design Plan

2021 GAS COLLECTION AND CONTROL SYSTEM DESIGN PLAN

FOR THE COFFIN BUTTE LANDFILL

PRESENTED TO:

REPUBLIC SERVICES

PREPARED BY:

ENERGYNEERING SOLUTIONS

December 9, 2021

TABLE OF CONTENTS

1 INTRODUCTION 3

1.1 PURPOSE 3
1.2 COMPLIANCE SUMMARY 3
1.3 CERTIFICATION 3

2 EXISTING SITE CONDITIONS 3

2.1 LANDFILL DESCRIPTION 3
2.2 CURRENT GCCS 3
2.3 CONTROL SYSTEM 4

3 FUTURE GCCS 5

3.1 VERTICAL WELLS 5
3.2 HORIZONTAL COLLECTORS 6
3.3 LFG PIPING 6

3.3.1 TRENCHING AND SLOPE 7

3.4 WELLHEADS 7

4 DESIGN CONSIDERATIONS 7

4.1 DEPTH OF REFUSE 7
4.2 SOLID WASTE GAS GENERATION RATES AND FLOW CHARACTERISTICS 8
4.3 LANDFILL COVER PROPERTIES 8

4.3.1 INTERIM COVER 8

4.3.2 FINAL COVER 8

4.4 LANDFILL GAS SYSTEM EXPANDABILITY 9
4.5 LEACHATE AND CONDENSATE MANAGEMENT 9

4.5.1 COMPRESSED AIR AND LIQUID CONVEYANCE 9

4.5.2 VERTICAL WELL PUMPS 9

4.5.3 AIR COMPRESSOR 10

4.6 COMPATIBILITY WITH FILLING OPERATIONS AND ACCESSIBILITY 10
4.7 INTEGRATION WITH CLOSURE AND END USE 10
4.8 AIR INTRUSION CONTROL 10
4.9 CORROSION RESISTANCE 10
4.10 RESISTANCE TO DECOMPOSITION HEAT 11
4.11 FILL SETTLEMENT 11
4.12 ISOLATION OF INDIVIDUAL COMPONENTS 11
4.13 LANDFILL GAS EXTRACTION COMPONENT CONSTRUCTION 12

4.13.1 MATERIALS 12

4.13.2 COMPONENT SIZING 12

4.13.3 COMPONENT LOADING 12

4.13.4 SYSTEM EXPANSION 12

4.13.5 COMPONENT PERFORATION 12
4.13.6 AIR INFILTRATION 13
4.14 LANDFILL GAS EXTRACTION COMPONENT INSTALLATION 13
4.14.1 COMPONENT PLACEMENT 13
4.14.2 LEACHATE 13
4.14.3 WELLS AND HORIZONTAL TRENCH COLLECTORS 14
4.14.4 COMPONENT SHORT CIRCUITING 14
4.14.5 GRAVEL BACKFILL 14
4.15 LANDFILL GAS EXTRACTION COMPONENTS CONNECTIONS TO LFG TRANSMISSION PIPING 14
5 CALCULATIONS 15
5.1 PIPE LOADING 15
5.2 GAS GENERATION AND COLLECTION 15
5.2.1 WASTE TYPES 16
5.2.2 METHANE GENERATION RATE AND METHANE GENERATION POTENTIAL 16
5.2.3 LANDFILL GAS GENERATION 16
5.3 RADIUS OF INFLUENCE AND WELL SPACING 17
5.4 LFG PIPE SIZING 18
5.5 COMPRESSOR SIZING 19
6 OPERATIONS 20
6.1 SURFACE EMISSION MONITORING 20
6.2 EMISSION MITIGATION MEASURES 20
6.2.1 INSTALLATION MITIGATIONS 20
6.2.2 OPERATIONAL MITIGATIONS 20
6.3 ASBESTOS AND NON-PRODUCTIVE WASTE 21
6.4 ALTERNATIVE COMPLIANCE OPTIONS 21
6.5 WELLHEAD SAMPLING 21
6.6 WELL RAISING 21
6.7 GCCS OPERATION 22
APPENDIX A: GCCS MASTER PLAN 23
APPENDIX B: LFG GENERATION MODEL (LANDGEM) 24
APPENDIX C: PRESSURE LOSS CALCULATIONS FOR LFG HEADER AND LATERAL PIPING 25
APPENDIX D: RADIUS OF INFLUENCE CALCULATIONS 26
APPENDIX E: COMPRESSOR SIZING CALCULATIONS 27
APPENDIX F: SURFACE EMISSION MONITORING PLAN 28
APPENDIX G: ALTERNATIVE OPERATION AND MONITORING PLAN (AOMP) 29
APPENDIX H: COMPLIANCE REVIEW TABLE 30

1 Introduction

1.1 Purpose

The purpose of this document is to provide a design plan in accordance with the Oregon State Plan design requirements for the landfill gas (LFG) collection and control system (GCCS) at the Coffin Butte Landfill (CBLF). This document serves as the GCCS Design Plan and was prepared pursuant to OAR 340-239-0110. This GCCS Design Plan supersedes all other previously prepared GCCS Design Plan Submittals.

1.2 Compliance Summary

A summary of applicable regulations and implementation of these regulations at Coffin Butte Landfill is presented in Appendix H of this Design Plan.

1.3 Certification

This Design Plan for the GCCS at CBLF has been prepared by Energyneering Solutions (ESI), as authorized by Republic, which operates the GCCS at CBLF.

I certify that the GCCS as described in this plan meets the design requirements specified in OAR 340-239-0110. I further certify that this Design Plan was prepared by me or under my direct supervision, and that I am a duly registered Professional Engineer.

Benjamin Benson, P.E.

Certifying Engineer

Oregon P.E. License No. 80443

2 Existing Site Conditions

2.1 Landfill Description

Coffin Butte Landfill is located in Corvallis, in Benton County, Oregon. The landfill is owned and operated by Republic under Solid Waste Permit Identification Number 306 issued by the Oregon Department of Environmental Quality (DEQ). The landfill accepts municipal solid waste (MSW), construction and demolition landfill waste (CDL), and inert burn waste. The landfill began accepting waste in 1978 and has a design capacity of approximately 39.7 million tons at a projected closure date of 2041.

2.2 Current GCCS

An active GCCS is in place and operating and will be expanded as waste continues to be placed. As of 2021, CBLF has 312 active vertical extraction wells and horizontal collectors in total. Existing vertical extraction wells have a well spacing ranging from 150 to 200 feet throughout the fill area. Whenever possible, existing wells were installed along permanent benches and at edges of plateaus. These locations made them easier to maintain, monitor, and install; additionally, this ensured the wells stayed out of the way of site filling operations. In other cases, some vertical wells and horizontal collectors were extended, replaced, or decommissioned as needed according to operation and compliance needs.

The elevation difference between ground surface and the operational layer at all wellhead locations is at a minimum 55ft (i.e. wells were not be drilled in waste less than 55ft deep), and there is a minimum of 15ft between the bottom of each well and the operational layer to ensure the liner is protected. All other vertical wells are drilled to their maximum depth to facilitate liquid collection and drainage to the base of the landfill. Where gravel chimneys or gabion baskets have been installed at the base of a cell, vertical wells are drilled to the top of the chimneys to encourage liquid drainage and collection. Borehole drilling locations were specified with coordinates by the Engineer in detailed designs. The selected drilling Contractor sent surveyed and staked well locations to the Engineer prior to drilling so that waste depths could be verified

Permanent lateral and header pipes were installed below grade and were constructed of high-density polyethylene (HDPE) pipe. Temporary piping was installed either above or below grade to accommodate ongoing waste placement operations as needed. LFG is currently conveyed through this pipe network to the electrical generation plant and backup utility flares, located southeast of the disposal area.

Condensate that forms in the GCCS piping is discharged to the leachate collection system (LCS) via direct connections to LCS clean/access riser or to condensate pump stations located around the perimeter of the disposal area. Condensate drained by gravity to the condensate pump stations is discharged through a force main(s) to the LCS. Condensate collected in condensate drains is transported via gravity directly to the LCS via leachate system access risers. The condensate is disposed of coincidentally with landfill leachate in accordance with the requirements of the facility Solid Waste Permit.

Additional information and drawings of the GCCS are included in Appendix A.

2.3 Control System

Currently, the landfill directs its LFG to an electrical generation plant owned and operated by the Pacific Northwest Generating Cooperative (PNGC) which consists of three 3516 Caterpillar engines each capable combusting of approximately 287 scfm and two 3520 Caterpillar engines each capable of combusting approximately 527 scfm each and has the ability for further expansion.

The PNGC facility has two backup utility flares for handling excess LFG. The blower skid and flare system equipment are located on the southeastern corner of the landfill. The complete system includes two LFG blowers and two candlestick flares with a combined 3,000 scfm capacity. One 2000 scfm capacity flare was installed with the initial GCCS, while an additional 1000 scfm flare was installed in 2015 after the LFG flow to the flare station rose following GCCS expansion. As of 2021, the flare station currently has a combined flow approximately 2000-2200 scfm with the remainder of the collected LFG being utilizes by the power generation facility that has up to 95% annual generation capacity.

The flares are designed to reduce NMOCs by 98 percent weight or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen, which meets 40 CFR §60.752(b)(2)(iii)(B), but not OAR 340-239-0110 (2)(b)(A) which requires a methane destruction efficiency of at least 99 percent by weight. Both current flares are equipped with continuous temperature recorders and flowmeters which meet the requirements of OAR 340-239-0110 (2)(c)(A)(i) and OAR 340-239-0110 (2)(c)(A)(ii).

In accordance with OAR 340-239-0110 (2)(c)(A)(ii)(I) the flare exhaust temperatures and LFG flow rate are monitored continuously. The flare exhaust temperature is monitored using a thermocouple installed at the flare tip. The LFG flow rate is measured using an orifice plate, installed along the LFG piping, downstream of the blowers. The utility flare is constantly monitored for the presence of a flame, indicating that combustion is occurring. Monitoring for the presence of a flame is accomplished by an ultraviolet flame scanner, thermocouple, or comparable device. In the event that a flame is not detected, indicating that the combustion process has been disrupted, the monitoring system will automatically:

- Cut power to the LFG blowers, and;

- Initiate the closure of a pneumatic-activated valve at the inlet to the blowers. There is no bypass around the control device.

Stopping the blowers will cause the LFG extraction process to cease. Closing the inlet valve to the blowers will eliminate the potential for direct venting of LFG through the control device system.

The backup utility flare consists of a 2,000 scfm capacity skid mounted utility flare system manufactured by LFG & E International in order to provide additional LFG control capacity. The utility Triton flare, model CF-2000, is 10-inch diameter and approximately 31-feet tall. The skid-mounted utility flare system also features a fail-closed valve, a main condensate knockout, a flow meter, a 2,000 scfm capacity New York blower, and a control valve for the blower. The blower is a single stage fan blower with direct drive 30 HP, 480 V AC, three phase motor, and shall be capable of generating 50 inches water column (W.C.) inlet vacuum and 15 inches W.C. discharge pressure.

In the event that LFG extracted from the landfill exceeds the capacity of the control systems, additional control mechanisms will be installed. These additional control mechanisms may include, but are not limited to, upgrading the existing control devices or installation of other beneficial-use facilities.

Visual inspections of all control mechanisms associated with the control system are performed monthly.

3 FUTURE GCCS

The Coffin Butte Landfill will continue to place waste in accordance with the solid waste permit. Installation of additional GCCS components is anticipated to be coordinated with fill development and as required by DEQ regulations regarding installation of GCCS components stipulated in OAR 340-239-0110: Gas Collection and Control System Requirements. Due to operational changes, the GCCS design plan presented in Appendix A may be altered to maintain compliance with the provisions of the DEQ and to accommodate actual field conditions at the time of construction.

3.1 VERTICAL WELLS

Vertical wells will be constructed of 6" diameter schedule 40 carbon steel or HDPE piping. Perforations of vertical wells will be at a suitable depth to prevent air intrusion, as calculated in Section 5.3. The borehole for vertical wells will be a minimum of 3ft in diameter with washed non-calcareous stone fill made up of stone from 1-3 inches in size. The borehole will have bentonite plug between the stone backfill and soil cover, as well as a secondary bentonite plug within the soil cover, to prevent migration of gas through the borehole. Where the wellhead comes above the landfill's cover tarping, a geomembrane boot will be installed. Vertical well material, size, connections, and backfill may be modified; however, vertical wells will maintain compliance to OAR 340-239-0110(1) and OAR 340-239-0110(2).

The elevation difference between ground surface and the operational layer at all wellhead locations will at a minimum be 55ft (i.e. wells will not be drilled in waste less than 55ft deep), and there will be a minimum of 15ft between the bottom of each well and the operational layer to ensure the liner is protected. All vertical wells will be drilled to their maximum depth, within the bounds described previously, to facilitate liquid collection and drainage to the base of the landfill. Where gravel chimneys or gabion baskets have been installed at the base of a cell, vertical wells will be drilled to the top of the chimneys to encourage liquid drainage and collection. Borehole drilling locations will be specified with coordinates by the Engineer in detailed designs. The selected drilling Contractor will send surveyed and staked well locations to the Engineer prior to drilling so that waste depths can be verified.

To maximize vertical well life, wells will only be drilled in areas of final, or interim final fill. Wells installed in interim final fill areas are designed to maximize collection from an area that will remain undisturbed for many years and will only be placed in areas with adequate waste depth. Eventually, as filling in these areas resumes, the wells will need extended or replaced to continue providing adequate collection.

Whenever possible, wells will be installed along permanent benches and at edges of plateaus. These locations will make them easier to maintain, monitor, and install; additionally, this will ensure the wells stay out of the way of site filling operations. Vertical wells will be spaced to ensure adequate LFG collection density in accordance with OAR 340-239-0110(1)(c)(J); spacing determination is further described in Section 5.3.

ESI is currently evaluating performance of carbon steel vertical well casing which have been installed over the previous few years. An adaptive design process should consider long term performance of all casing materials installed at this site to ensure the materials used provide the highest probability of long-term success.

Minimal corrosion of the carbon steel casings have been observed to date and no steel casings have collapsed under the forces of waste settlement. As a tentative plan, it is intended to continue installing carbon steel casings when installation is along a permanent side slope. The top 3 feet of these steel casings is to be an extension of SDR 11 HDPE to allow for wellhead lowering as necessary based on settlement. When vertical extraction wells are planned for installation on an intermediate slope, casing material should be reviewed on a case-by-case basis to determine if the cost of carbon steel casings is justified based on the anticipated life span for the installed location.

A typical vertical extraction well detail is shown on drawing sheet M3.01 in Appendix A. Carbon steel and PVC casings are to be slotted per Detail C shown on drawing sheet M3.08. HDPE casings, if used, are to be perforated per Detail D on the same drawing sheet. Carbon steel casings will be evaluated to see how the material performs for 10 or more years of use.

3.2 Horizontal Collectors

Horizontal collectors will be constructed of 6" diameter HDPE DR11. Collectors will be centered within a trench, a minimum of 2ft wide and 3ft deep, backfilled with washed non-calcareous stone (1-3 inches in size). A bentonite plug will be installed at the transition from solid to perforated pipe and a geomembrane boot provided where the pipe comes above the landfill cover tarping. Whenever possible, horizontal collectors will be designed to drain liquid back into the landfill, rather than out through wellheads. Like the vertical well design, horizontal collector design is subject to modification but will maintain compliance to OAR 340-239-0110(1) and OAR 340-239-0110(2).

As has been done previously in the existing GCCS, horizontal collectors will be used between waste lifts and in shallower areas of fill. These collectors will have a minimum 100 ft distance from perforated pipe to the edge of fill and will be spaced at 100ft from each other. They will typically not be collected from until there is at least 30ft of waste placed above them or otherwise sufficient LFG generation. Horizontal collectors will act as surface collectors if necessary, and the GCCS may be expanded by adding horizontal collectors near the perimeter of waste to prevent offsite migration as per OAR 340-239-0110(1)(c)(J). By following these guidelines for horizontal collectors, air intrusion will be prevented, and anaerobic decomposition promoted. Horizontal collectors are not shown on the master plan layout for clarity.

3.3 LFG Piping

All lateral and header LFG piping will be butt fusion welded HDPE at a minimum thickness of SDR 17. Piping will be sized, as specified in Section 5.4, to maintain a adequate vacuum of at each wellhead, even during maximum expected LFG generation; the current blowers will be required to run at their full capacity, 50" W.C., to do this. As discussed in Sections 4.8 and 4.9 HDPE header and lateral piping will be suitably resistant to corrosion and to decomposition due to heat meeting requirement OAR 340-239-0110(2)(a)(I). The LFG piping will be installed in a manner that minimizes obstruction of filling operations as discussed in Section 4.6. Header and lateral piping will be in regions that have reached final fill unless the piping is specified as temporary in designs. When piping is temporary or in specific cases outlined in GCCS designs, it may be necessary to install piping above grade; however, the majority of LFG piping will be installed in a trench as discussed in Section 3.3.1.

3.3.1 Trenching and Slope

According to the US Army Corps of Engineer's *Landfill Gas Collection and Treatment Systems Engineer Manual*, when header pipe is within the Landfill boundaries, it should be on a 2% grade when condensate flow is in the same direction as LFG flow and a 4% grade when condensate flows opposite to LFG. This grade prevents differential settlement in the Landfill from causing low spots in the header piping. Considering this recommendation and ESI's experience, a 3% grade was selected for header and lateral piping at the Landfill to allow condensate drainage to the appropriate in-line condensate sumps located at low points and other strategic locations throughout the Landfill. A survey of the LFG piping path will be submitted to the Engineer during all construction projects by the Contractor so elevation and location can be verified.

Header and lateral piping will be buried with two strips of warning tape buried 3-6" above it; piping will be spaced 6" from any other pipes if it is in a shared trench. Pipe trenches will be backfilled with sand bedding that will support the pipe in resisting vertical loads. Each pipe will be buried at a minimum of 1 ft from pipe crown to the surface except where the LFG header crosses a bench in the landfill, in final closure areas, or when an above ground stub-up is specified in design drawings.

3.4 Wellheads

Vertical wells and horizontal collectors will each have a wellhead comprised of, at minimum, a positive closing throttle valve and at least two sampling ports, as specified in OAR 340-239-0110(2)(a)(K). As feasible, new wellheads will be installed, and existing wellheads retrofitted, with flow meter devices and separate temperature sampling ports to ensure accurate flow readings. Standard wellhead pipe sizing will be 2"; wellhead sizing may be increased or decreased to accommodate unique flow conditions at specific wells. Well heads will be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

4 Design Considerations

Design considerations meet the requirements of OAR 340-239-0110(1)(c)(A), below, as described in Sections 4.1 through 4.15. Each GCCS design will be certified to achieve comprehensive control of surface gas emissions by a professional engineer before GCCS construction takes place.

OAR 340-239-0110(1)(c)(A) *The Design Plan must be prepared and certified by a professional engineer. The following issues must be addressed in the design: Depths of solid waste, solid waste gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, resistance to the solid waste decomposition heat, and ability to isolate individual components or sections for repair or troubleshooting without shutting down entire collection system.*

The GCCS has been designed to be consistent with DEQ requirements to achieve comprehensive control of both lateral migration and surface emissions of LFG.

Issues related to compliance with OAR 340-239-0110 (1)(c)(A) are discussed in the following sections.

Applicable information used in the design of the GCCS is included in Appendix A (GCCS Master Plan), Appendix B (LFG Generation Model), Appendix C (Pressure Loss Calculations in LFG Header and Lateral Piping), Appendix D (Radius of Influence Calculations), Appendix E (Compressor Sizing), Appendix F (Surface Emissions Plan), and Appendix G (Alternative Operation and Monitoring Plan).

4.1 Depth of Refuse

The GCCS master plan incorporates vertical gas extraction wells for regions of the landfill with at least 55-70' of waste depth. Horizontal gas collectors will be used throughout the landfill and placed between waste lifts to provide gas collection in the shallower regions of fill and in areas of active fill. As described in Section 3.1, there will be at least 15' between the operational layer and the bottom of each vertical well's borehole.

Depths of refuse are calculated, at the time of the design of the GCCS, based upon existing topography and permit plan and record documentation of landfill liner grades. The landfill surface elevations are determined from aerial survey data at the time of the design.

4.2 Solid Waste Gas Generation Rates and Flow Characteristics

The maximum expected LFG flow rate for the site was used for sizing the GCCS. The LFG generation rate calculations were performed using the United States Environmental Protection Agency (EPA) Landfill Gas Emission Model (LandGEM) (values- k=0.04/year and L_0=80 m^3/Mg), historical waste receipts and the permitted design capacity of the facility. The maximum LFG generation rate projected to be approximately 6900 scfm.

The LandGEM emissions model is a design tool which uses the information available to project future operating conditions. This model was developed based upon operating conditions at a cross-section of landfills within the United States and is approved for use by the EPA. Actual operating parameters may dictate changes in the system flow characteristics and process equipment as the system is developed. The LandGEM model meets the requirements of OAR 340-239-0110(2).

LFG generation variables are discussed in Section 5.2 and LFG projections. The complete 2021 LandGEM report provided in Appendix B.

4.3 Landfill Cover Properties

The final cover design will incorporate a composite geosynthetic/low permeability soil barrier. The primary purpose of the final cover system units is to prevent precipitation infiltration that would generate additional leachate. However, the final cover system design also provides a significant barrier to LFG emission and air infiltration when combined with an active LFG extraction system. The GCCS will provide components for collecting LFG and relieving pressures from LFG from beneath the landfill covers.

4.3.1 Interim Cover

The size of the active operational areas of the Landfill is controlled using interim covers consisting of temporary plastic tarps. The interim soil cover, where used, will typically be a minimum of 12-inches thick. The temporary plastic covers are typically 12-mil, lightweight plastic with a nylon reinforcing scrim or 45-mil ethylene propylene diene monomer (EPDM) rubber. EPDM sheets are available in panels up to 200 feet by 200 feet. The cover material is held down by sandbags placed on a spacing of approximately 10 feet or anchored with specialized earth anchors in the case of EPDM cover. Sheet seams are sewn together, taped, or made by overlapping the sheets and placing sandbags along the seam. The seams will be shingled down slope to properly shed water. The interim cover will facilitate the control of landfill gas prior to final cover being put in place.

4.3.2 Final Cover

The final landfill cover inhibits the infiltration of stormwater and the migration of landfill gas. This cover will be installed periodically during the operating life and the closure of the Landfill. The final cover will consist of:

- An under-drainage layer to allow collection of landfill gas and control of landfill seeps.

- 24" of compacted low permeability soil having a maximum hydraulic conductivity of $1x10^{-5}$ cm/s.

- Geomembrane, most-likely a 60-mil linear-low density polyethylene (LLDPE) or other approved geomembrane.

- Drainage layer, either 12 inches of gravel or a geocomposite drainage layer

- Plantings, which would include a diverse grass/forb seed mix of native species, shallow-rooted shrubs, and limited areas of mixed forest where topsoil would be deep enough to ensure the integrity of the cover system.

In areas of the landfill under final cover, LFG collection efficiency is expected to increase to as much as 90% due to enhanced effectiveness of the cover to limit air infiltration and LFG emissions. Sections of the landfill already at final grade are currently covered with a LLDPE geomembrane.

4.4 Landfill Gas System Expandability

Expandability of the GCCS is achieved by installing tees with blind flanges along the transmission piping or providing expansion capabilities for additional LFG control devices. These flanges or expansion points provide planned access for expansion of the LFG transmission piping and LFG control device facility(s) in the future. Coffin Butte Landfill may require the installation of supplemental GCCS components to comply with State and Federal regulations at some point in the future. If that need is determined, an alteration will be submitted to the DEQ for review and concurrence prior to the installation of those components. Any needed design component will be installed and operational no later than 60 days after the date on which the area requires control.

4.5 Leachate and Condensate Management

Condensate generated in header, lateral, and horizontal collector piping will maintain drainage from landfill high points to condensate and leachate sumps or leachate cleanouts and drains installed at low points in the Landfill. The current GCCS system includes condensate sumps at low points in the header piping, which will be utilized in future GCCS designs. As shown on the GCCS Master Plan, all LFG piping will slope towards a condensate pump. If necessary, sumps will be upsized to handle condensate for the Landfill. Additional sumps may also be installed if low points are encountered in future designs.

Leachate is pumped from the LCS to an onsite pond for storage. As warranted, leachate is trucked off site for permanent disposal. The LCS is designed according to Subtitle D standards (40 CFR§257 and §258) and is part of the Solid Waste Disposal Permit.

4.5.1 Compressed Air and Liquid Conveyance

2" diameter SDR 9 HDPE piping will provide compressed air to pneumatic pumps for dewatering vertical wells and sumps. The piping will be in a shared trench with the LFG and liquid conveyance piping (see next paragraph) wherever possible to limit the amount of trenching needed in each GCCS design. The compressed air line will stub-up at each vertical well with an isolation valve for isolating individual pumps. The compressed air line will also have isolation and blow-off valves installed at strategic locations in the Landfill. Blow-off valves will allow the compressed air line to be cleaned out and the pressure to be released if necessary.

A 4" diameter liquid conveyance line will stub-up with an isolation valve at each vertical well, along with every compressed air line stub-up. Like the compressed air line, the liquid conveyance line will share a trench with LFG piping whenever possible. Liquid conveyance cleanouts will be installed in the piping every 200ft, comprised of wye-fittings, ball valves, and camlock fittings. Cleanouts are included with these features and at this quantity to allow for easy access to every point in the piping for cleaning by vacuum trucks and water trucks.

4.5.2 Vertical Well Pumps

Leachate extraction pumps in vertical wells will be pneumatic. The pump will operate using the compressed air line with an in-line regulator and will discharge into the 4" liquid conveyance line. This type of pump was selected because it is commonly used for landfill vertical well leachate pumping and can easily be integrated into the liquid conveyance and compressed air lines. The pump will be of a diameter is so that it will fit within the 6" carbon steel or HDPE pipe used for vertical wells. The pump will also be installed with a stabilizer

LFG well cap that will allow the pump to be easily accessible. The pump model selection is subject to change in future designs depending on the site and well specific pumping requirements

4.5.3 Air Compressor

In 2021, CBLF installed a Sullair 3709VB Series 50 HP rotary screw compressor to replace the former model Sullair ST2208 30 HP screw compressor. This larger compressor has a typical lifetime of 15 years and is capable of supplying enough air to operate all proposed pneumatic leachate extraction pumps cycling simultaneously. For more information regarding compressor sizing, please refer to Section 5.5

4.6 Compatibility with Filling Operations and Accessibility

Accessibility to the GCCS components is achieved by installing commonly accessed components (such as wellheads and monitoring ports) on relatively flat surfaces of the landfill or near the landfill's road network. Wellheads, piping risers, valves and monitoring ports will be installed above grade, or within vaults, to maintain accessibility.

At the time of this report, an active GCCS has been constructed and is operating in the Coffin Butte Landfill. Future additions or expansions of the GCCS will be designed to integrate the existing GCCS components currently operating at the Coffin Butte Landfill. As refuse filling operations proceed and portions of the site reach final or near-final grades, additional GCCS components will be installed. This method of installation allows GCCS components to be constructed while minimizing interference of the GCCS with ongoing filling operations.

4.7 Integration with Closure and End Use

Currently, the post-closure end-use for the site is unspecified and will likely be utilized as open space. Any modifications to the closure end-use must be approved by Coffin Butte Landfill personnel to evaluate their compatibility with the GCCS. Any items of concern related to maintaining and operating the GCCS will be mitigated by either altering the proposed post-closure end-use or by adjusting or modifying the GCCS in accordance with DEQ requirements.

4.8 Air Intrusion Control

Air intrusion will be minimized throughout the entire Landfill by the interim cover and the final cover described in Section 4.3. Where collectors, wells, or piping pass through the cover, a geomembrane boot will be used to prevent these regions from becoming an air intrusion source. Monthly well tuning and regular maintenance of the cover will also be essential in preventing air intrusion. The radius of influence of vertical wells, which is described in Section 5.3, was used to determine the length of solid pipe and determine a recommended vacuum for wells both on waste plateaus and slopes. By using both these values, the potential for air intrusion due to overpulling at wells will be minimized

4.9 Corrosion Resistance

Corrosion resistance of the GCCS is achieved through the use of corrosion resistant materials or materials that have a corrosion resistant coating. The primary components used in the construction of the GCCS are high density polyethylene (HDPE) and polyvinyl chloride (PVC) piping. All HDPE piping will have a minimum rating standard dimension ratio (SDR) of 17. All PVC piping will have a minimum rating of Schedule 40. Components will be inspected during routine GCCS monitoring for abrasion, chipping, or other potential deterioration of the components. If damage to the materials is observed that may be detrimental to the performance of the GCCS, the components will be replaced or repaired.

4.10 Resistance to Decomposition Heat

Resistance of the GCCS to the heat generated as a result of refuse decomposition was achieved through the use of materials tested and proven to withstand temperatures well above those typically found in landfills. The GCCS will be inspected during routine LFG system monitoring for heat damage. If heat damage of the GCCS components is observed and is believed to be detrimental to the operation of the GCCS, the cause of the elevated landfill temperature will be investigated and the GCCS will be adjusted or modified to mitigate the effects of the elevated temperatures.

The primary point of observation during routine LFG system monitoring will be at the individual wellheads. Each wellhead possesses either an integral thermometer or a connection for the use of portable thermometer. The extraction wells will generally be operated at temperatures of less than 131 °F unless an alternative temperature parameter is approved for an individual monitoring point. All wellhead components are visually inspected, and the control valve and monitoring connection physically exercised during each monitoring event, to insure free operation of the components.

In the event that the monitored LFG temperature exceeds 150°F, the well casing will be inspected via fiber optic camera or other suitable means to ensure that the integrity of the casing has not been compromised. Vertical extraction well casings will be constructed of schedule 40 carbon steel. Legacy casings may be schedule 80 PVC or HDPE. A compromised PVC or HDPE casing will typically show signs of physical deformation or internal "bulges" if excessive heat has been applied for a prolonged period of time. In the event that damage has occurred that negatively impacted the operations of the extraction well, the DEQ will be notified and a remedy for that extraction point proposed for review and concurrence.

Since the LFG stream cools as it is drawn through the piping system, the lateral and header piping will be exposed to relatively cooler gas temperatures than will the extraction wells and wellheads. These components will be inspected only in the event that a surface fire or other disturbance is observed.

4.11 Fill Settlement

Settlement will occur due to decomposition of the refuse. To accommodate refuse settlement, the GCCS components will be designed and installed with several features to account for this settlement, including:

- LFG extraction wellheads connected to the LFG transmission piping via a flexible pipe or hose connection. This allows the LFG piping to accommodate changes in the orientation of the LFG transmission piping or LFG extraction well.
- LFG transmission piping sloped at sufficient grades (a minimum 3.0 percent within the waste limits, and 0.5 percent outside the waste limits) so that reasonable amounts of differential and total settlement may occur without causing pipe breakage or disrupting the overall flow gradient of the LFG transmission piping.
- HDPE piping used for the construction of the header piping and transmission system. HDPE piping is flexible and absorbs differential settlement without breaking or cracking.

4.12 Isolation of Individual Components

The GCCS will be designed to include isolation valves at gas header, air, and liquid forcemain junctions and branches so as to allow for the ability to isolate individual components or sections for repair or troubleshooting without shutting down the entire collection system

4.13 Landfill Gas Extraction Component Construction

OAR 340-239-0110(2)(I) *The landfill gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: Convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system must extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated with regard to the need to prevent excessive air infiltration.*

Design considerations related to compliance with OAR 340-239-0110(2)(I) are discussed in the following sections:

4.13.1 Materials

The GCCS components will be constructed of PVC, HDPE, fiberglass, corrosion resistant steel, Neoprene (gaskets and seals) and other non-porous corrosion resistant materials.

4.13.2 Component Sizing

The final development piping network, blowers, and flares are sized for a maximum estimated flow of 6,900 scfm with the ability for expansion. The GCCS facilities will be expanded as needed to handle 6,900 scfm as estimated by the EPA LandGEM emissions model. This accounts for the entire disposal area, at the final grade development elevations of the landfill. Capacity of the extraction and treatment system components will be phased in as LFG generation and extraction rates increase. Please see Section 3.5 for full discussion of the control systems.

4.13.3 Component Loading

The GCCS components were designed to withstand the estimated installation, static, settlement, overburden, and traffic loads. Installation loads were determined to be insignificant for GCCS components (PVC, HDPE, and carbon steel) based on the installation methods used. Static loads from the vacuums applied to the GCCS components and applied loads on the GCCS were both evaluated. Vacuum loads required for the GCCS operation were compared to, and found to be less than, the allowable vacuum loads for the GCCS components. Foundations used for GCCS components were designed to handle the applied loads. The applied loads on GCCS components within the landfill, as well as settlement forces, cannot accurately be predicted due to the non-homogeneous nature of the refuse within the landfill.

The GCCS components within the landfill are consistent with those at other landfills that have been in place for extended periods of time (in excess of 15 years) and verified to withstand applied static and settlement forces. Overburden and traffic loads for the LFG transmission piping are less than the allowable loads recommended by the piping manufacturer.

4.13.4 System Expansion

The GCCS shall be expanded as necessary to comply with DEQ requirements. The Coffin Butte Landfill will conduct monitoring and document compliance of the GCCS, in accordance with DEQ requirements. If the GCCS at the Coffin Butte Landfill does not meet the measures of performance set forth by DEQ, the GCCS will be adjusted or modified in accordance with DEQ requirements.

4.13.5 Component Perforation

The vertical well and interim horizontal trench collector elements will be perforated as shown on the design plans (Appendix A) or as approved by the design engineer at the time of installation, to allow LFG entry

without inducing head losses sufficient to impair performance across the intended extent of control. The perforation patterns used for the Coffin Butte Landfill GCCS design have been successfully used in previous LFG control applications.

4.13.6 Air Infiltration

The LFG collection elements were designed to prevent excessive air infiltration through the use of solid pipe and solid backfill near the ground surface for vertical LFG extraction wells and interim horizontal trenches in the perimeter slope area. Hydrated bentonite plugs and geomembrane seals, if warranted, will be provided around vertical well casings and interim horizontal trench access piping, where they penetrate the landfill final cover or interim cover systems. Further, air intrusion control will be accomplished through monitoring of the standard operational procedures (SOP) for the LFG collection elements in accordance with DEQ and NSPS requirements. If the GCCS does not meet the SOP, it will be adjusted or modified in accordance with DEQ and NSPS requirements.

Near surface collectors may be used on occasion to prevent surface emissions and are approved for operation with higher than normal oxygen readings.

4.14 Landfill Gas Extraction Component Installation

OAR 340-239-0110(2)(J) *Vertical wells must be placed so as not to endanger underlying liners and must address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors must be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices must be designed so as not to allow indirect short circuiting of air into the cover, into the solid waste, into the collection system, or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.*

Design considerations related to compliance with OAR 340-239-0110(2)(J) are discussed in the following sections:

4.14.1 Component Placement

Depths of refuse were calculated, at the time of the design of the GCCS, based upon the permit plan final grades and record documentation of landfill liner grades. Vertical LFG extraction wells will be designed to extend from the landfill surface to a maximum depth of 15 feet above the landfill base. Any changes made to borehole depths during design or construction must be verified and acknowledged by the following representatives: QA/QC Reviewer, Design Engineer, CQA Inspector, Environmental Manager, Surveyor, and Driller. Under no circumstances shall drilling begin without providing all the aforementioned signatures. Any changes to well location or depth shall require signatures to be obtained again.

4.14.2 Leachate

The occurrence of leachate within the landfill will be addressed by the LCS as stated in Section 4.5 of this Design Plan. Leachate management within the landfill with a composite liner will be accomplished through the LCS which includes a leachate drainage layer, perforated collection piping, side slope risers with liquid pumping equipment, and liquid storage and disposal systems. A force main could then be used to convey the extracted liquids to the leachate storage facilities

If free liquids are encountered, the drilling contractor will attempt to drill through the perched zone of liquids allowing drainage into the underlying waste mass and the LCS. In the event that the zone of perched liquids cannot be penetrated, the well installation may be terminated. If necessary, appropriate measures will be taken to complete the well installation procedure at a nearby location.

If perched liquids are observed within the extraction wells after installation, and it is determined that the liquid level is restrictive to efficient LFG extraction, attempts may be made to reduce the leachate level. This

is typically accomplished by periodic pumping of the liquids using either electric or pneumatic pumping systems. Liquids removed from the well casings will be discharged to the LCS.

4.14.3 Wells and Horizontal Trench Collectors

Vertical wells and interim horizontal trench collectors, constructed for LFG collection elements, are of sufficient cross-section to allow for their proper construction and completion, including centering of the pipes and placement of gravel backfill. The wells and interim trenches will be constructed under supervision of a construction quality assurance program implemented by the Coffin Butte Landfill and verified to be properly constructed, as indicated on the design plans in Appendix A.

4.14.4 Component Short Circuiting

LFG collection elements are designed to prevent air infiltration through the cover, refuse contamination of the collection elements, and direct venting of LFG to the atmosphere. Air intrusion control will be verified through monitoring of LFG quality at the extraction components (note exemption for near surface collectors in Section 4.13.6), monitoring of surface emission levels and maintenance of the landfill cover in accordance with DEQ requirements. Separation of the collection elements from the refuse is accomplished by placing gravel backfill in the annular borehole space around extraction wells casings and the interim horizontal trench pipes, providing a filter pack between the refuse and the LFG collection elements. Direct venting of the LFG to the atmosphere is avoided by operating the GCCS under a controlled application of vacuum and the quarterly monitoring of surface emissions.

4.14.5 Gravel Backfill

Gravel of sufficient size is specified to prevent penetration or blockages of the LFG collector pipe perforations. Gravel (non-calcareous) to be utilized will be a nominal 1 to 3-inch in size.

4.15 Landfill Gas Extraction Components Connections to LFG Transmission Piping

OAR 340-239-0110(2)(K) *Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly shall include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices shall be constructed of PVC, HDPE, fiberglass, stainless steel, or other non-porous material of suitable thickness.*

The collection devices are connected to the collection header pipes using lateral piping. The lateral piping will be connected to the header piping either above or below the landfill surface, as required by field conditions at the time of installation. The connector assemblies and collection devices (vertical extraction wellheads) are detailed in section 3.4 of this design plan.

5 Calculations

The calculations described in this section serve to support the GCCS Design in Section 3 and the design considerations in Section 4.

5.1 Pipe Loading

In addition to their suitability to resisting corrosion and decomposition due to heat, the GCCS components must withstand loading due to installation, static, and settlement forces as well as overburden or traffic loads per OAR 340-239-0110(2)(a)(I). Installation forces are negligible for the PVC and HDPE pipe selected as well as pressure due to applied vacuum within piping. The static pressure due to waste was determined at a depth of 230ft, which is the difference in elevation between the current surface and the well with the highest elevation per the GCCS Master Plan. Using a waste density of 2,000 lb/yd^3 and the equation below, the maximum pressure in a vertical well was determined to be 118.3 psi. The maximum pressure was then compared to the collapse pressure for Schedule 80 PVC, which is 343 psi for 6" diameter pipe. This result indicates the static loading will not cause pipe collapse even at the deepest regions of fill.

$$P = \varrho D$$

where,

P = Static pressure, ϱ = Waste density, D = depth of waste

The pipe is assumed to be capable of resisting most settlement forces due to the materials use historically in Landfills. However, there is no accurate way to predict what settlement forces will be. Vertical extraction well casings are to be made of 6" schedule 40 carbon steel, which has a collapse pressure significantly higher than the PVC used in the above calculation. By installing most GCCS piping and vertical wells in areas that have reached final fill, the overall loading on the GCCS due to settlement will be reduced as some of the initial waste settlement will have occurred prior to pipe installation. Resistance of header and lateral piping to traffic loads will be considered on a case-by-case basis and will depend on the depth of pipe burial and weight of traffic loads. If necessary, corrugated metal or ductile iron pipe will be used to carry the gas collection piping and provide resistance to loads.

5.2 Gas Generation and Collection

As stated in 340-239-0110(1)(c)(C) the gas mover equipment must "be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment". Because a gas collection and control system is already in place at Coffin Butte Landfill, actual flow data may be used to project the maximum expected gas generation flow rate along with the equation from 40 CFR 60.755(a)(1)(ii):

$$Q_m = \sum_{i-1}^{n} 2kL_0M_i(e^{-kt}i)$$

where,

Q_m = maximum expected gas generation flow rate, cubic meters per year

L_0 = methane generation potential, cubic meters per megagram solid waste

k = methane generation rate constant, year^{-1}

M_i = mass of solid waste in the ith section, megagrams

t_i = age of the ith section, years

The EPA's Landfill Gas Emissions Model was used for projecting maximum LFG generation rates. The results of the LandGEM model ran for CBLF is shown in Appendix B.

5.2.1 Waste Types

The LandGEM uses the waste placed each year, historically and in the future, as an input, which is represented by M_i in the equation above. Waste totals and waste composition for each year were provided by Republic and previous LandGEM models for CBLF. It was assumed that the future waste composition would remain the same as the current composition and that the Landfill would take in approximately 800,000 tons of waste each year. The waste was split into five different categories for the LandGEM: MSW (70.5%), Special Wastes (8%), Construction & Demolition (CDL) (3%), Organics (3%) and Inert (15.5%).

5.2.2 Methane Generation Rate and Methane Generation Potential

In 2021, The LandGEM was calibrated to determine past and future gas generation rates at the Landfill using a bulk waste model that was composed from an amalgamation of sperate gas generation curves from each specific waste stream accounted for at the Landfill.

Coffin Butte Landfill accepts predominantly MSW waste, but also has a significant waste influx from burn waste and construction and demolition debris due to forest fires in the area. These waste streams contribute less to gas generation than typical MSW and in some cases are completely inert, as in the case of charred or burned debris. ESI opted to use an L_0 value of 80 m^3/Mg rather than the conventional value of 100 m^3/Mg, which would be typical of rural MSW landfills with limited recycling such as Coffin Butte, to account for these other waste streams.

In the bulk model, a k value of 0.04 $year^{-1}$ was used. This value is typical of a landfill within the climate range that Coffin Butte is located. Additional models were ran using k values of 0.03 and 0.05, but the best fit curve, when compared to actual gas collection records, was generated at a k value of 0.04.

The requisite parts that composed the final bulk model were LandGEM projections of each individual waste stream, each with their own specific k and L_0 values incorporated. These values are shown below in Table 1.

Table 1: The percent volume, gas generation rate and gas generation potential listed for each waste type that has been or will be accepted at Coffin Butte Landfill.

Waste Type	k (Units of $year^{-1}$)	L_0 (m^3/Mg)	Waste Stream (% volume)
MSW	0.04	115	70.5
C&D	0.03	20	3
Organics	0.05	130	3
Special Wastes	0.03	20	8
Inert	0	0	15.5

5.2.3 Landfill Gas Generation

Because the header and lateral piping is expected to be in use longer than 15 years, pipe sizing, which is discussed in Section 5.4, is based on the maximum gas generation rate for the waste mass shown in the GCCS Master Plan in Appendix A.

According to the EPA's AP-42, a collection efficiency of 75% is a recommended default assumption although it can range from 50-95%. Because Coffin Butte Landfill makes use of a temporary cover for active waste areas and has not recorded methane surface emissions, a collection efficiency of 75% is assumed to be a conservative collection efficiency from which to base the capacity of the GCCS design. This collection

efficiency will be reevaluated over time as more flare data and more accurate well flow data becomes available.

Table 2 shows the projected LFG generated and LFG collected for 15 years from now, when the waste placed in the Master Plan is complete, and when the LandGEM projects gas generation will be at a maximum. In 2036 the projected LFG Collected at the enclosed flare assuming a 75% collection efficiency is 4366 scfm. This is well over the 3,000 scfm capacity of the current blower/flare skid, excluding the utilization of the PNGC LFGTE plant. The LFG collected at the skid is expected to reach over 3,000 scfm in 2022. If the actual collected LFG matches the LandGEM projections, the flare system will need to be resized before this point. Pipe sizing for the GCCS Master Plan is based on the predicted LFG collected in 2047, which is two years after final waste placement is complete and the model is projecting the maximum LFG generation of 6900 scfm of LFG and 5223 scfm at 75% collection efficiency.

Table 2: Projected LFG Generated and LFG Collected with 75% collection efficiency for 2022, 2036, and 2045.

Year	Projected LFG Generated (cfm)	Projected LFG Collected (cfm)
2022	4381	3286
2036	6181	4366
2045	6900	5175

5.3 Radius of Influence and Well Spacing

The DEQ requires that "active collection wells, horizontal collectors, surface collectors, or other extraction devices" be spaced as necessary to achieve compliance with OAR 340-239-0110(2). The sufficient density to achieve this point of compliance is met by the well spacing as shown on the GCCS Master Plan (Appendix A), which is based on the calculated radius of influence (ROI) for each well. The goal in the ROI calculation was to maximize the radius while preventing air intrusion and to determine the vacuum necessary to reach the maximum radius.

The calculation of ROI for each well is shown in Appendix D and is dependent on several factors including length of solid well piping, waste permeability to LFG both vertically and horizontally, waste density, methane generation rate per unit mass, well vacuum, and the slope on which a well is placed. For the purpose of this design, the radius of influence was calculated assuming higher waste density and typical waste horizontal permeability which are shown in Table 3. A higher waste density was chosen due to known historical operational standards and waste composition data provided by Republic For compacted waste, the ratio of horizontal to vertical permeability to LFG can range anywhere from 2:1 to 10:1. For this design, a permeability ratio of 6:1 was used because it is a standard value and because the landfill cover used at the Landfill should make the ratio even higher.

Table 3: Values that were used in calculating the radius of influence for wells at Coffin Butte Landfill.

Variable	Value
Permeability	$5 \cdot 10^{-4}$ cm/sec
Waste Density	2,000 lb/yd^3
Gas Generation	0.1

For the purpose of calculating radius of influence, wells at Coffin Butte Landfill were split into three different categories: wells on a 3:1 slope, wells on a 4:1 slope, wells on a 10:1 slope, and wells on a 1:0 slope (Waste Plateaus). Table 4 lists the ROI for each category of wells, and the ROI calculations for each individual well are also shown in Appendix D.

Table 4: ROI for each vertical well category along with solid pipe length and well vacuum needed.

Well Slope (run:rise)	Radius of Influence (ft)	Solid Pipe Length (ft)	Well Vacuum (in H20)
3:1	72.0	30	1.83
4:1	84.9	30	2.65
10:1	111.4	30	4.88
1:0	120.0	30	5.76

5.4 LFG Pipe Sizing

The final GCCS headers and laterals will need to be sized for a total potential system LFG flow of 6900 SCFM. This LFG flow rate is based on the total projected gas generation simulated from the LandGEM (Shown in Appendix B). The Master Plan Drawings (shown in Appendix A) have the GCCS headers and laterals sized so that the pressure drop between the blowers and the LFG wellheads is less than 20" W.C. for the maximum projected flow rate. This is to ensure that sufficient vacuum is available to all wells. Additionally, header and lateral pipes are sized for a pressure drop less than 1" W.C. per 100 ft of pipe per Republic Standards section 3.7.7.

The final design will have an 18" diameter perimeter header with exception of the southern portion of pipe that will be 24" diameter pipe. The perimeter header will be installed outside of waste when possible. The 24" diameter header pipe will allow for a lower pressure drop to the wells in Cell 6. Sumps are installed along the parameter header at low points.

Currently, an 18" diameter perimeter header has been installed along the South and East side of Cells 4 and 5. Header piping over waste is designed to traverse along the haul roads whenever feasible. Installing the header along the haul road allows for ease of installation, repair, and system troubleshooting.

An 18" diameter crossover header is recommended to be installed to allow for multiple pathways to the wells on the North side of the landfill. This crossover header also allows a direct route for the gas coming from the top of the wellfield prior to completion of the landfill. The crossover over will be installed as the haul road extends each year until the landfill reaches final grades. See Appendix C for more information regarding pressure loss and header sizing.

The Darcy-Weisbach equation listed below is used to calculate the pressure loss through pipe segments. Drawing M2.04 shows the pipe length, the pipe size, the flow rates and the calculated pressure drops per section of pipe.

$$\Delta p = f_D \frac{L * \rho * V^2}{2 * D}$$

$\Delta p - Pressure\ Loss$

$f_D - Darcy\ (Moody) Friction\ Factor$

$L - Length\ of\ Pipe$

$\rho - Density\ of\ Landfill\ Gas$

$V - Velocity\ \ of\ Landfill\ Gas$

$D - Inside\ Diameter\ of\ Pipe$

Assumptions:

- Landfill gas consists of 50% Methane by volume and 50% Carbon Dioxide by volume.
- The gas is 100% saturated with water vapor
- The gas is at 100 degrees Fahrenheit
- The vacuum at the blowers is 50 inches of water column.
- Small radius of influence wells generate 30 SCFM of LFG.
- Lange radius of influence wells generate 55 SCFM of LFG.
- Header piping in waste is assumed to be HDPE SDR 17 and outside of waste is assumed to be HDPE SDR 26 in accordance with Republic's SOP on Landfill Gas Design section 3.7.7.
- Header segment calculations use the longer distances or piping from points, even is shorter routes exist, this it to ensure piping is oversized, rather than undersized.
- These calculations assume all header isolation valves are open in order to accommodate proper liquid drainage.

See Appendix C for more information regarding pressure loss and header sizing.

5.5 Compressor Sizing

The compressor described in Section 4.5.1 will accommodate the air flow requirements of 160 QED AP4+ pneumatic pumps cycling simultaneously. This quantity of pumps was determined by taking the number of projected vertical wells installed in 2036 and multiplying by 70% which correlates with the current number of vertical wells that house leachate extraction pumps. This is a worst-case model of air requirements near the end of the estimated life of the air compressor equipment. The air compressor is adequately sized to serve every pump when the landfill has reached the extent of the current GCCS Master Plan; however, this is past the expected 15 year life of the compressor. A new air compressor will be selected and sized accordingly when the current compressor reaches the end of its operational life.

The air usage for each pump was determined from the pump specification sheet provided by QED and shown in Appendix E. The air consumption for one pump at an average well depth of 120ft is 1.1 SCF/gal. Based upon typical usage (pumps cycling at 40% capacity), we find that the gallons per minute used would be 5 gpm. These two values multiplied together give us the required air flow rate per pump and can be directly compared to compressor sizes for system sizing. A 120ft well depth on average was used because the air flow requirements at that depth are at a peak for our expected well depth range. These calculations can be viewed in Appendix E.

6 Operations

OAR 340-239-0110(2) outlines operational standards for collection and control systems. CBLF currently complies with their Title V Permit and the NSPS. In meeting these requirements, CBLF has submitted a Startup, Shutdown, and Malfunction Plan; and a Surface Emission Monitoring Plan. CBLF also operates the GCCS in a manner that complies with requirements and has provided all reports required by their permit.

The following sections will address new operational standards required by OAR 340-239-0110(2).

6.1 Surface Emission Monitoring

The Coffin Butte Landfill currently conducts, at a minimum, quarterly surface emissions monitoring in accordance with NSPS requirements. The landfill will continue to conduct surface monitoring in accordance with DEQ requirements in OAR 340-239-0600)(1). If the GCCS at the Coffin Butte Landfill does not meet the measures of performance set forth in OAR 340-239-0200, the GCCS will be adjusted or modified in accordance with the DEQ to meet these requirements. These adjustments or modifications may include the installation of additional collection elements, cap and cover repairs, or other actions defined by field conditions at the time of monitoring.

All GCCS components containing LFG or under positive pressure will be monitored at minimum, quarterly for leaks. Any component leak exceeding 500 ppmv methane will be tagged and repaired within 10 days of discovery. Any component leak exceeding 250 ppmv will be recorded pursuant to OAR 340-239-0700(2)(a)(S). Quarterly testing at CBLF may be conducted prior to scheduled maintenance and planned outage time periods of PNGC's LFGTE facility.

6.2 Emission Mitigation Measures

OAR 340-239-0110 (1)(c)(E) *The Design Plan must include a description of potential mitigation measures to be used to prevent the release of methane or other pollutants into the atmosphere during the installation or preparation of wells, piping, or other equipment; during repairs or the temporary shutdown of gas collection system components; or, when solid waste is to be excavated and moved.*

6.2.1 Installation Mitigations

In order to mitigate the release of LFG into the atmosphere during installation and expansion of the GCCS, vertical LFG extraction wells will be set and securely capped or connected to existing vacuum source within the GCCS infrastructure, immediately following drilling. Boreholes will then be backfilled as indicated in the design plans in Appendix A. Under no circumstances will a borehole be left open to atmosphere for times exceeding those needed for proper well setting and installation during construction.

Horizontal collectors will be installed and backfilled as indicated in the design plans in Appendix A immediately following trenching. If a collector is not able to be installed immediately, the trench will be backfilled in order to mitigate LFG release into the atmosphere. Installed collectors will remain securely capped until connected to existing GCCS infrastructure.

6.2.2 Operational Mitigations

During repairs or temporary shutdown of GCCS components, the system will be isolated, if possible, to not cause a complete shutdown of the system while repairs or expansions are being made. Repairs requiring the complete shutdown of the GCCS will be carried out in an expedited manner in which minimizes downtime or allows for partial operation of the GCCS via isolation if possible.

When solid waste is to be moved or excavated, approved fill and cover material will be placed upon the area immediately following the end of the operations. Ongoing excavations will be covered with daily cover as to mitigate LFG emissions into the atmosphere while active operations are not occurring.

In the event of any temporary shutdown due to an emergency, catastrophic event, or landfill fire, DEQ will be notified in accordance with OAR 340-239-0700(3)(n).

6.3 Asbestos and Non-Productive Waste

Outside of the designated asbestos areas, no areas of the landfill were determined to be non-productive; therefore, no areas of the landfill have been excluded from the coverage of the GCCS. As per OAR 340-239-0110(2)(a)(H), a non-productive area may be excluded from control if the total excluded area can be shown to contribute less than one percent (1%) of the total amount of methane emissions from the landfill. If an area(s) is determined to be non-productive at a future date, an application to exclude these areas from the operations of the GCCS will be submitted and all calculations, data, and documentation will be submitted to DEQ. Methane emissions from areas in question will be calculated with a method in accordance with OAR 340-239-0800(5).

All future active areas with active and passive collection systems will be installed with liners on the bottoms and all sides in which gas is to be collected. The liner will be installed as required by 40 C.F.R § 258.40 design criteria.

6.4 Alternative Compliance Options

Per NSPS 40 CFR §60.752(b)(2)(i)(B), the previous GCCS design plan included any alternatives to "the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of §60.753 through §60.753 proposed by the owner or operator." The current approved AOMP for Coffin Butte Landfill is shown in Appendix G. The purpose of this AOMP is to ensure the wellfield can be reasonably operated to maintain compliance and prevent fugitive emissions.

The current AOMP will be reviewed and resubmitted to DEQ for approval in pursuant to OAR 340-239-0110(1)(c)(D).

6.5 Wellhead Sampling

Each wellhead will have a sampling port and measuring devices to comply with the following, pursuant of OAR 340-239-0110(3):

- Sample port in which nitrogen and oxygen concentrations in the landfill gas may be monitored on a monthly basis as provided in OAR 340-239-0600(3).
- Sampling port in which landfill gas temperature may be monitored on a monthly basis as provided in OAR 340-239-0600(3).
- Sampling port in which gauge pressure in the gas collection header may be measured on a monthly basis as provided in OAR 340-239-0600(2)(d).

6.6 Well Raising

Continuous operation of the GCCS as detailed in requirements OAR 340-239-0110(2)(a)(A) and OAR 340-239-0110(2)(a)(B) do not apply to wells that are being raised, provided they are being raised due to new fill being added or compacted within the immediate vicinity around the well and that once installed the gas collection extension is sealed and capped until the well is reconnected to a vacuum source.

Wells being raised due to new waste deposition will be sealed and capped in a manner pursuant to these requirements and will be reconnected to a vacuum source as soon as filling operations cease within the immediate vicinity of the raised well.

6.7 GCCS Operation

The components and design considerations within this GCCS design plan allow for CBLF to operate the GCCS in accordance with all monitoring and operational practices detailed in OAR 340-239-0600. Currently the GCCS is monitored twice each month. A monthly SOP review is provided by the design engineer along with a report to address exceedances, operational concerns, and other compliance issues so that points of noncompliance with any section of OAR 340-239-0600 may be addressed in an expedient manner.

APPENDIX A: GCCS MASTER PLAN

GCCS MASTER PLAN 2016

COFFIN BUTTE LANDFILL

CORVALLIS, OREGON

PROJECT INFORMATION

PROJECT LOCATION

28972 COFFIN BUTTE ROAD
CORVALLIS, OREGON 97330

PROJECT DESCRIPTION

LANDFILL GAS COLLECTION AND CONTROL SYSTEM (GCCS) MASTER PLAN TO SERVE AS A GENERAL GUIDE FOR FUTURE 5 YEAR PLANNING AND ANNUAL GCCS EXPANSIONS.

LANDFILL OWNER

REPUBLIC SERVICES
28972 COFFIN BUTTE ROAD
CORVALLIS, OREGON 97330
(541) 745-5792

GCCS ENGINEER

ENERGYNEERING SOLUTIONS, INC.
15820 BARCLAY DRIVE,
SISTERS, OR 97759
(541) 549-8766

DRAWING INDEX

1. GAS COLLECTION

M0.01	COVER PAGE	M3.01	VERTICAL WELL DETAILS I
M1.00	CELL BOUNDARY MAP	M3.02	VERTICAL WELL DETAILS II
M1.01	EXISTING LFG INFRASTRUCTURE I	M3.03	VERTICAL WELL DETAILS III
M1.02	EXISTING LFG INFRASTRUCTURE II	M3.04	HORIZONTAL WELL DETAILS
M2.01	FINAL PIPING PLAN	M3.05	SUMP DETAILS
M2.02	FINAL FACILITY CONNECTION	M3.06	TRENCH AND CROSSING DETAILS
M2.03	FINAL VERTICAL WELL PLAN	M3.07	STUB-UP DETAILS
M2.04	CALCULATIONS	M3.08	MISC. DETAILS

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

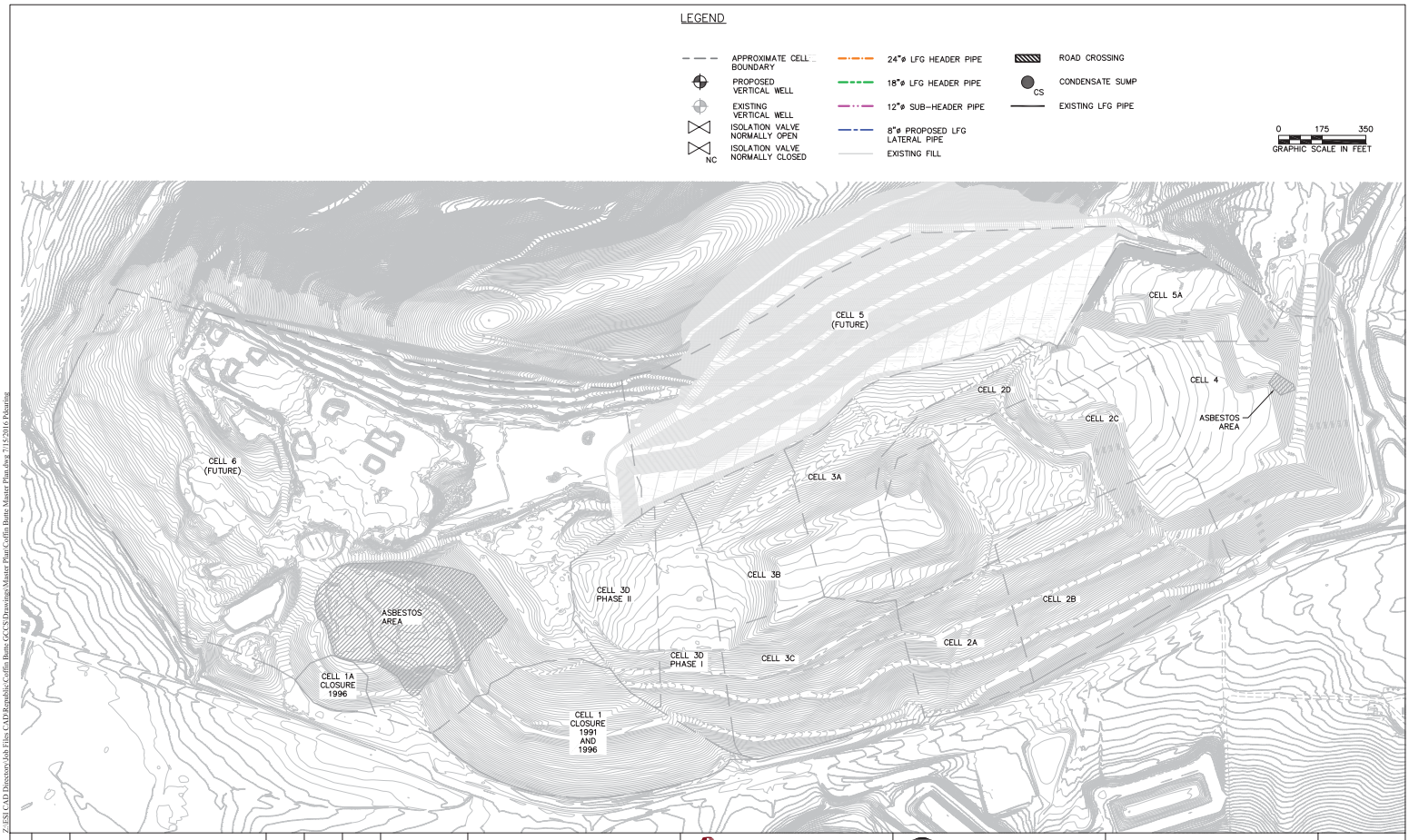
ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

COVER PAGE

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M0.01
PROJECT NO.

Z:\CB CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan.dwg Jul 08, 2016 - 3:7pm By: Pdearing



Z:\ESI CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan.dwg 7/15/2016 Pdearing

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

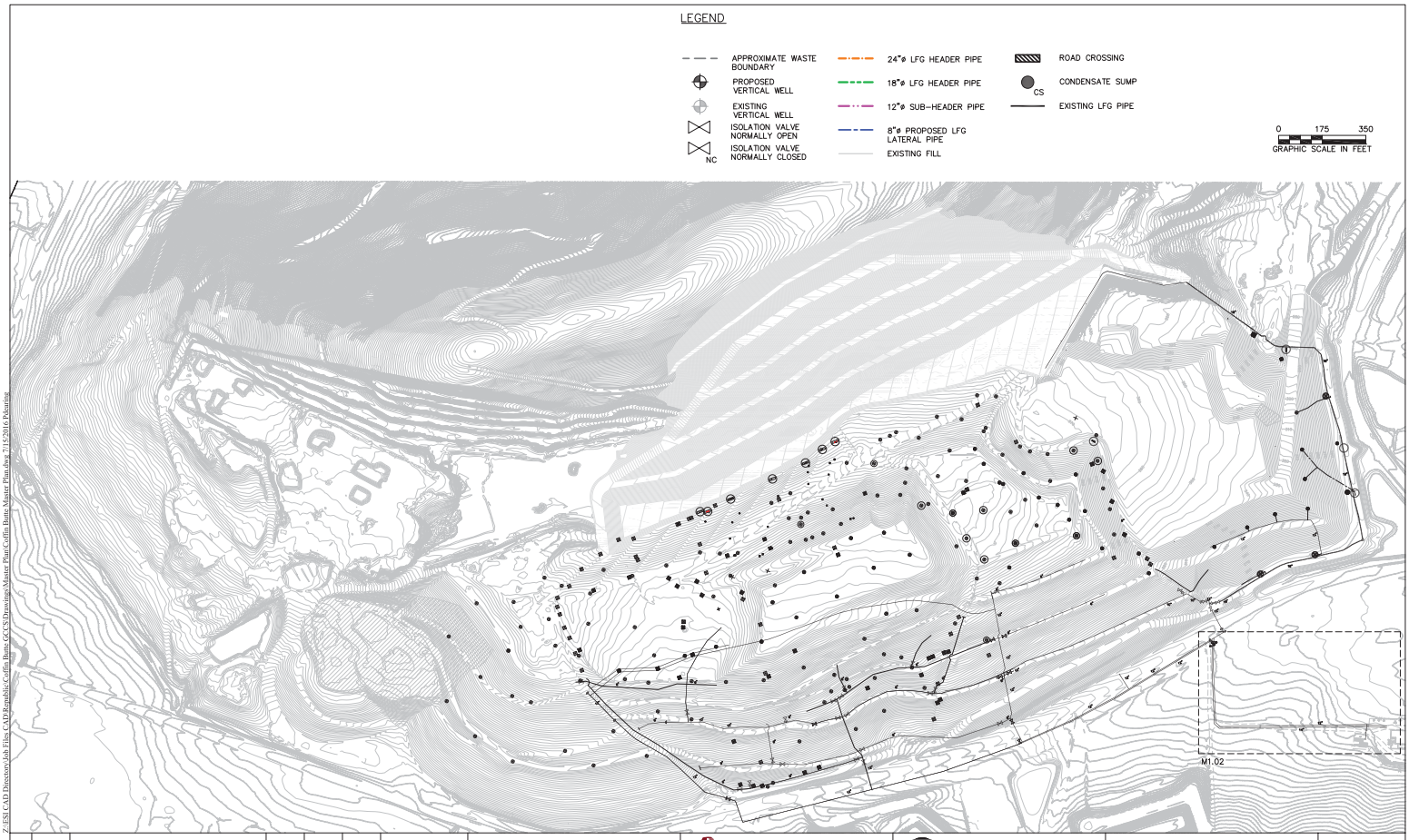
ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

CELL BOUNDARY MAP

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO.
M1.00

PROJECT NO.
085-11-1001



Z:\ESI CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan.dwg 7/15/2016 Pdearing

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

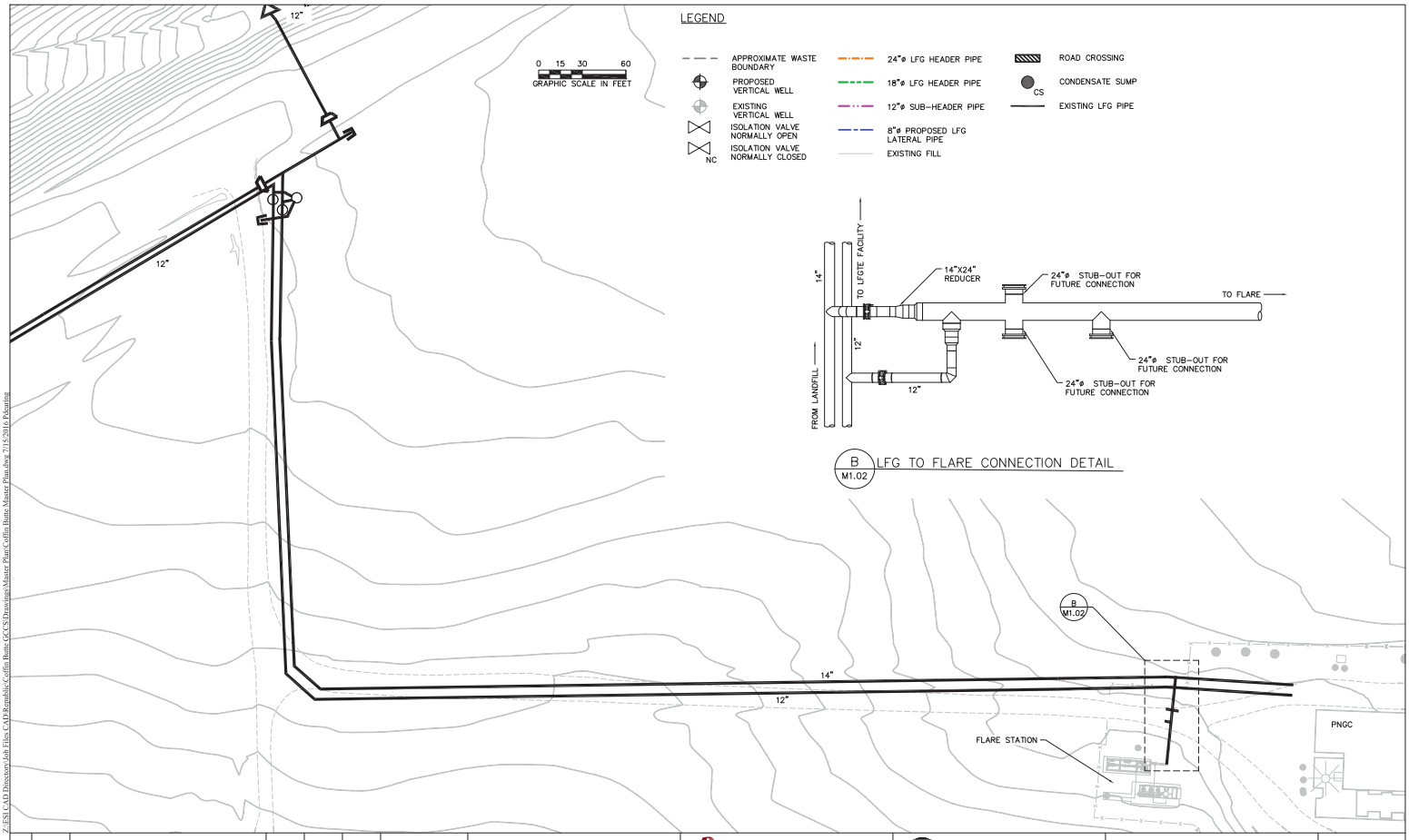
ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

EXISTING LFG INFRASTRUCTURE I

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO.
M1.01

PROJECT NO.
085-11-1001



REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

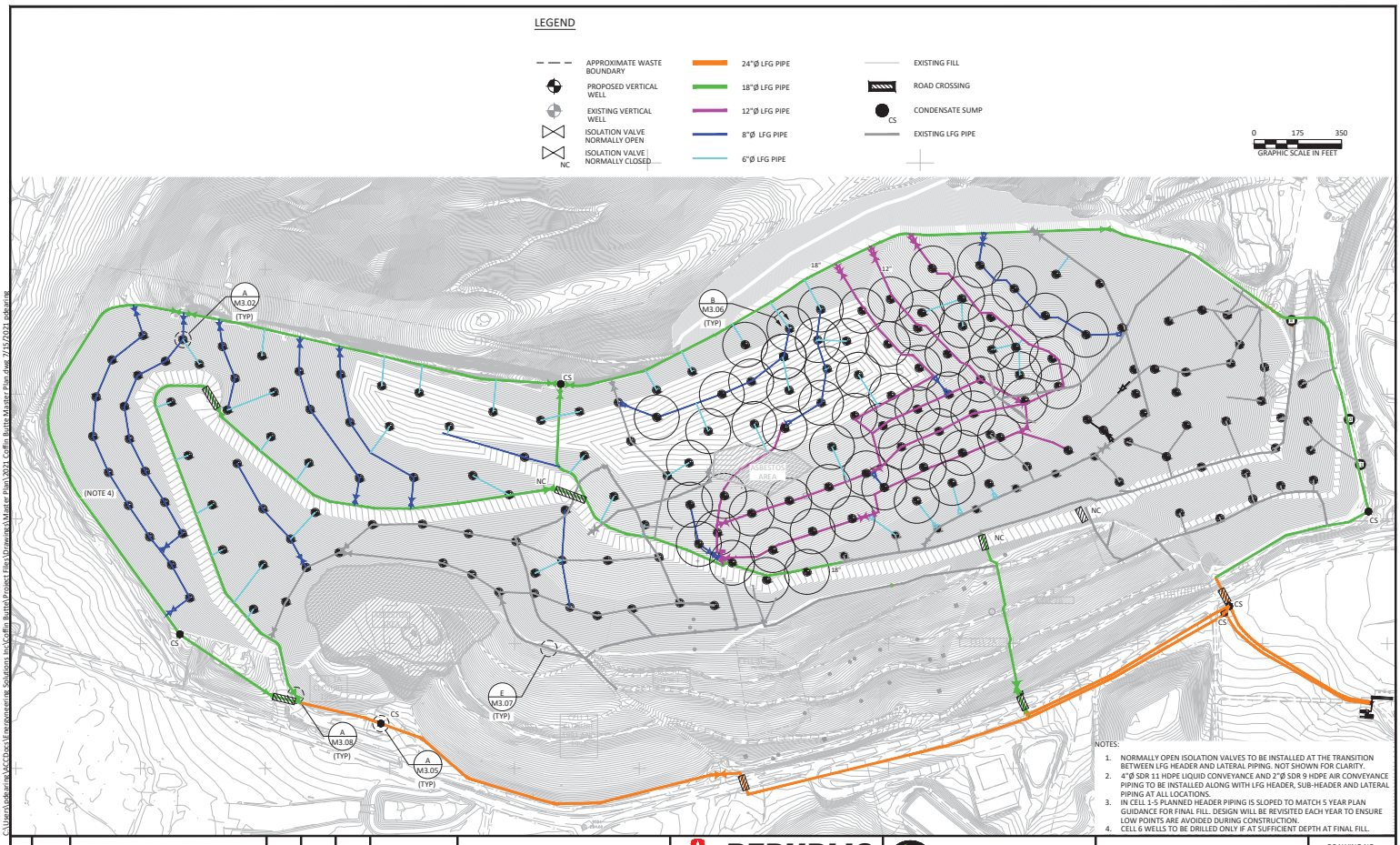
EXISTING LFG INFRASTRUCTURE II

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M1.02

PROJECT NO. 085-11-1001

Z:\ES\CAD Directory\Job Files\CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan.dwg 7/15/2016 Pkearins



REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/11/21	ISSUED FOR REVIEW	PD	AH	CF

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330 PHONE: (541) 745-5792 FAX: (541) 745-3826

ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901

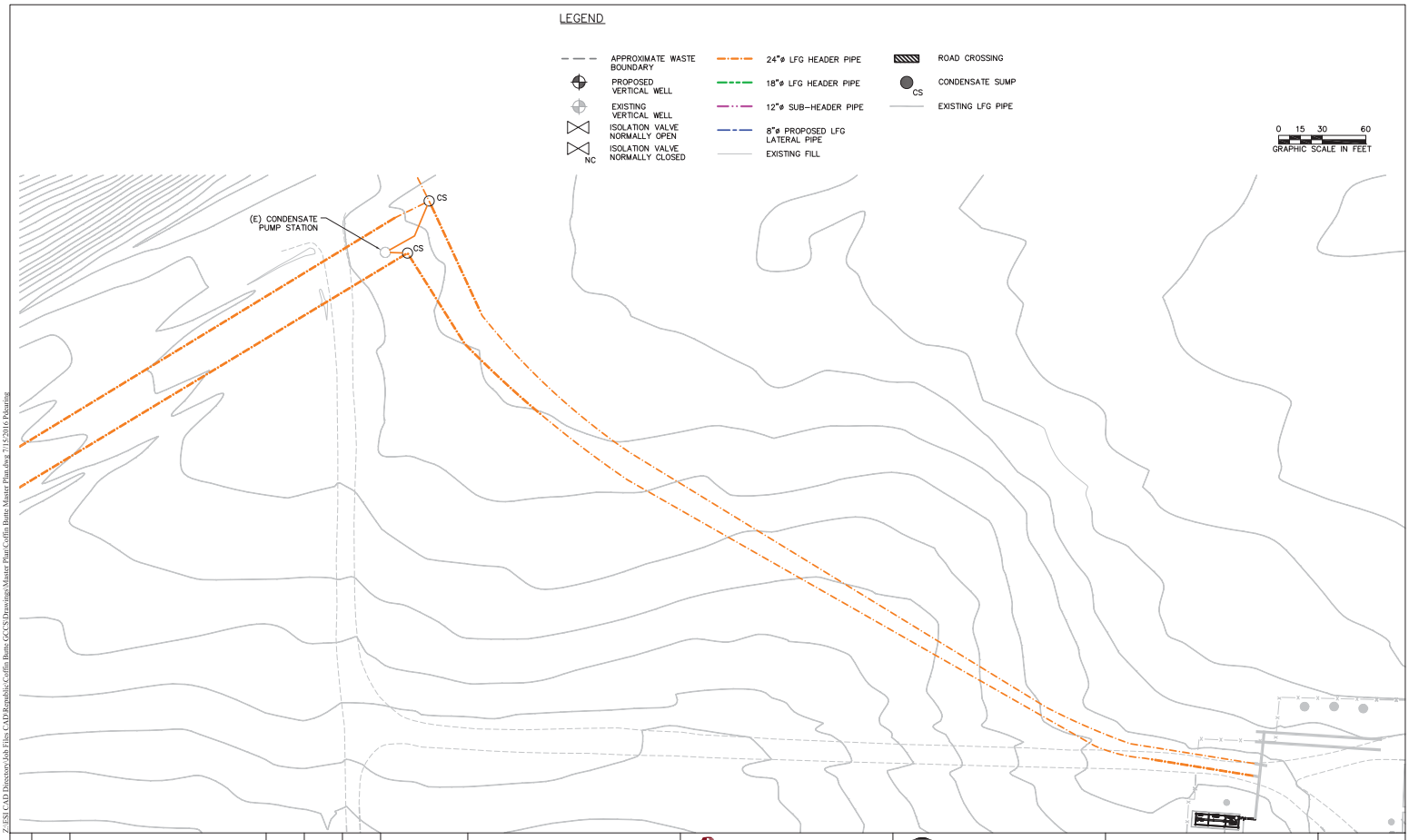
FINAL PIPING PLAN

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M2.01

PROJECT NO. 014.524

C:\Users\ahalbring\AC Docs\Vaerpoteering Solutions Inc\Coffin Butte\Project Files\Drawings\Master Plan\2021 Coffin Butte Master Plan.dwg, 7/15/2021 ahalbring



Z:\ESI CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan.dwg 7/15/2016 Pdearing

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

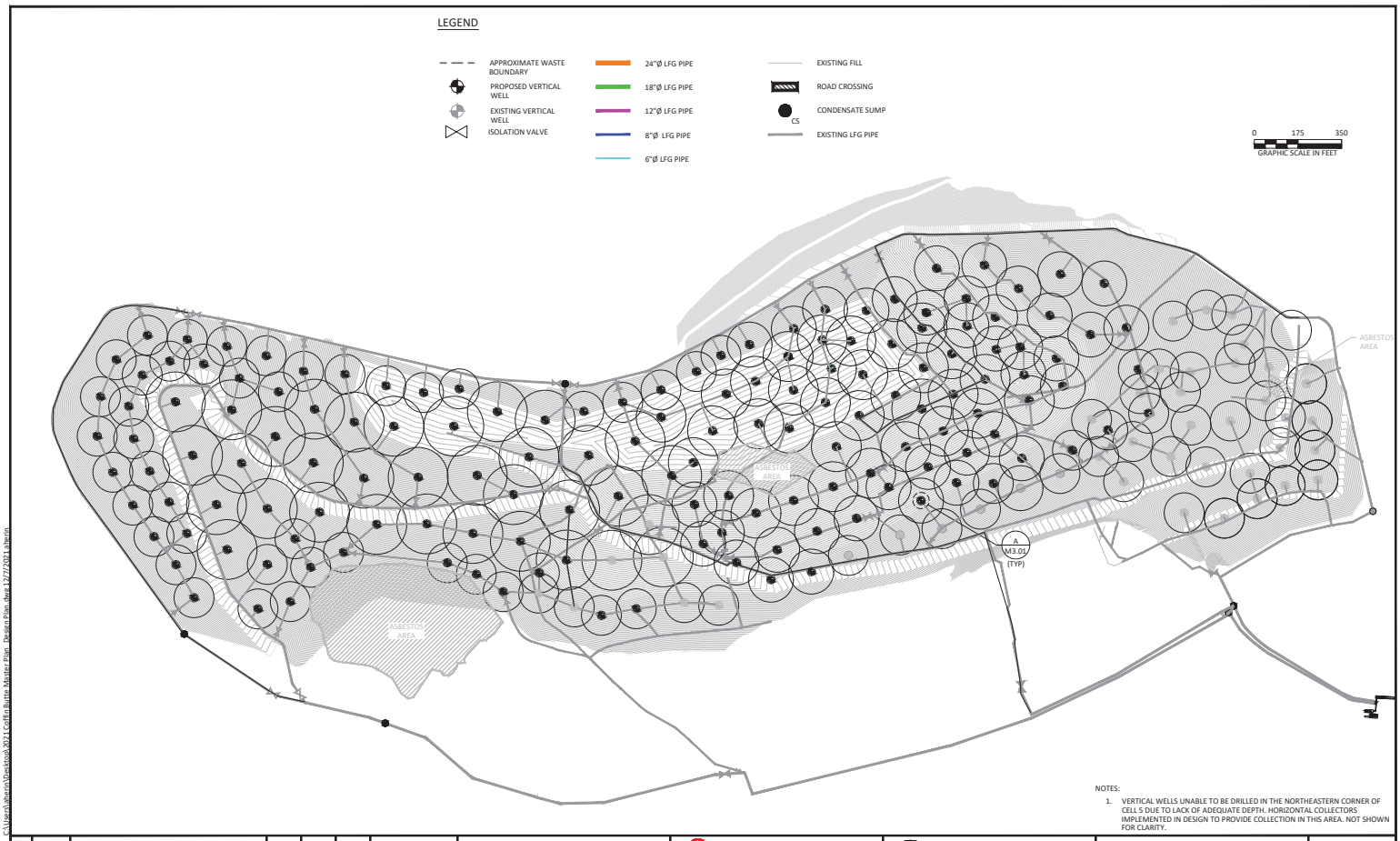
REPUBLIC SERVICES
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

FINAL FACILITY CONNECTION

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO.
M2.02
PROJECT NO.
085-11-1001



NOTES:

1. VERTICAL WELLS UNABLE TO BE DRILLED IN THE NORTHEASTERN CORNER OF CELL 5 DUE TO LACK OF ADEQUATE DEPTH. HORIZONTAL COLLECTORS IMPLEMENTED IN DESIGN TO PROVIDE COLLECTION IN THIS AREA. NOT SHOWN FOR CLARITY.

C:\Users\aherin\Desktop\2021 Coffin Butte Master Plan_Design Plan.dwg 12/7/2021 aherin

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	07/16/21	GCCS MASTER PLAN	PD	AH	CF

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330 PHONE: (541) 745-5792
FAX: (541) 745-3826

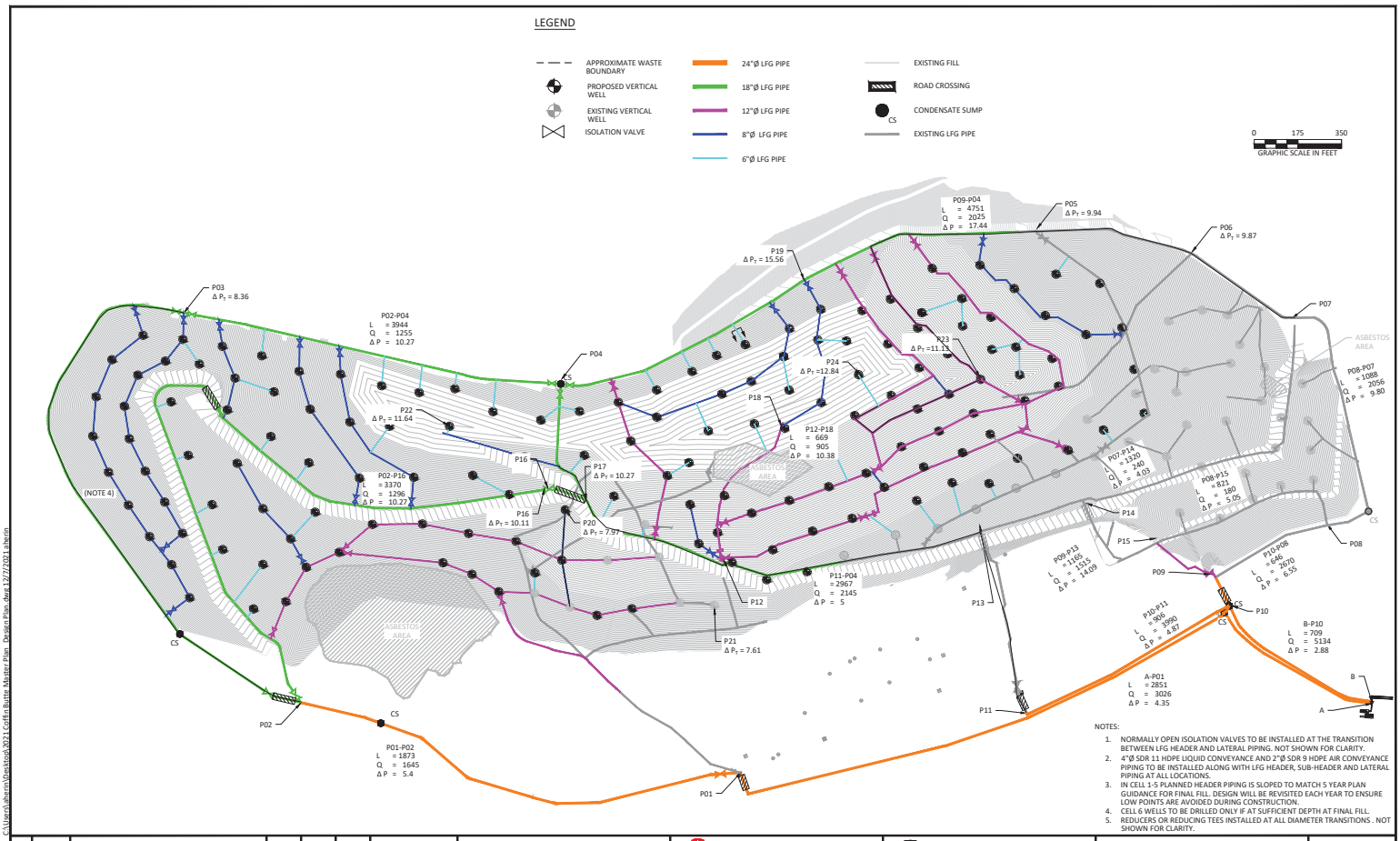
ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

FINAL VERTICAL WELL PLAN

2021 MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO.
M2.03

PROJECT NO.
014.524



REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	07/16/21	GCCS MASTER PLAN	PD	AH	CF

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330 PHONE: (541) 745-5792 FAX: (541) 745-3826

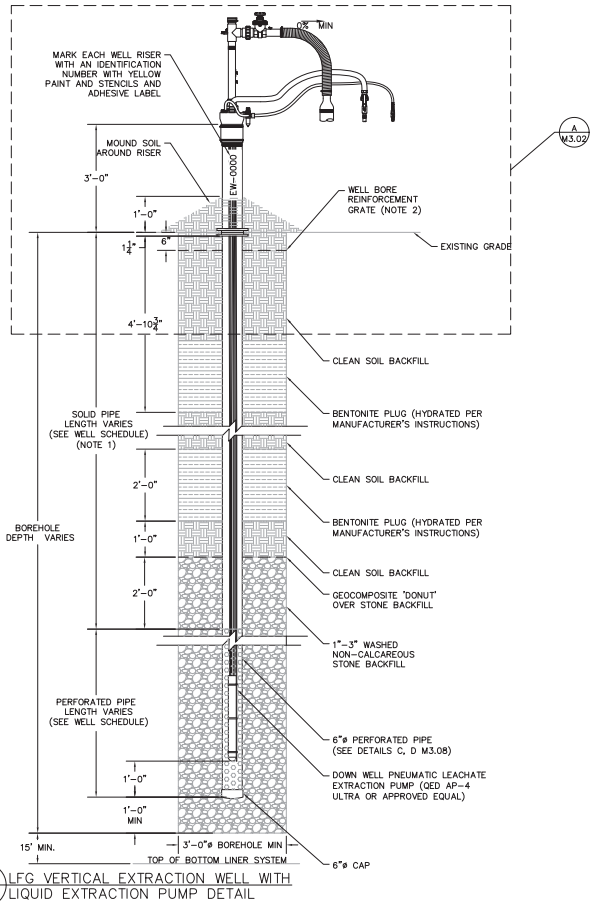
ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901

CALCULATIONS

2021 MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M2.04
PROJECT NO. 014.524

C:\Users\Aharen\Desktop\2021 Coffin Butte Master Plan Design Plan.dwg 11/7/2021 aharen



A M3.01 LFG VERTICAL EXTRACTION WELL WITH LIQUID EXTRACTION PUMP DETAIL

NOTES:
1. VERTICAL EXTRACTION WELLS TO BE INSTALLED WITH 20' MINIMUM SOLID PIPE, 15' IF OTHERWISE NOTED AND EXPLAINED.
2. WELL BORE REINFORCEMENT GRATES TO BE RELOCATED FROM ABOVE GRADE TO BELOW GRADE AFTER BACKFILLING COMPLETE. THESE GRATES ARE REQUIRED FOR ALL WELLS AND BOREHOLE ABANDONMENTS IN ORDER TO PROVIDE A SAFEGUARD FROM POTENTIAL COLLAPSE OF BACKFILL MATERIAL.
3. AIR AND LIQUID CONVEYANCE STUB-UPS TO BE LOCATED AT EVERY VERTICAL LFG COLLECTION WELL AND WHERE APPLICABLE.

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

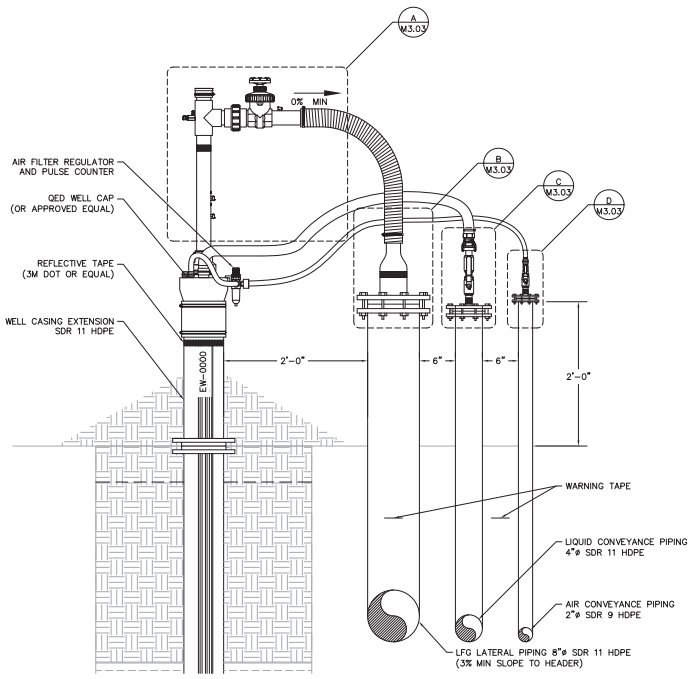
ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

VERTICAL WELL DETAILS I

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M3.01
PROJECT NO. 014-T06

Z:\ES CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing



A M3.02 STANDARD LFG VERTICAL WELLHEAD DETAIL

Z:\ES\ CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

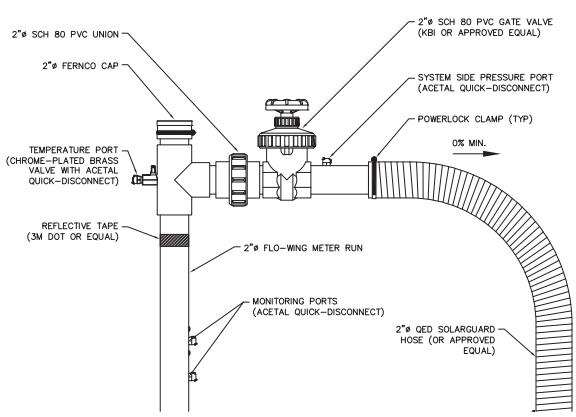
REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

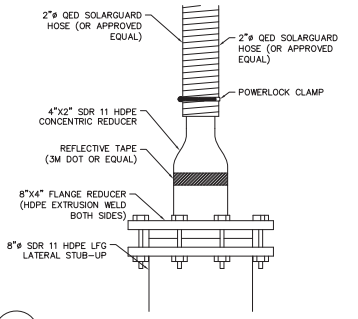
VERTICAL WELL DETAILS II

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

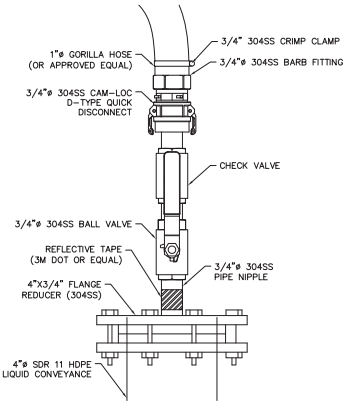
DRAWING NO. M3.02
PROJECT NO. 014-T06



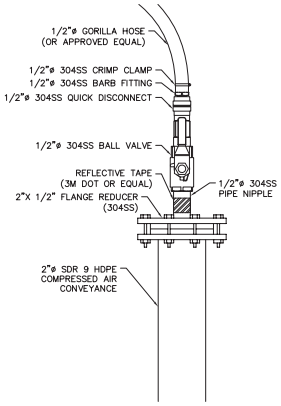
A M3.03 STANDARD LFG WELLHEAD



B M3.03 STANDARD LFG LATERAL STUB-UP DETAIL



C M3.03 STANDARD LIQUID CONVEYANCE STUB-UP DETAIL



D M3.03 STANDARD AIR CONVEYANCE STUB-UP DETAIL

Z:\ES\ CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

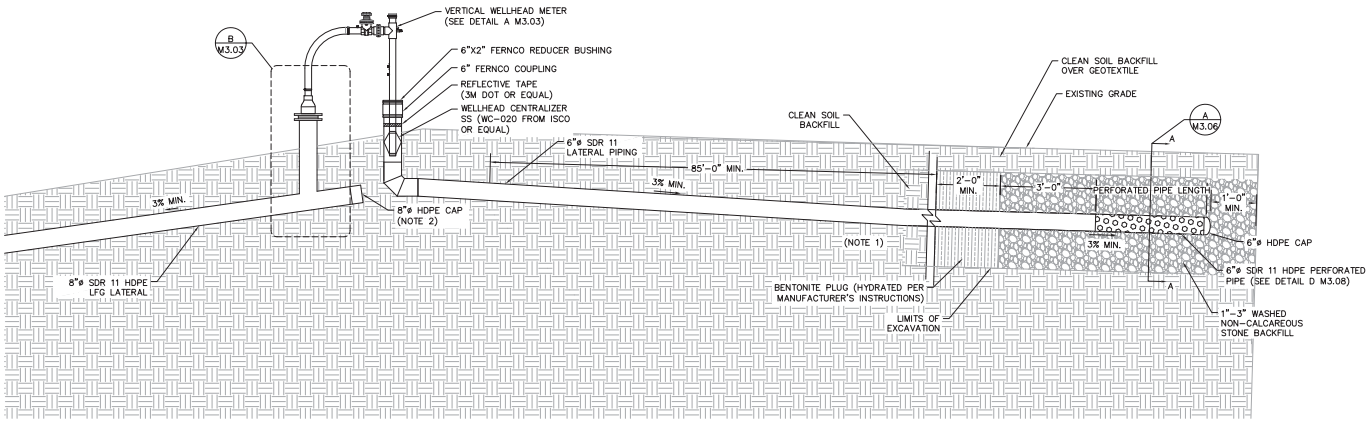
REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5702
FAX: (541) 745-3826

ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

VERTICAL WELL DETAILS III

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M3.03
PROJECT NO. 014-T06



A
M3.04 TYPE I UP-SLOPE LFG HORIZONTAL EXTRACTION WELL DETAIL

NOTES:

1. EXCAVATION NOT TO INTERFERE WITH THE LANDFILL LINER.

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

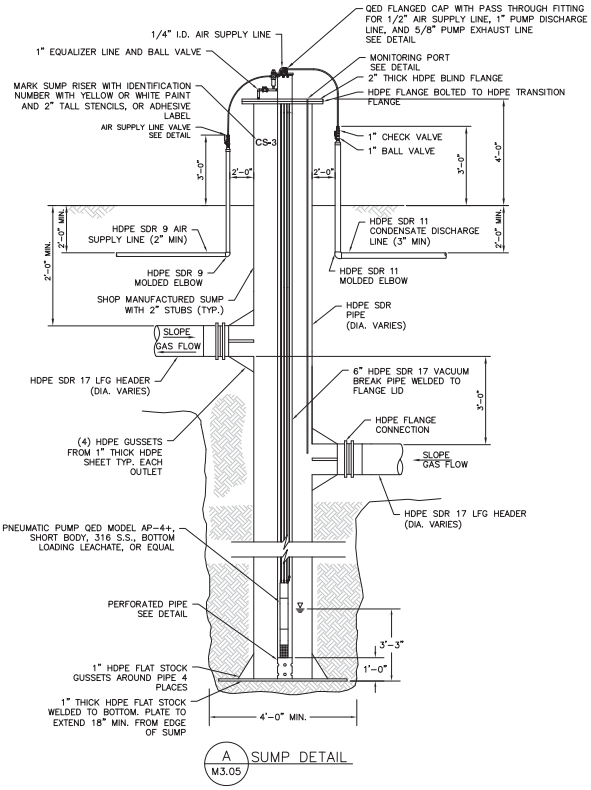
ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

HORIZONTAL WELL DETAILS

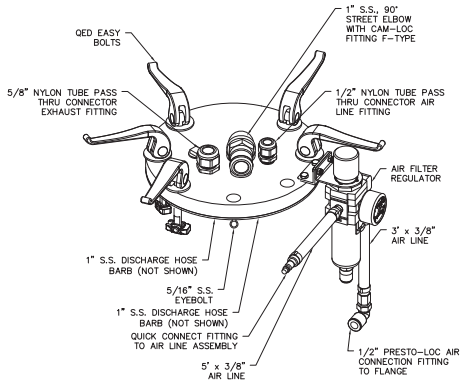
MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO.
M3.04
PROJECT NO.
014-T06

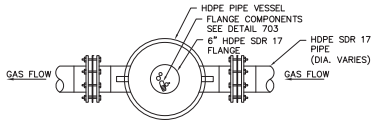
Z:\CSI CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing



A M3.05 SUMP DETAIL



B M3.05 SUMP LID DETAIL



C M3.05 SUMP DETAIL TOP VIEW

NOTES:
1. EXCAVATION NOT TO INTERFERE WITH THE LANDFILL LINER.
2. EXTEND AS FEASIBLE FOR EASE OF FUTURE CONNECTION.
3. 6"ø HDPE SDR 17 VACUUM BREAK PIPE EXTRUSION WELDED TO FLANGE LID. 1'-0" OF PIPE TO PROTRUDE THROUGH TOP OF FLANGE. CENTER OF PIPE LOCATED 2" OFF CENTER OF BLIND FLANGE.
4. THOROUGHLY COAT ENTIRE SURFACE OF BOLTS, WASHERS, NUTS AND BACKUP RINGS WITH POLYCOAT RUBBERIZED PRIMER, OR EQUAL, AFTER TIGHTENING BOLTS. WRAP FLANGE IN PLASTIC WRAP PRIOR TO BACKFILLING.
5. CONTRACTOR SHALL VERIFY CONDENSATE SUMP CONFIGURATION AND NECESSARY ELEVATIONS IN FIELD. ADJUSTMENTS SHALL BE APPROVED BY ENGINEER PRIOR TO INSTALLATION.

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

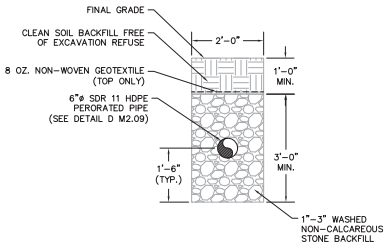
REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

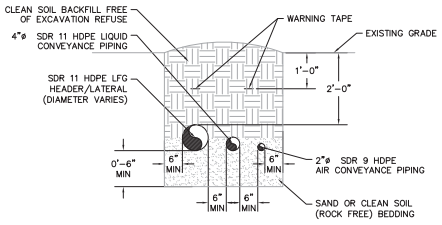
SUMP DETAIL
MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M3.05
PROJECT NO. 014-T06

Z:\ES CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing



A M3.06 LFG HORIZONTAL EXTRACTION WELL TRENCH DETAIL



B M3.06 LFG HEADER TRENCH DETAIL

NOTES:
1. EXCAVATION NOT TO INTERFERE WITH THE LANDFILL LINER.
2. LFG LATERALS WITHIN SLOPES OF WASTE (NOT INCLUDING ALONG ROADWAYS) MAY BE PLACED AT A 1'-0" DEPTH WITH THE WARNING TAPE INSTALLED AT 0'-6".

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

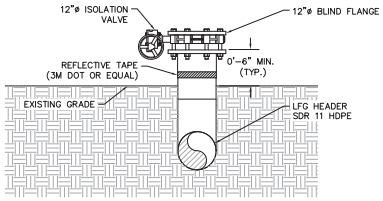
ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

TRENCH DETAILS

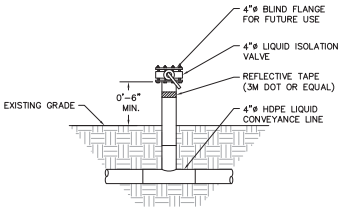
MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M3.06
PROJECT NO. 014-T06

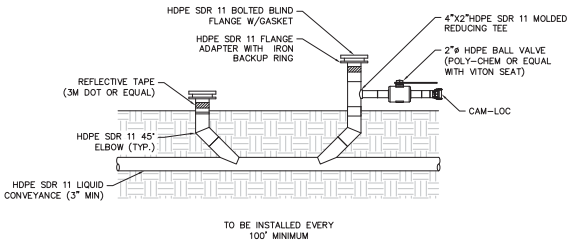
Z:\ES CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing



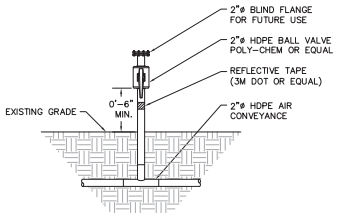
A M3.07 LFG HEADER STUB-UP DETAIL



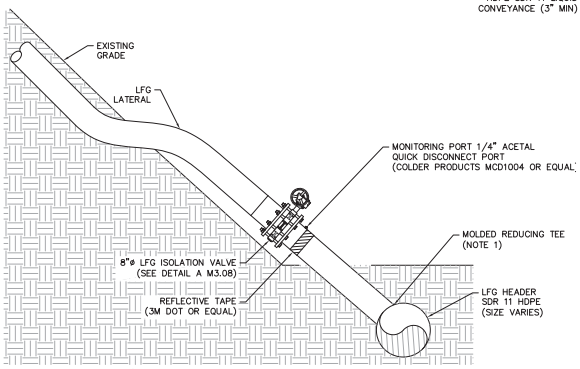
B M3.07 LIQUID CONVEYANCE STUB-UP DETAIL



C M3.07 LIQUID CONVEYANCE CLEAN-OUT DETAIL



D M3.07 AIR CONVEYANCE STUB-UP DETAIL



E M3.07 LFG HEADER STUB-UP TO LATERAL DETAIL

NOTES:
1. BRANCH SADDLE AND/OR COMBINATION REDUCING TEE AND BELL REDUCER MAY BE USED SUBJECT TO ANNUAL DESIGN AND AVAILABLE FITTINGS.

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

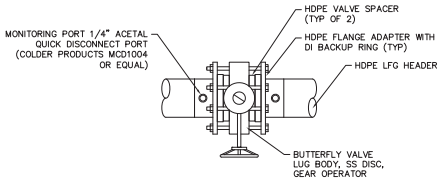
REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

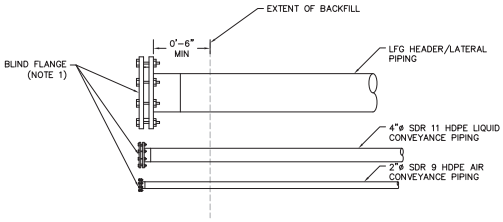
STUB-UP DETAILS
MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M3.07
PROJECT NO. 014-T06

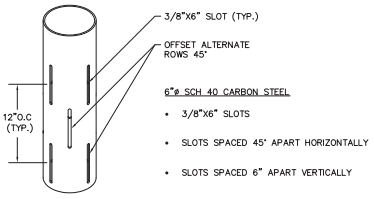
Z:\ES CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing



A M3.08 LFG HEADER ISOLATION VALVE DETAIL

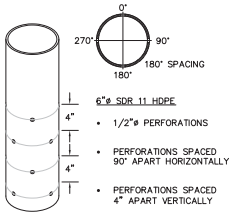


B M3.08 LFG HEADER/ LATERAL, AIR & LIQUID PIPE TERMINATION DETAIL



1. ALTERNATE SLOT DETAILS MAY BE SUBMITTED IF THE CONTRACTOR HAS PREFERRED FABRICATION OR AVAILABILITY.
2. ALTERNATES TO BE APPROVED BY THE DESIGN ENGINEER.

C M3.08 CARBON STEEL SLOTTED WELL CASING DETAIL



1. ALTERNATE PERFORATION DETAILS MAY BE SUBMITTED IF THE CONTRACTOR HAS PREFERRED FABRICATION OR AVAILABILITY.
2. ALTERNATES TO BE APPROVED BY THE DESIGN ENGINEER.

D M3.08 HDPE PERFORATED WELL CASING DETAIL

NOTES:
1. IF TERMINATING WITHIN THE WASTE, TERMINATE WITH AN HDPE CAP (INSTEAD OF A BLIND FLANGE) AND INCLUDE A STAKE LABELING PIPE SERVICE AND SIZE.

Z:\ES\ CAD Directory\Job Files CAD\Republic\Coffin Butte GCCS\Drawings\Master Plan\Coffin Butte Master Plan M2 Details.dwg Jul 08, 2016 - 3:7pm By: Pdearing

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	06/30/16	GCCS MASTER PLAN	PD	DC	JM

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330
PHONE: (541) 745-5792
FAX: (541) 745-3826

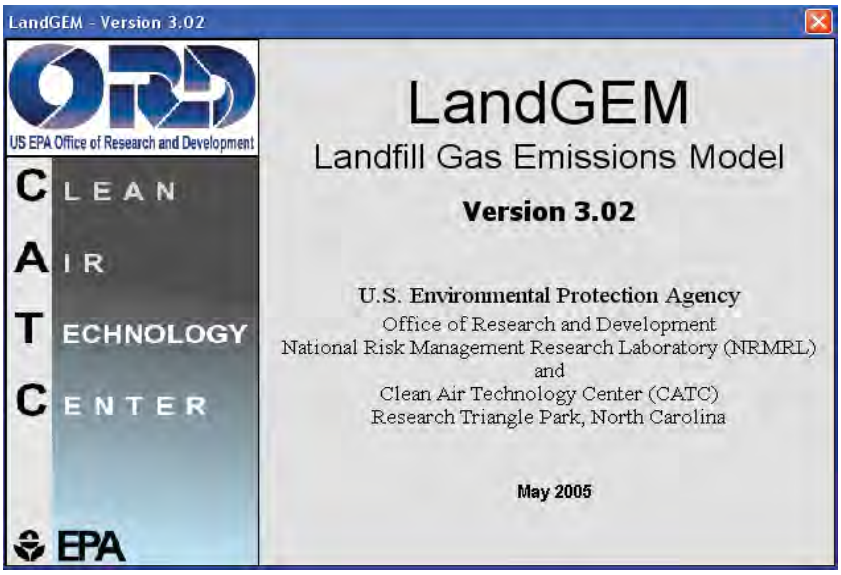
ENERGYNEERING® SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759
PHONE: (541) 549-8766
FAX: (541) 549-1901

MISC. DETAILS I

MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO. M3.08
PROJECT NO. 014-T06

APPENDIX B: LFG GENERATION MODEL (LANDGEM)



Summary Report

Landfill Name or Identifier: Special Waste CB Landfill

Date: Monday, May 10, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate ($year^{-1}$)

L_o = potential methane generation capacity (m^3/Mg)

M_i = mass of waste accepted in the ith year (Mg)

t_{ij} = age of the jth section of waste mass M_i accepted in the ith year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1978**	
Landfill Closure Year (with 80-year limit)	**2045**	
Actual Closure Year (without limit)	***2045***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.030**	*year^{-1}*
Potential Methane Generation Capacity, L_o	**20**	*m^3/Mg*
NMOC Concentration	**600**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	40,984	45,082	0	0
1998	34,970	38,467	40,984	45,082
1999	33,476	36,824	75,954	83,549
2000	36,351	39,986	109,430	120,373
2001	38,282	42,110	145,781	160,359
2002	69,163	76,079	184,063	202,469
2003	197,915	217,707	253,225	278,548
2004	87,785	96,563	451,141	496,255
2005	75,921	83,514	538,925	592,818
2006	93,495	102,845	614,847	676,331
2007	81,486	89,634	708,342	779,176
2008	101,682	111,851	789,828	868,811
2009	137,438	151,182	891,511	980,662
2010	94,090	103,499	1,028,949	1,131,844
2011	68,905	75,796	1,123,039	1,235,342
2012	51,975	57,172	1,191,944	1,311,138
2013	63,013	69,314	1,243,919	1,368,311
2014	88,426	97,269	1,306,931	1,437,624
2015	103,883	114,272	1,395,358	1,534,893
2016	66,203	72,824	1,499,241	1,649,165
2017	86,699	95,369	1,565,444	1,721,989

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2018	123,351	135,686	1,652,144	1,817,358
2019	97,989	107,788	1,775,495	1,953,044
2020	61,484	67,632	1,873,484	2,060,832
2021	58,182	64,000	1,934,968	2,128,465
2022	58,182	64,000	1,993,150	2,192,465
2023	58,182	64,000	2,051,332	2,256,465
2024	58,182	64,000	2,109,513	2,320,465
2025	58,182	64,000	2,167,695	2,384,465
2026	58,182	64,000	2,225,877	2,448,465
2027	58,182	64,000	2,284,059	2,512,465
2028	58,182	64,000	2,342,241	2,576,465
2029	58,182	64,000	2,400,422	2,640,465
2030	58,182	64,000	2,458,604	2,704,465
2031	58,182	64,000	2,516,786	2,768,465
2032	58,182	64,000	2,574,968	2,832,465
2033	58,182	64,000	2,633,150	2,896,465
2034	58,182	64,000	2,691,332	2,960,465
2035	58,182	64,000	2,749,513	3,024,465
2036	58,182	64,000	2,807,695	3,088,465
2037	58,182	64,000	2,865,877	3,152,465
2038	58,182	64,000	2,924,059	3,216,465
2039	58,182	64,000	2,982,241	3,280,465
2040	58,182	64,000	3,040,422	3,344,465
2041	58,182	64,000	3,098,604	3,408,465
2042	58,182	64,000	3,156,786	3,472,465
2043	58,182	64,000	3,214,968	3,536,465
2044	58,182	64,000	3,273,150	3,600,465
2045	58,182	64,000	3,331,332	3,664,465
2046	0	0	3,389,513	3,728,465
2047	0	0	3,389,513	3,728,465
2048	0	0	3,389,513	3,728,465
2049	0	0	3,389,513	3,728,465
2050	0	0	3,389,513	3,728,465
2051	0	0	3,389,513	3,728,465
2052	0	0	3,389,513	3,728,465
2053	0	0	3,389,513	3,728,465
2054	0	0	3,389,513	3,728,465
2055	0	0	3,389,513	3,728,465
2056	0	0	3,389,513	3,728,465
2057	0	0	3,389,513	3,728,465

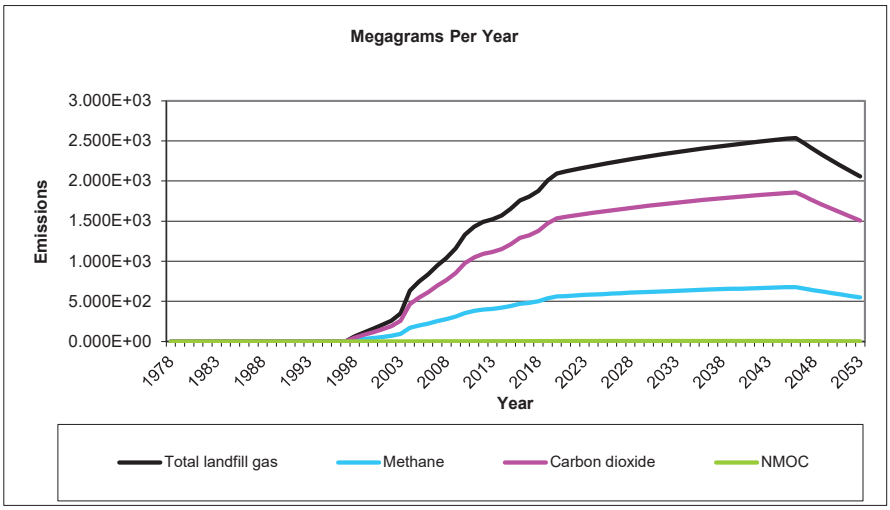
Pollutant Parameters

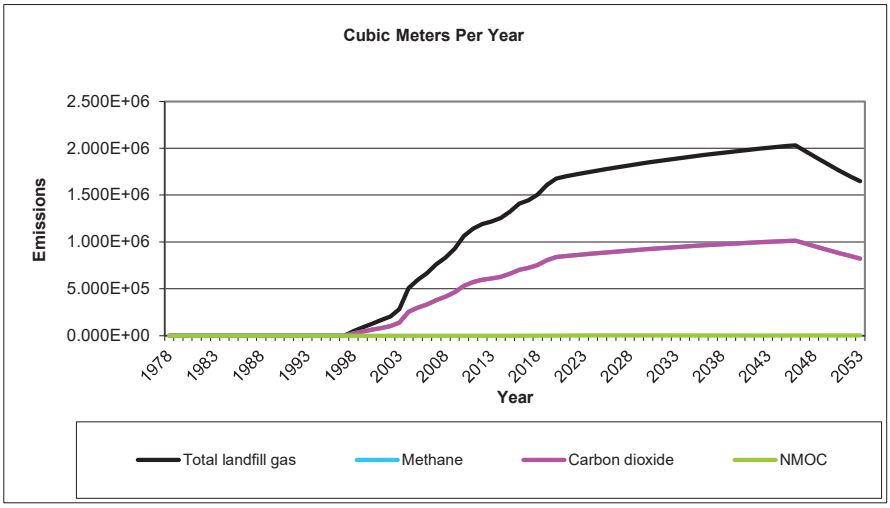
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

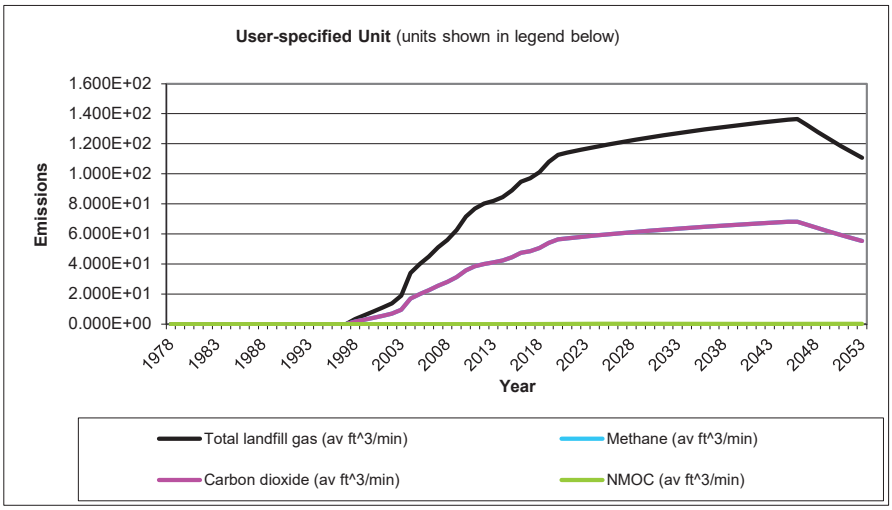
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
3.000E+03
2.500E+03
2.000E+03
1.500E+03
1.000E+03
5.000E+02
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
2.500E+06
2.000E+06
1.500E+06
1.000E+06
5.000E+05
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
1.600E+02
1.400E+02
1.200E+02
1.000E+02
8.000E+01
6.000E+01
4.000E+01
2.000E+01
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	6.060E+01	4.852E+04	3.260E+00	1.619E+01	2.426E+04	1.630E+00
1999	1.105E+02	8.849E+04	5.946E+00	2.952E+01	4.425E+04	2.973E+00
2000	1.567E+02	1.255E+05	8.433E+00	4.187E+01	6.276E+04	4.217E+00
2001	2.059E+02	1.648E+05	1.108E+01	5.499E+01	8.242E+04	5.538E+00
2002	2.564E+02	2.053E+05	1.379E+01	6.848E+01	1.026E+05	6.897E+00
2003	3.511E+02	2.811E+05	1.889E+01	9.377E+01	1.406E+05	9.444E+00
2004	6.333E+02	5.071E+05	3.407E+01	1.692E+02	2.536E+05	1.704E+01
2005	7.444E+02	5.961E+05	4.005E+01	1.988E+02	2.980E+05	2.002E+01
2006	8.346E+02	6.683E+05	4.491E+01	2.229E+02	3.342E+05	2.245E+01
2007	9.482E+02	7.593E+05	5.102E+01	2.533E+02	3.796E+05	2.551E+01
2008	1.041E+03	8.333E+05	5.599E+01	2.780E+02	4.167E+05	2.800E+01
2009	1.160E+03	9.291E+05	6.242E+01	3.099E+02	4.645E+05	3.121E+01
2010	1.329E+03	1.064E+06	7.151E+01	3.550E+02	5.322E+05	3.576E+01
2011	1.429E+03	1.144E+06	7.688E+01	3.817E+02	5.721E+05	3.844E+01
2012	1.489E+03	1.192E+06	8.009E+01	3.976E+02	5.960E+05	4.005E+01
2013	1.522E+03	1.218E+06	8.186E+01	4.064E+02	6.092E+05	4.093E+01
2014	1.570E+03	1.257E+06	8.445E+01	4.193E+02	6.285E+05	4.223E+01
2015	1.654E+03	1.324E+06	8.899E+01	4.418E+02	6.622E+05	4.450E+01
2016	1.759E+03	1.408E+06	9.463E+01	4.698E+02	7.042E+05	4.731E+01
2017	1.805E+03	1.445E+06	9.710E+01	4.820E+02	7.225E+05	4.855E+01
2018	1.880E+03	1.505E+06	1.011E+02	5.020E+02	7.525E+05	5.056E+01
2019	2.006E+03	1.607E+06	1.079E+02	5.359E+02	8.033E+05	5.397E+01
2020	2.092E+03	1.675E+06	1.126E+02	5.588E+02	8.376E+05	5.628E+01
2021	2.121E+03	1.698E+06	1.141E+02	5.665E+02	8.492E+05	5.706E+01
2022	2.144E+03	1.717E+06	1.154E+02	5.728E+02	8.586E+05	5.769E+01
2023	2.167E+03	1.735E+06	1.166E+02	5.788E+02	8.676E+05	5.830E+01
2024	2.189E+03	1.753E+06	1.178E+02	5.847E+02	8.764E+05	5.889E+01
2025	2.210E+03	1.770E+06	1.189E+02	5.904E+02	8.850E+05	5.946E+01
2026	2.231E+03	1.786E+06	1.200E+02	5.959E+02	8.932E+05	6.002E+01
2027	2.251E+03	1.803E+06	1.211E+02	6.013E+02	9.013E+05	6.056E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2028	2.271E+03	1.818E+06	1.222E+02	6.065E+02	9.091E+05	6.108E+01
2029	2.290E+03	1.833E+06	1.232E+02	6.116E+02	9.167E+05	6.159E+01
2030	2.308E+03	1.848E+06	1.242E+02	6.165E+02	9.240E+05	6.208E+01
2031	2.326E+03	1.862E+06	1.251E+02	6.212E+02	9.312E+05	6.256E+01
2032	2.343E+03	1.876E+06	1.261E+02	6.258E+02	9.381E+05	6.303E+01
2033	2.360E+03	1.890E+06	1.270E+02	6.303E+02	9.448E+05	6.348E+01
2034	2.376E+03	1.903E+06	1.278E+02	6.347E+02	9.513E+05	6.392E+01
2035	2.392E+03	1.915E+06	1.287E+02	6.389E+02	9.576E+05	6.434E+01
2036	2.407E+03	1.928E+06	1.295E+02	6.430E+02	9.638E+05	6.476E+01
2037	2.422E+03	1.939E+06	1.303E+02	6.470E+02	9.697E+05	6.516E+01
2038	2.437E+03	1.951E+06	1.311E+02	6.508E+02	9.755E+05	6.555E+01
2039	2.451E+03	1.962E+06	1.318E+02	6.546E+02	9.811E+05	6.592E+01
2040	2.464E+03	1.973E+06	1.326E+02	6.582E+02	9.866E+05	6.629E+01
2041	2.477E+03	1.984E+06	1.333E+02	6.617E+02	9.919E+05	6.664E+01
2042	2.490E+03	1.994E+06	1.340E+02	6.651E+02	9.970E+05	6.699E+01
2043	2.503E+03	2.004E+06	1.346E+02	6.685E+02	1.002E+06	6.732E+01
2044	2.515E+03	2.014E+06	1.353E+02	6.717E+02	1.007E+06	6.765E+01
2045	2.526E+03	2.023E+06	1.359E+02	6.748E+02	1.011E+06	6.796E+01
2046	2.538E+03	2.032E+06	1.365E+02	6.778E+02	1.016E+06	6.827E+01
2047	2.463E+03	1.972E+06	1.325E+02	6.578E+02	9.860E+05	6.625E+01
2048	2.390E+03	1.914E+06	1.286E+02	6.384E+02	9.569E+05	6.429E+01
2049	2.319E+03	1.857E+06	1.248E+02	6.195E+02	9.286E+05	6.239E+01
2050	2.251E+03	1.802E+06	1.211E+02	6.012E+02	9.011E+05	6.055E+01
2051	2.184E+03	1.749E+06	1.175E+02	5.834E+02	8.745E+05	5.876E+01
2052	2.120E+03	1.697E+06	1.140E+02	5.662E+02	8.487E+05	5.702E+01
2053	2.057E+03	1.647E+06	1.107E+02	5.494E+02	8.236E+05	5.534E+01
2054	1.996E+03	1.598E+06	1.074E+02	5.332E+02	7.992E+05	5.370E+01
2055	1.937E+03	1.551E+06	1.042E+02	5.175E+02	7.756E+05	5.211E+01
2056	1.880E+03	1.505E+06	1.011E+02	5.022E+02	7.527E+05	5.057E+01
2057	1.824E+03	1.461E+06	9.816E+01	4.873E+02	7.304E+05	4.908E+01
2058	1.770E+03	1.418E+06	9.526E+01	4.729E+02	7.089E+05	4.763E+01
2059	1.718E+03	1.376E+06	9.244E+01	4.589E+02	6.879E+05	4.622E+01
2060	1.667E+03	1.335E+06	8.971E+01	4.454E+02	6.676E+05	4.485E+01
2061	1.618E+03	1.296E+06	8.706E+01	4.322E+02	6.479E+05	4.353E+01
2062	1.570E+03	1.257E+06	8.449E+01	4.194E+02	6.287E+05	4.224E+01
2063	1.524E+03	1.220E+06	8.199E+01	4.070E+02	6.101E+05	4.099E+01
2064	1.479E+03	1.184E+06	7.957E+01	3.950E+02	5.921E+05	3.978E+01
2065	1.435E+03	1.149E+06	7.721E+01	3.833E+02	5.746E+05	3.861E+01
2066	1.393E+03	1.115E+06	7.493E+01	3.720E+02	5.576E+05	3.747E+01
2067	1.352E+03	1.082E+06	7.272E+01	3.610E+02	5.411E+05	3.636E+01
2068	1.312E+03	1.050E+06	7.057E+01	3.503E+02	5.251E+05	3.528E+01
2069	1.273E+03	1.019E+06	6.848E+01	3.400E+02	5.096E+05	3.424E+01
2070	1.235E+03	9.891E+05	6.646E+01	3.299E+02	4.946E+05	3.323E+01
2071	1.199E+03	9.599E+05	6.449E+01	3.202E+02	4.799E+05	3.225E+01
2072	1.163E+03	9.315E+05	6.259E+01	3.107E+02	4.658E+05	3.129E+01
2073	1.129E+03	9.040E+05	6.074E+01	3.015E+02	4.520E+05	3.037E+01
2074	1.096E+03	8.773E+05	5.894E+01	2.926E+02	4.386E+05	2.947E+01
2075	1.063E+03	8.513E+05	5.720E+01	2.840E+02	4.257E+05	2.860E+01
2076	1.032E+03	8.262E+05	5.551E+01	2.756E+02	4.131E+05	2.776E+01
2077	1.001E+03	8.018E+05	5.387E+01	2.674E+02	4.009E+05	2.694E+01
2078	9.717E+02	7.781E+05	5.228E+01	2.595E+02	3.890E+05	2.614E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	9.429E+02	7.551E+05	5.073E+01	2.519E+02	3.775E+05	2.537E+01
2080	9.151E+02	7.328E+05	4.923E+01	2.444E+02	3.664E+05	2.462E+01
2081	8.880E+02	7.111E+05	4.778E+01	2.372E+02	3.555E+05	2.389E+01
2082	8.618E+02	6.901E+05	4.637E+01	2.302E+02	3.450E+05	2.318E+01
2083	8.363E+02	6.697E+05	4.500E+01	2.234E+02	3.348E+05	2.250E+01
2084	8.116E+02	6.499E+05	4.367E+01	2.168E+02	3.249E+05	2.183E+01
2085	7.876E+02	6.307E+05	4.238E+01	2.104E+02	3.153E+05	2.119E+01
2086	7.643E+02	6.120E+05	4.112E+01	2.042E+02	3.060E+05	2.056E+01
2087	7.417E+02	5.940E+05	3.991E+01	1.981E+02	2.970E+05	1.995E+01
2088	7.198E+02	5.764E+05	3.873E+01	1.923E+02	2.882E+05	1.936E+01
2089	6.986E+02	5.594E+05	3.758E+01	1.866E+02	2.797E+05	1.879E+01
2090	6.779E+02	5.428E+05	3.647E+01	1.811E+02	2.714E+05	1.824E+01
2091	6.579E+02	5.268E+05	3.540E+01	1.757E+02	2.634E+05	1.770E+01
2092	6.384E+02	5.112E+05	3.435E+01	1.705E+02	2.556E+05	1.717E+01
2093	6.196E+02	4.961E+05	3.333E+01	1.655E+02	2.481E+05	1.667E+01
2094	6.012E+02	4.815E+05	3.235E+01	1.606E+02	2.407E+05	1.617E+01
2095	5.835E+02	4.672E+05	3.139E+01	1.559E+02	2.336E+05	1.570E+01
2096	5.662E+02	4.534E+05	3.046E+01	1.512E+02	2.267E+05	1.523E+01
2097	5.495E+02	4.400E+05	2.956E+01	1.468E+02	2.200E+05	1.478E+01
2098	5.333E+02	4.270E+05	2.869E+01	1.424E+02	2.135E+05	1.435E+01
2099	5.175E+02	4.144E+05	2.784E+01	1.382E+02	2.072E+05	1.392E+01
2100	5.022E+02	4.021E+05	2.702E+01	1.341E+02	2.011E+05	1.351E+01
2101	4.874E+02	3.903E+05	2.622E+01	1.302E+02	1.951E+05	1.311E+01
2102	4.730E+02	3.787E+05	2.545E+01	1.263E+02	1.894E+05	1.272E+01
2103	4.590E+02	3.675E+05	2.469E+01	1.226E+02	1.838E+05	1.235E+01
2104	4.454E+02	3.567E+05	2.396E+01	1.190E+02	1.783E+05	1.198E+01
2105	4.323E+02	3.461E+05	2.326E+01	1.155E+02	1.731E+05	1.163E+01
2106	4.195E+02	3.359E+05	2.257E+01	1.120E+02	1.679E+05	1.128E+01
2107	4.071E+02	3.260E+05	2.190E+01	1.087E+02	1.630E+05	1.095E+01
2108	3.950E+02	3.163E+05	2.125E+01	1.055E+02	1.582E+05	1.063E+01
2109	3.834E+02	3.070E+05	2.063E+01	1.024E+02	1.535E+05	1.031E+01
2110	3.720E+02	2.979E+05	2.002E+01	9.938E+01	1.490E+05	1.001E+01
2111	3.610E+02	2.891E+05	1.943E+01	9.644E+01	1.446E+05	9.713E+00
2112	3.504E+02	2.806E+05	1.885E+01	9.359E+01	1.403E+05	9.426E+00
2113	3.400E+02	2.723E+05	1.829E+01	9.082E+01	1.361E+05	9.147E+00
2114	3.300E+02	2.642E+05	1.775E+01	8.814E+01	1.321E+05	8.877E+00
2115	3.202E+02	2.564E+05	1.723E+01	8.553E+01	1.282E+05	8.614E+00
2116	3.108E+02	2.488E+05	1.672E+01	8.301E+01	1.244E+05	8.360E+00
2117	3.016E+02	2.415E+05	1.623E+01	8.055E+01	1.207E+05	8.113E+00
2118	2.927E+02	2.343E+05	1.575E+01	7.817E+01	1.172E+05	7.873E+00

Results (Continued)

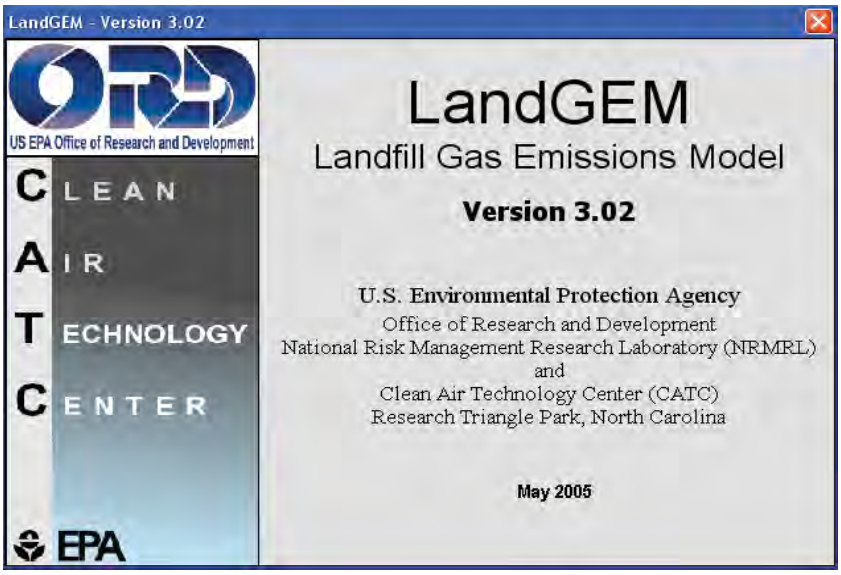
Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	4.441E+01	2.426E+04	1.630E+00	1.044E-01	2.911E+01	1.956E-03
1999	8.099E+01	4.425E+04	2.973E+00	1.903E-01	5.309E+01	3.567E-03
2000	1.149E+02	6.276E+04	4.217E+00	2.699E-01	7.531E+01	5.060E-03
2001	1.509E+02	8.242E+04	5.538E+00	3.545E-01	9.890E+01	6.645E-03
2002	1.879E+02	1.026E+05	6.897E+00	4.415E-01	1.232E+02	8.276E-03
2003	2.573E+02	1.406E+05	9.444E+00	6.046E-01	1.687E+02	1.133E-02
2004	4.641E+02	2.536E+05	1.704E+01	1.091E+00	3.043E+02	2.044E-02
2005	5.456E+02	2.980E+05	2.002E+01	1.282E+00	3.576E+02	2.403E-02
2006	6.117E+02	3.342E+05	2.245E+01	1.437E+00	4.010E+02	2.694E-02
2007	6.949E+02	3.796E+05	2.551E+01	1.633E+00	4.556E+02	3.061E-02
2008	7.627E+02	4.167E+05	2.800E+01	1.792E+00	5.000E+02	3.359E-02
2009	8.503E+02	4.645E+05	3.121E+01	1.998E+00	5.574E+02	3.745E-02
2010	9.741E+02	5.322E+05	3.576E+01	2.289E+00	6.386E+02	4.291E-02
2011	1.047E+03	5.721E+05	3.844E+01	2.461E+00	6.866E+02	4.613E-02
2012	1.091E+03	5.960E+05	4.005E+01	2.564E+00	7.152E+02	4.806E-02
2013	1.115E+03	6.092E+05	4.093E+01	2.620E+00	7.310E+02	4.912E-02
2014	1.150E+03	6.285E+05	4.223E+01	2.703E+00	7.542E+02	5.067E-02
2015	1.212E+03	6.622E+05	4.450E+01	2.849E+00	7.947E+02	5.340E-02
2016	1.289E+03	7.042E+05	4.731E+01	3.029E+00	8.450E+02	5.678E-02
2017	1.323E+03	7.225E+05	4.855E+01	3.108E+00	8.671E+02	5.826E-02
2018	1.377E+03	7.525E+05	5.056E+01	3.237E+00	9.030E+02	6.067E-02
2019	1.470E+03	8.033E+05	5.397E+01	3.455E+00	9.640E+02	6.477E-02
2020	1.533E+03	8.376E+05	5.628E+01	3.603E+00	1.005E+03	6.753E-02
2021	1.554E+03	8.492E+05	5.706E+01	3.653E+00	1.019E+03	6.847E-02
2022	1.572E+03	8.586E+05	5.769E+01	3.693E+00	1.030E+03	6.922E-02
2023	1.588E+03	8.676E+05	5.830E+01	3.732E+00	1.041E+03	6.995E-02
2024	1.604E+03	8.764E+05	5.889E+01	3.770E+00	1.052E+03	7.066E-02
2025	1.620E+03	8.850E+05	5.946E+01	3.807E+00	1.062E+03	7.135E-02
2026	1.635E+03	8.932E+05	6.002E+01	3.842E+00	1.072E+03	7.202E-02
2027	1.650E+03	9.013E+05	6.056E+01	3.877E+00	1.082E+03	7.267E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2028	1.664E+03	9.091E+05	6.108E+01	3.910E+00	1.091E+03	7.330E-02
2029	1.678E+03	9.167E+05	6.159E+01	3.943E+00	1.100E+03	7.391E-02
2030	1.691E+03	9.240E+05	6.208E+01	3.975E+00	1.109E+03	7.450E-02
2031	1.704E+03	9.312E+05	6.256E+01	4.005E+00	1.117E+03	7.508E-02
2032	1.717E+03	9.381E+05	6.303E+01	4.035E+00	1.126E+03	7.564E-02
2033	1.729E+03	9.448E+05	6.348E+01	4.064E+00	1.134E+03	7.618E-02
2034	1.741E+03	9.513E+05	6.392E+01	4.092E+00	1.142E+03	7.670E-02
2035	1.753E+03	9.576E+05	6.434E+01	4.119E+00	1.149E+03	7.721E-02
2036	1.764E+03	9.638E+05	6.476E+01	4.146E+00	1.157E+03	7.771E-02
2037	1.775E+03	9.697E+05	6.516E+01	4.171E+00	1.164E+03	7.819E-02
2038	1.786E+03	9.755E+05	6.555E+01	4.196E+00	1.171E+03	7.865E-02
2039	1.796E+03	9.811E+05	6.592E+01	4.220E+00	1.177E+03	7.911E-02
2040	1.806E+03	9.866E+05	6.629E+01	4.244E+00	1.184E+03	7.955E-02
2041	1.816E+03	9.919E+05	6.664E+01	4.266E+00	1.190E+03	7.997E-02
2042	1.825E+03	9.970E+05	6.699E+01	4.288E+00	1.196E+03	8.039E-02
2043	1.834E+03	1.002E+06	6.732E+01	4.310E+00	1.202E+03	8.079E-02
2044	1.843E+03	1.007E+06	6.765E+01	4.331E+00	1.208E+03	8.118E-02
2045	1.852E+03	1.011E+06	6.796E+01	4.351E+00	1.214E+03	8.155E-02
2046	1.860E+03	1.016E+06	6.827E+01	4.370E+00	1.219E+03	8.192E-02
2047	1.805E+03	9.860E+05	6.625E+01	4.241E+00	1.183E+03	7.950E-02
2048	1.752E+03	9.569E+05	6.429E+01	4.116E+00	1.148E+03	7.715E-02
2049	1.700E+03	9.286E+05	6.239E+01	3.994E+00	1.114E+03	7.487E-02
2050	1.650E+03	9.011E+05	6.055E+01	3.876E+00	1.081E+03	7.266E-02
2051	1.601E+03	8.745E+05	5.876E+01	3.762E+00	1.049E+03	7.051E-02
2052	1.553E+03	8.487E+05	5.702E+01	3.650E+00	1.018E+03	6.843E-02
2053	1.508E+03	8.236E+05	5.534E+01	3.543E+00	9.883E+02	6.640E-02
2054	1.463E+03	7.992E+05	5.370E+01	3.438E+00	9.591E+02	6.444E-02
2055	1.420E+03	7.756E+05	5.211E+01	3.336E+00	9.307E+02	6.254E-02
2056	1.378E+03	7.527E+05	5.057E+01	3.238E+00	9.032E+02	6.069E-02
2057	1.337E+03	7.304E+05	4.908E+01	3.142E+00	8.765E+02	5.889E-02
2058	1.298E+03	7.089E+05	4.763E+01	3.049E+00	8.506E+02	5.715E-02
2059	1.259E+03	6.879E+05	4.622E+01	2.959E+00	8.255E+02	5.546E-02
2060	1.222E+03	6.676E+05	4.485E+01	2.872E+00	8.011E+02	5.383E-02
2061	1.186E+03	6.479E+05	4.353E+01	2.787E+00	7.774E+02	5.223E-02
2062	1.151E+03	6.287E+05	4.224E+01	2.704E+00	7.544E+02	5.069E-02
2063	1.117E+03	6.101E+05	4.099E+01	2.624E+00	7.321E+02	4.919E-02
2064	1.084E+03	5.921E+05	3.978E+01	2.547E+00	7.105E+02	4.774E-02
2065	1.052E+03	5.746E+05	3.861E+01	2.472E+00	6.895E+02	4.633E-02
2066	1.021E+03	5.576E+05	3.747E+01	2.398E+00	6.691E+02	4.496E-02
2067	9.905E+02	5.411E+05	3.636E+01	2.328E+00	6.494E+02	4.363E-02
2068	9.613E+02	5.251E+05	3.528E+01	2.259E+00	6.302E+02	4.234E-02
2069	9.329E+02	5.096E+05	3.424E+01	2.192E+00	6.115E+02	4.109E-02
2070	9.053E+02	4.946E+05	3.323E+01	2.127E+00	5.935E+02	3.987E-02
2071	8.785E+02	4.799E+05	3.225E+01	2.064E+00	5.759E+02	3.870E-02
2072	8.526E+02	4.658E+05	3.129E+01	2.003E+00	5.589E+02	3.755E-02
2073	8.274E+02	4.520E+05	3.037E+01	1.944E+00	5.424E+02	3.644E-02
2074	8.029E+02	4.386E+05	2.947E+01	1.887E+00	5.264E+02	3.537E-02
2075	7.792E+02	4.257E+05	2.860E+01	1.831E+00	5.108E+02	3.432E-02
2076	7.562E+02	4.131E+05	2.776E+01	1.777E+00	4.957E+02	3.331E-02
2077	7.338E+02	4.009E+05	2.694E+01	1.724E+00	4.811E+02	3.232E-02
2078	7.121E+02	3.890E+05	2.614E+01	1.673E+00	4.668E+02	3.137E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	6.911E+02	3.775E+05	2.537E+01	1.624E+00	4.530E+02	3.044E-02
2080	6.707E+02	3.664E+05	2.462E+01	1.576E+00	4.397E+02	2.954E-02
2081	6.508E+02	3.555E+05	2.389E+01	1.529E+00	4.267E+02	2.867E-02
2082	6.316E+02	3.450E+05	2.318E+01	1.484E+00	4.140E+02	2.782E-02
2083	6.129E+02	3.348E+05	2.250E+01	1.440E+00	4.018E+02	2.700E-02
2084	5.948E+02	3.249E+05	2.183E+01	1.398E+00	3.899E+02	2.620E-02
2085	5.772E+02	3.153E+05	2.119E+01	1.356E+00	3.784E+02	2.543E-02
2086	5.602E+02	3.060E+05	2.056E+01	1.316E+00	3.672E+02	2.467E-02
2087	5.436E+02	2.970E+05	1.995E+01	1.277E+00	3.564E+02	2.394E-02
2088	5.276E+02	2.882E+05	1.936E+01	1.240E+00	3.458E+02	2.324E-02
2089	5.120E+02	2.797E+05	1.879E+01	1.203E+00	3.356E+02	2.255E-02
2090	4.968E+02	2.714E+05	1.824E+01	1.167E+00	3.257E+02	2.188E-02
2091	4.821E+02	2.634E+05	1.770E+01	1.133E+00	3.161E+02	2.124E-02
2092	4.679E+02	2.556E+05	1.717E+01	1.099E+00	3.067E+02	2.061E-02
2093	4.541E+02	2.481E+05	1.667E+01	1.067E+00	2.977E+02	2.000E-02
2094	4.406E+02	2.407E+05	1.617E+01	1.035E+00	2.889E+02	1.941E-02
2095	4.276E+02	2.336E+05	1.570E+01	1.005E+00	2.803E+02	1.884E-02
2096	4.150E+02	2.267E+05	1.523E+01	9.752E-01	2.720E+02	1.828E-02
2097	4.027E+02	2.200E+05	1.478E+01	9.463E-01	2.640E+02	1.774E-02
2098	3.908E+02	2.135E+05	1.435E+01	9.184E-01	2.562E+02	1.721E-02
2099	3.793E+02	2.072E+05	1.392E+01	8.912E-01	2.486E+02	1.671E-02
2100	3.681E+02	2.011E+05	1.351E+01	8.649E-01	2.413E+02	1.621E-02
2101	3.572E+02	1.951E+05	1.311E+01	8.393E-01	2.342E+02	1.573E-02
2102	3.466E+02	1.894E+05	1.272E+01	8.145E-01	2.272E+02	1.527E-02
2103	3.364E+02	1.838E+05	1.235E+01	7.904E-01	2.205E+02	1.482E-02
2104	3.264E+02	1.783E+05	1.198E+01	7.671E-01	2.140E+02	1.438E-02
2105	3.168E+02	1.731E+05	1.163E+01	7.444E-01	2.077E+02	1.395E-02
2106	3.074E+02	1.679E+05	1.128E+01	7.224E-01	2.015E+02	1.354E-02
2107	2.983E+02	1.630E+05	1.095E+01	7.011E-01	1.956E+02	1.314E-02
2108	2.895E+02	1.582E+05	1.063E+01	6.803E-01	1.898E+02	1.275E-02
2109	2.810E+02	1.535E+05	1.031E+01	6.602E-01	1.842E+02	1.238E-02
2110	2.727E+02	1.490E+05	1.001E+01	6.407E-01	1.787E+02	1.201E-02
2111	2.646E+02	1.446E+05	9.713E+00	6.218E-01	1.735E+02	1.166E-02
2112	2.568E+02	1.403E+05	9.426E+00	6.034E-01	1.683E+02	1.131E-02
2113	2.492E+02	1.361E+05	9.147E+00	5.856E-01	1.634E+02	1.098E-02
2114	2.418E+02	1.321E+05	8.877E+00	5.683E-01	1.585E+02	1.065E-02
2115	2.347E+02	1.282E+05	8.614E+00	5.515E-01	1.539E+02	1.034E-02
2116	2.278E+02	1.244E+05	8.360E+00	5.352E-01	1.493E+02	1.003E-02
2117	2.210E+02	1.207E+05	8.113E+00	5.194E-01	1.449E+02	9.735E-03
2118	2.145E+02	1.172E+05	7.873E+00	5.040E-01	1.406E+02	9.447E-03



Summary Report

Landfill Name or Identifier: Organic waste CB Landfill Model

Date: Monday, May 10, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate ($year^{-1}$)
L_o = potential methane generation capacity (m^3/Mg)
M_i = mass of waste accepted in the ith year (Mg)
t_{ij} = age of the jth section of waste mass M_i accepted in the ith year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1978**	
Landfill Closure Year (with 80-year limit)	**2045**	
Actual Closure Year (without limit)	***2045***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.050**	*year $^{-1}$*
Potential Methane Generation Capacity, L_o	**130**	*m^3/Mg*
NMOC Concentration	**600**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	0	0	0	0
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	0	0	0	0
2006	0	0	0	0
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	2,610	2,871	0	0
2016	2,690	2,959	2,610	2,871
2017	2,807	3,088	5,300	5,830

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2018	2,781	3,059	8,107	8,918
2019	27,106	29,817	10,888	11,977
2020	17,744	19,518	37,994	41,794
2021	21,818	24,000	55,738	61,312
2022	21,818	24,000	77,556	85,312
2023	21,818	24,000	99,374	109,312
2024	21,818	24,000	121,192	133,312
2025	21,818	24,000	143,010	157,312
2026	21,818	24,000	164,829	181,312
2027	21,818	24,000	186,647	205,312
2028	21,818	24,000	208,465	229,312
2029	21,818	24,000	230,283	253,312
2030	21,818	24,000	252,101	277,312
2031	21,818	24,000	273,920	301,312
2032	21,818	24,000	295,738	325,312
2033	21,818	24,000	317,556	349,312
2034	21,818	24,000	339,374	373,312
2035	21,818	24,000	361,192	397,312
2036	21,818	24,000	383,010	421,312
2037	21,818	24,000	404,829	445,312
2038	21,818	24,000	426,647	469,312
2039	21,818	24,000	448,465	493,312
2040	21,818	24,000	470,283	517,312
2041	21,818	24,000	492,101	541,312
2042	21,818	24,000	513,920	565,312
2043	21,818	24,000	535,738	589,312
2044	21,818	24,000	557,556	613,312
2045	21,818	24,000	579,374	637,312
2046	0	0	601,192	661,312
2047	0	0	601,192	661,312
2048	0	0	601,192	661,312
2049	0	0	601,192	661,312
2050	0	0	601,192	661,312
2051	0	0	601,192	661,312
2052	0	0	601,192	661,312
2053	0	0	601,192	661,312
2054	0	0	601,192	661,312
2055	0	0	601,192	661,312
2056	0	0	601,192	661,312
2057	0	0	601,192	661,312

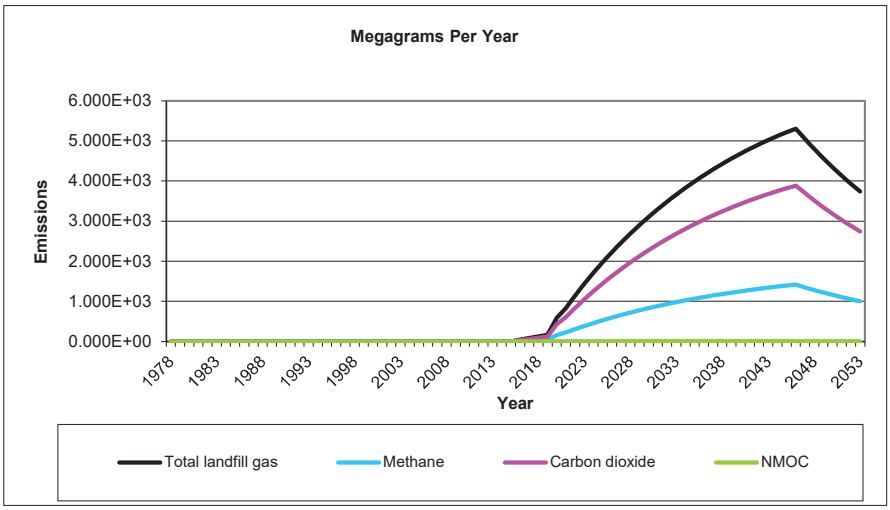
Pollutant Parameters

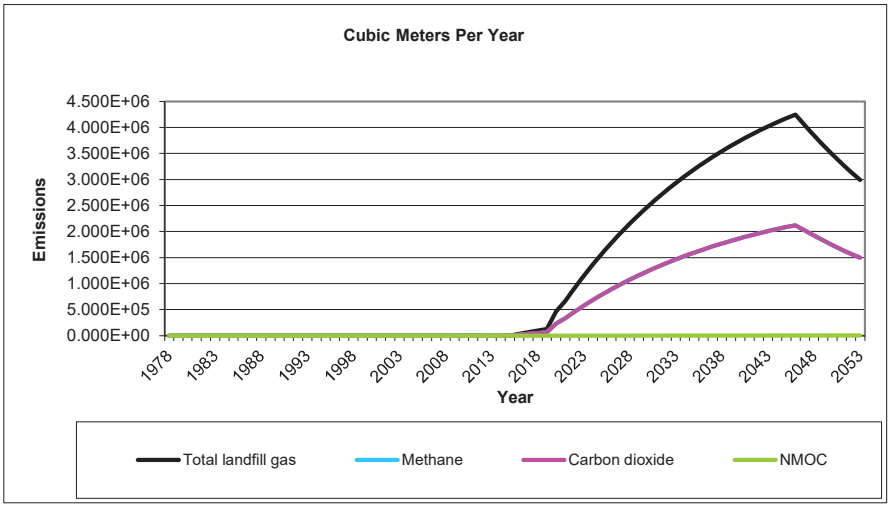
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

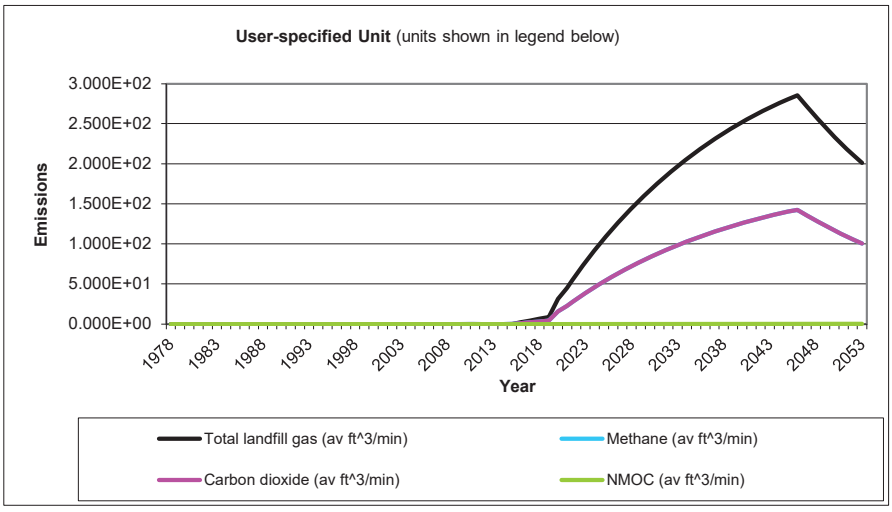
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
6.000E+03
5.000E+03
4.000E+03
3.000E+03
2.000E+03
1.000E+03
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
4.500E+06
4.000E+06
3.500E+06
3.000E+06
2.500E+06
2.000E+06
1.500E+06
1.000E+06
5.000E+05
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
3.000E+02
2.500E+02
2.000E+02
1.500E+02
1.000E+02
5.000E+01
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1999	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2000	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2001	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2002	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2003	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2004	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2005	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2006	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2007	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2008	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2009	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2010	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2011	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2012	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2013	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2014	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2015	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2016	4.144E+01	3.318E+04	2.229E+00	1.107E+01	1.659E+04	1.115E+00
2017	8.212E+01	6.575E+04	4.418E+00	2.193E+01	3.288E+04	2.209E+00
2018	1.227E+02	9.823E+04	6.600E+00	3.277E+01	4.912E+04	3.300E+00
2019	1.608E+02	1.288E+05	8.654E+00	4.296E+01	6.440E+04	4.327E+00
2020	5.833E+02	4.671E+05	3.138E+01	1.558E+02	2.335E+05	1.569E+01
2021	8.365E+02	6.699E+05	4.501E+01	2.234E+02	3.349E+05	2.250E+01
2022	1.142E+03	9.145E+05	6.145E+01	3.051E+02	4.573E+05	3.072E+01
2023	1.433E+03	1.147E+06	7.709E+01	3.827E+02	5.737E+05	3.854E+01
2024	1.709E+03	1.369E+06	9.196E+01	4.566E+02	6.844E+05	4.598E+01
2025	1.972E+03	1.579E+06	1.061E+02	5.268E+02	7.897E+05	5.306E+01
2026	2.222E+03	1.780E+06	1.196E+02	5.936E+02	8.898E+05	5.979E+01
2027	2.460E+03	1.970E+06	1.324E+02	6.572E+02	9.851E+05	6.619E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2028	2.687E+03	2.151E+06	1.446E+02	7.177E+02	1.076E+06	7.228E+01
2029	2.902E+03	2.324E+06	1.561E+02	7.752E+02	1.162E+06	7.807E+01
2030	3.107E+03	2.488E+06	1.672E+02	8.299E+02	1.244E+06	8.358E+01
2031	3.302E+03	2.644E+06	1.776E+02	8.819E+02	1.322E+06	8.882E+01
2032	3.487E+03	2.792E+06	1.876E+02	9.314E+02	1.396E+06	9.381E+01
2033	3.663E+03	2.934E+06	1.971E+02	9.785E+02	1.467E+06	9.855E+01
2034	3.831E+03	3.068E+06	2.061E+02	1.023E+03	1.534E+06	1.031E+02
2035	3.991E+03	3.196E+06	2.147E+02	1.066E+03	1.598E+06	1.074E+02
2036	4.142E+03	3.317E+06	2.229E+02	1.106E+03	1.659E+06	1.114E+02
2037	4.287E+03	3.433E+06	2.306E+02	1.145E+03	1.716E+06	1.153E+02
2038	4.424E+03	3.543E+06	2.380E+02	1.182E+03	1.771E+06	1.190E+02
2039	4.555E+03	3.647E+06	2.451E+02	1.217E+03	1.824E+06	1.225E+02
2040	4.679E+03	3.747E+06	2.517E+02	1.250E+03	1.873E+06	1.259E+02
2041	4.797E+03	3.841E+06	2.581E+02	1.281E+03	1.921E+06	1.290E+02
2042	4.909E+03	3.931E+06	2.641E+02	1.311E+03	1.966E+06	1.321E+02
2043	5.016E+03	4.017E+06	2.699E+02	1.340E+03	2.008E+06	1.349E+02
2044	5.118E+03	4.098E+06	2.754E+02	1.367E+03	2.049E+06	1.377E+02
2045	5.215E+03	4.176E+06	2.806E+02	1.393E+03	2.088E+06	1.403E+02
2046	5.307E+03	4.250E+06	2.855E+02	1.418E+03	2.125E+06	1.428E+02
2047	5.048E+03	4.042E+06	2.716E+02	1.348E+03	2.021E+06	1.358E+02
2048	4.802E+03	3.845E+06	2.584E+02	1.283E+03	1.923E+06	1.292E+02
2049	4.568E+03	3.658E+06	2.458E+02	1.220E+03	1.829E+06	1.229E+02
2050	4.345E+03	3.479E+06	2.338E+02	1.161E+03	1.740E+06	1.169E+02
2051	4.133E+03	3.310E+06	2.224E+02	1.104E+03	1.655E+06	1.112E+02
2052	3.931E+03	3.148E+06	2.115E+02	1.050E+03	1.574E+06	1.058E+02
2053	3.740E+03	2.995E+06	2.012E+02	9.989E+02	1.497E+06	1.006E+02
2054	3.557E+03	2.849E+06	1.914E+02	9.502E+02	1.424E+06	9.570E+01
2055	3.384E+03	2.710E+06	1.821E+02	9.039E+02	1.355E+06	9.103E+01
2056	3.219E+03	2.577E+06	1.732E+02	8.598E+02	1.289E+06	8.659E+01
2057	3.062E+03	2.452E+06	1.647E+02	8.178E+02	1.226E+06	8.237E+01
2058	2.912E+03	2.332E+06	1.567E+02	7.780E+02	1.166E+06	7.835E+01
2059	2.770E+03	2.218E+06	1.491E+02	7.400E+02	1.109E+06	7.453E+01
2060	2.635E+03	2.110E+06	1.418E+02	7.039E+02	1.055E+06	7.089E+01
2061	2.507E+03	2.007E+06	1.349E+02	6.696E+02	1.004E+06	6.744E+01
2062	2.385E+03	1.909E+06	1.283E+02	6.369E+02	9.547E+05	6.415E+01
2063	2.268E+03	1.816E+06	1.220E+02	6.059E+02	9.082E+05	6.102E+01
2064	2.158E+03	1.728E+06	1.161E+02	5.763E+02	8.639E+05	5.804E+01
2065	2.052E+03	1.643E+06	1.104E+02	5.482E+02	8.217E+05	5.521E+01
2066	1.952E+03	1.563E+06	1.050E+02	5.215E+02	7.817E+05	5.252E+01
2067	1.857E+03	1.487E+06	9.992E+01	4.960E+02	7.435E+05	4.996E+01
2068	1.767E+03	1.415E+06	9.504E+01	4.719E+02	7.073E+05	4.752E+01
2069	1.680E+03	1.346E+06	9.041E+01	4.488E+02	6.728E+05	4.520E+01
2070	1.598E+03	1.280E+06	8.600E+01	4.270E+02	6.400E+05	4.300E+01
2071	1.520E+03	1.218E+06	8.180E+01	4.061E+02	6.088E+05	4.090E+01
2072	1.446E+03	1.158E+06	7.781E+01	3.863E+02	5.791E+05	3.891E+01
2073	1.376E+03	1.102E+06	7.402E+01	3.675E+02	5.508E+05	3.701E+01
2074	1.309E+03	1.048E+06	7.041E+01	3.496E+02	5.240E+05	3.520E+01
2075	1.245E+03	9.968E+05	6.698E+01	3.325E+02	4.984E+05	3.349E+01
2076	1.184E+03	9.482E+05	6.371E+01	3.163E+02	4.741E+05	3.185E+01
2077	1.126E+03	9.019E+05	6.060E+01	3.009E+02	4.510E+05	3.030E+01
2078	1.071E+03	8.580E+05	5.765E+01	2.862E+02	4.290E+05	2.882E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	1.019E+03	8.161E+05	5.483E+01	2.722E+02	4.081E+05	2.742E+01
2080	9.695E+02	7.763E+05	5.216E+01	2.590E+02	3.882E+05	2.608E+01
2081	9.222E+02	7.385E+05	4.962E+01	2.463E+02	3.692E+05	2.481E+01
2082	8.772E+02	7.024E+05	4.720E+01	2.343E+02	3.512E+05	2.360E+01
2083	8.344E+02	6.682E+05	4.489E+01	2.229E+02	3.341E+05	2.245E+01
2084	7.937E+02	6.356E+05	4.271E+01	2.120E+02	3.178E+05	2.135E+01
2085	7.550E+02	6.046E+05	4.062E+01	2.017E+02	3.023E+05	2.031E+01
2086	7.182E+02	5.751E+05	3.864E+01	1.918E+02	2.876E+05	1.932E+01
2087	6.832E+02	5.471E+05	3.676E+01	1.825E+02	2.735E+05	1.838E+01
2088	6.499E+02	5.204E+05	3.496E+01	1.736E+02	2.602E+05	1.748E+01
2089	6.182E+02	4.950E+05	3.326E+01	1.651E+02	2.475E+05	1.663E+01
2090	5.880E+02	4.709E+05	3.164E+01	1.571E+02	2.354E+05	1.582E+01
2091	5.593E+02	4.479E+05	3.009E+01	1.494E+02	2.239E+05	1.505E+01
2092	5.321E+02	4.261E+05	2.863E+01	1.421E+02	2.130E+05	1.431E+01
2093	5.061E+02	4.053E+05	2.723E+01	1.352E+02	2.026E+05	1.362E+01
2094	4.814E+02	3.855E+05	2.590E+01	1.286E+02	1.928E+05	1.295E+01
2095	4.580E+02	3.667E+05	2.464E+01	1.223E+02	1.834E+05	1.232E+01
2096	4.356E+02	3.488E+05	2.344E+01	1.164E+02	1.744E+05	1.172E+01
2097	4.144E+02	3.318E+05	2.229E+01	1.107E+02	1.659E+05	1.115E+01
2098	3.942E+02	3.156E+05	2.121E+01	1.053E+02	1.578E+05	1.060E+01
2099	3.749E+02	3.002E+05	2.017E+01	1.002E+02	1.501E+05	1.009E+01
2100	3.567E+02	2.856E+05	1.919E+01	9.527E+01	1.428E+05	9.594E+00
2101	3.393E+02	2.717E+05	1.825E+01	9.062E+01	1.358E+05	9.126E+00
2102	3.227E+02	2.584E+05	1.736E+01	8.620E+01	1.292E+05	8.681E+00
2103	3.070E+02	2.458E+05	1.652E+01	8.200E+01	1.229E+05	8.258E+00
2104	2.920E+02	2.338E+05	1.571E+01	7.800E+01	1.169E+05	7.855E+00
2105	2.778E+02	2.224E+05	1.494E+01	7.419E+01	1.112E+05	7.472E+00
2106	2.642E+02	2.116E+05	1.422E+01	7.057E+01	1.058E+05	7.108E+00
2107	2.513E+02	2.013E+05	1.352E+01	6.713E+01	1.006E+05	6.761E+00
2108	2.391E+02	1.914E+05	1.286E+01	6.386E+01	9.572E+04	6.431E+00
2109	2.274E+02	1.821E+05	1.224E+01	6.074E+01	9.105E+04	6.118E+00
2110	2.163E+02	1.732E+05	1.164E+01	5.778E+01	8.661E+04	5.819E+00
2111	2.058E+02	1.648E+05	1.107E+01	5.496E+01	8.239E+04	5.535E+00
2112	1.957E+02	1.567E+05	1.053E+01	5.228E+01	7.837E+04	5.266E+00
2113	1.862E+02	1.491E+05	1.002E+01	4.973E+01	7.455E+04	5.009E+00
2114	1.771E+02	1.418E+05	9.529E+00	4.731E+01	7.091E+04	4.764E+00
2115	1.685E+02	1.349E+05	9.064E+00	4.500E+01	6.745E+04	4.532E+00
2116	1.603E+02	1.283E+05	8.622E+00	4.281E+01	6.416E+04	4.311E+00
2117	1.524E+02	1.221E+05	8.202E+00	4.072E+01	6.103E+04	4.101E+00
2118	1.450E+02	1.161E+05	7.802E+00	3.873E+01	5.806E+04	3.901E+00

Results (Continued)

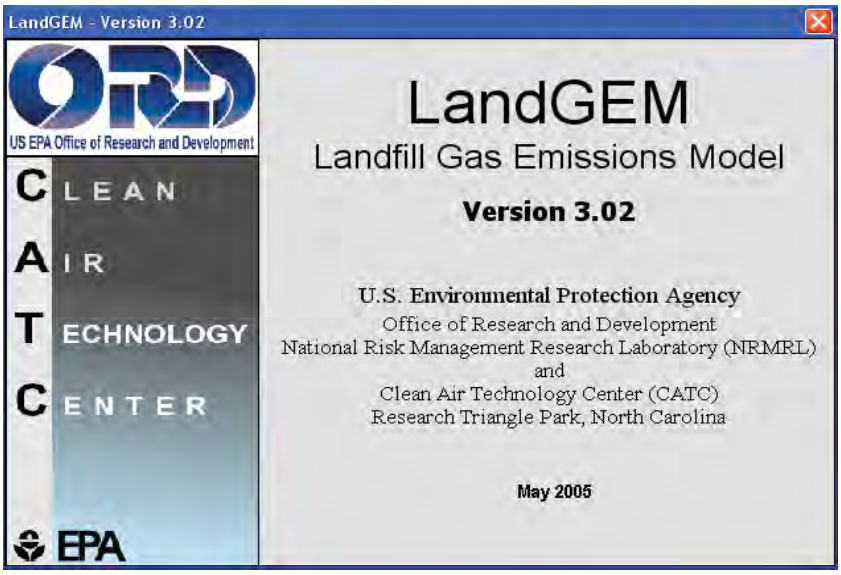
Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1999	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2000	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2001	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2002	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2003	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2004	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2005	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2006	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2007	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2008	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2009	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2010	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2011	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2012	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2013	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2014	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2015	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2016	3.037E+01	1.659E+04	1.115E+00	7.136E-02	1.991E+01	1.338E-03
2017	6.018E+01	3.288E+04	2.209E+00	1.414E-01	3.945E+01	2.651E-03
2018	8.991E+01	4.912E+04	3.300E+00	2.113E-01	5.894E+01	3.960E-03
2019	1.179E+02	6.440E+04	4.327E+00	2.770E-01	7.728E+01	5.192E-03
2020	4.275E+02	2.335E+05	1.569E+01	1.005E+00	2.803E+02	1.883E-02
2021	6.131E+02	3.349E+05	2.250E+01	1.441E+00	4.019E+02	2.700E-02
2022	8.370E+02	4.573E+05	3.072E+01	1.967E+00	5.487E+02	3.687E-02
2023	1.050E+03	5.737E+05	3.854E+01	2.467E+00	6.884E+02	4.625E-02
2024	1.253E+03	6.844E+05	4.598E+01	2.944E+00	8.212E+02	5.518E-02
2025	1.445E+03	7.897E+05	5.306E+01	3.397E+00	9.476E+02	6.367E-02
2026	1.629E+03	8.898E+05	5.979E+01	3.827E+00	1.068E+03	7.174E-02
2027	1.803E+03	9.851E+05	6.619E+01	4.237E+00	1.182E+03	7.943E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2028	1.969E+03	1.076E+06	7.228E+01	4.627E+00	1.291E+03	8.673E-02
2029	2.127E+03	1.162E+06	7.807E+01	4.998E+00	1.394E+03	9.369E-02
2030	2.277E+03	1.244E+06	8.358E+01	5.351E+00	1.493E+03	1.003E-01
2031	2.420E+03	1.322E+06	8.882E+01	5.686E+00	1.586E+03	1.066E-01
2032	2.556E+03	1.396E+06	9.381E+01	6.005E+00	1.675E+03	1.126E-01
2033	2.685E+03	1.467E+06	9.855E+01	6.309E+00	1.760E+03	1.183E-01
2034	2.808E+03	1.534E+06	1.031E+02	6.598E+00	1.841E+03	1.237E-01
2035	2.925E+03	1.598E+06	1.074E+02	6.873E+00	1.917E+03	1.288E-01
2036	3.036E+03	1.659E+06	1.114E+02	7.134E+00	1.990E+03	1.337E-01
2037	3.142E+03	1.716E+06	1.153E+02	7.382E+00	2.060E+03	1.384E-01
2038	3.242E+03	1.771E+06	1.190E+02	7.619E+00	2.126E+03	1.428E-01
2039	3.338E+03	1.824E+06	1.225E+02	7.844E+00	2.188E+03	1.470E-01
2040	3.429E+03	1.873E+06	1.259E+02	8.058E+00	2.248E+03	1.510E-01
2041	3.516E+03	1.921E+06	1.290E+02	8.261E+00	2.305E+03	1.549E-01
2042	3.598E+03	1.966E+06	1.321E+02	8.455E+00	2.359E+03	1.585E-01
2043	3.676E+03	2.008E+06	1.349E+02	8.639E+00	2.410E+03	1.619E-01
2044	3.751E+03	2.049E+06	1.377E+02	8.814E+00	2.459E+03	1.652E-01
2045	3.822E+03	2.088E+06	1.403E+02	8.981E+00	2.505E+03	1.683E-01
2046	3.889E+03	2.125E+06	1.428E+02	9.139E+00	2.550E+03	1.713E-01
2047	3.700E+03	2.021E+06	1.358E+02	8.694E+00	2.425E+03	1.630E-01
2048	3.519E+03	1.923E+06	1.292E+02	8.270E+00	2.307E+03	1.550E-01
2049	3.348E+03	1.829E+06	1.229E+02	7.866E+00	2.195E+03	1.475E-01
2050	3.184E+03	1.740E+06	1.169E+02	7.483E+00	2.088E+03	1.403E-01
2051	3.029E+03	1.655E+06	1.112E+02	7.118E+00	1.986E+03	1.334E-01
2052	2.881E+03	1.574E+06	1.058E+02	6.771E+00	1.889E+03	1.269E-01
2053	2.741E+03	1.497E+06	1.006E+02	6.440E+00	1.797E+03	1.207E-01
2054	2.607E+03	1.424E+06	9.570E+01	6.126E+00	1.709E+03	1.148E-01
2055	2.480E+03	1.355E+06	9.103E+01	5.827E+00	1.626E+03	1.092E-01
2056	2.359E+03	1.289E+06	8.659E+01	5.543E+00	1.546E+03	1.039E-01
2057	2.244E+03	1.226E+06	8.237E+01	5.273E+00	1.471E+03	9.884E-02
2058	2.135E+03	1.166E+06	7.835E+01	5.016E+00	1.399E+03	9.402E-02
2059	2.030E+03	1.109E+06	7.453E+01	4.771E+00	1.331E+03	8.943E-02
2060	1.931E+03	1.055E+06	7.089E+01	4.538E+00	1.266E+03	8.507E-02
2061	1.837E+03	1.004E+06	6.744E+01	4.317E+00	1.204E+03	8.092E-02
2062	1.748E+03	9.547E+05	6.415E+01	4.107E+00	1.146E+03	7.698E-02
2063	1.662E+03	9.082E+05	6.102E+01	3.906E+00	1.090E+03	7.322E-02
2064	1.581E+03	8.639E+05	5.804E+01	3.716E+00	1.037E+03	6.965E-02
2065	1.504E+03	8.217E+05	5.521E+01	3.535E+00	9.861E+02	6.625E-02
2066	1.431E+03	7.817E+05	5.252E+01	3.362E+00	9.380E+02	6.302E-02
2067	1.361E+03	7.435E+05	4.996E+01	3.198E+00	8.922E+02	5.995E-02
2068	1.295E+03	7.073E+05	4.752E+01	3.042E+00	8.487E+02	5.703E-02
2069	1.232E+03	6.728E+05	4.520E+01	2.894E+00	8.073E+02	5.424E-02
2070	1.171E+03	6.400E+05	4.300E+01	2.753E+00	7.680E+02	5.160E-02
2071	1.114E+03	6.088E+05	4.090E+01	2.618E+00	7.305E+02	4.908E-02
2072	1.060E+03	5.791E+05	3.891E+01	2.491E+00	6.949E+02	4.669E-02
2073	1.008E+03	5.508E+05	3.701E+01	2.369E+00	6.610E+02	4.441E-02
2074	9.591E+02	5.240E+05	3.520E+01	2.254E+00	6.287E+02	4.225E-02
2075	9.123E+02	4.984E+05	3.349E+01	2.144E+00	5.981E+02	4.019E-02
2076	8.678E+02	4.741E+05	3.185E+01	2.039E+00	5.689E+02	3.823E-02
2077	8.255E+02	4.510E+05	3.030E+01	1.940E+00	5.412E+02	3.636E-02
2078	7.852E+02	4.290E+05	2.882E+01	1.845E+00	5.148E+02	3.459E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	7.470E+02	4.081E+05	2.742E+01	1.755E+00	4.897E+02	3.290E-02
2080	7.105E+02	3.882E+05	2.608E+01	1.670E+00	4.658E+02	3.130E-02
2081	6.759E+02	3.692E+05	2.481E+01	1.588E+00	4.431E+02	2.977E-02
2082	6.429E+02	3.512E+05	2.360E+01	1.511E+00	4.215E+02	2.832E-02
2083	6.116E+02	3.341E+05	2.245E+01	1.437E+00	4.009E+02	2.694E-02
2084	5.817E+02	3.178E+05	2.135E+01	1.367E+00	3.814E+02	2.562E-02
2085	5.534E+02	3.023E+05	2.031E+01	1.300E+00	3.628E+02	2.437E-02
2086	5.264E+02	2.876E+05	1.932E+01	1.237E+00	3.451E+02	2.318E-02
2087	5.007E+02	2.735E+05	1.838E+01	1.177E+00	3.282E+02	2.205E-02
2088	4.763E+02	2.602E+05	1.748E+01	1.119E+00	3.122E+02	2.098E-02
2089	4.530E+02	2.475E+05	1.663E+01	1.065E+00	2.970E+02	1.996E-02
2090	4.310E+02	2.354E+05	1.582E+01	1.013E+00	2.825E+02	1.898E-02
2091	4.099E+02	2.239E+05	1.505E+01	9.633E-01	2.687E+02	1.806E-02
2092	3.899E+02	2.130E+05	1.431E+01	9.163E-01	2.556E+02	1.718E-02
2093	3.709E+02	2.026E+05	1.362E+01	8.716E-01	2.432E+02	1.634E-02
2094	3.528E+02	1.928E+05	1.295E+01	8.291E-01	2.313E+02	1.554E-02
2095	3.356E+02	1.834E+05	1.232E+01	7.887E-01	2.200E+02	1.478E-02
2096	3.193E+02	1.744E+05	1.172E+01	7.502E-01	2.093E+02	1.406E-02
2097	3.037E+02	1.659E+05	1.115E+01	7.136E-01	1.991E+02	1.338E-02
2098	2.889E+02	1.578E+05	1.060E+01	6.788E-01	1.894E+02	1.272E-02
2099	2.748E+02	1.501E+05	1.009E+01	6.457E-01	1.801E+02	1.210E-02
2100	2.614E+02	1.428E+05	9.594E+00	6.142E-01	1.714E+02	1.151E-02
2101	2.486E+02	1.358E+05	9.126E+00	5.843E-01	1.630E+02	1.095E-02
2102	2.365E+02	1.292E+05	8.681E+00	5.558E-01	1.550E+02	1.042E-02
2103	2.250E+02	1.229E+05	8.258E+00	5.287E-01	1.475E+02	9.910E-03
2104	2.140E+02	1.169E+05	7.855E+00	5.029E-01	1.403E+02	9.426E-03
2105	2.036E+02	1.112E+05	7.472E+00	4.784E-01	1.335E+02	8.967E-03
2106	1.936E+02	1.058E+05	7.108E+00	4.550E-01	1.269E+02	8.529E-03
2107	1.842E+02	1.006E+05	6.761E+00	4.328E-01	1.208E+02	8.113E-03
2108	1.752E+02	9.572E+04	6.431E+00	4.117E-01	1.149E+02	7.718E-03
2109	1.667E+02	9.105E+04	6.118E+00	3.916E-01	1.093E+02	7.341E-03
2110	1.585E+02	8.661E+04	5.819E+00	3.725E-01	1.039E+02	6.983E-03
2111	1.508E+02	8.239E+04	5.535E+00	3.544E-01	9.886E+01	6.643E-03
2112	1.435E+02	7.837E+04	5.266E+00	3.371E-01	9.404E+01	6.319E-03
2113	1.365E+02	7.455E+04	5.009E+00	3.206E-01	8.945E+01	6.010E-03
2114	1.298E+02	7.091E+04	4.764E+00	3.050E-01	8.509E+01	5.717E-03
2115	1.235E+02	6.745E+04	4.532E+00	2.901E-01	8.094E+01	5.438E-03
2116	1.174E+02	6.416E+04	4.311E+00	2.760E-01	7.699E+01	5.173E-03
2117	1.117E+02	6.103E+04	4.101E+00	2.625E-01	7.324E+01	4.921E-03
2118	1.063E+02	5.806E+04	3.901E+00	2.497E-01	6.967E+01	4.681E-03



Summary Report

Landfill Name or Identifier: C&D CB Landfill Model

Date: Monday, May 10, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate ($year^{-1}$)

L_o = potential methane generation capacity (m^3/Mg)

M_i = mass of waste accepted in the ith year (Mg)

t_{ij} = age of the jth section of waste mass M_i accepted in the ith year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1978**	
Landfill Closure Year (with 80-year limit)	**2045**	
Actual Closure Year (without limit)	***2045***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.030**	*year $^{-1}$*
Potential Methane Generation Capacity, L_o	**20**	*m^3/Mg*
NMOC Concentration	**600**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	42,445	46,690	0	0
1998	45,738	50,312	42,445	46,690
1999	49,698	54,668	88,184	97,002
2000	47,705	52,476	137,882	151,670
2001	46,303	50,933	185,587	204,146
2002	45,715	50,287	231,890	255,079
2003	34,835	38,318	277,605	305,366
2004	15,247	16,772	312,440	343,684
2005	23,248	25,573	327,687	360,456
2006	29,273	32,200	350,936	386,029
2007	18,242	20,067	380,208	418,229
2008	10,279	11,307	398,451	438,296
2009	8,485	9,334	408,730	449,603
2010	6,258	6,884	417,216	458,937
2011	7,355	8,091	423,474	465,821
2012	6,330	6,963	430,829	473,912
2013	9,488	10,437	437,159	480,875
2014	21,376	23,514	446,647	491,312
2015	18,200	20,020	468,023	514,826
2016	12,848	14,133	486,223	534,845
2017	18,880	20,768	499,071	548,978

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2018	19,300	21,230	517,952	569,747
2019	26,133	28,747	537,251	590,977
2020	24,747	27,222	563,385	619,723
2021	21,818	24,000	588,132	646,945
2022	21,818	24,000	609,950	670,945
2023	21,818	24,000	631,769	694,945
2024	21,818	24,000	653,587	718,945
2025	21,818	24,000	675,405	742,945
2026	21,818	24,000	697,223	766,945
2027	21,818	24,000	719,041	790,945
2028	21,818	24,000	740,859	814,945
2029	21,818	24,000	762,678	838,945
2030	21,818	24,000	784,496	862,945
2031	21,818	24,000	806,314	886,945
2032	21,818	24,000	828,132	910,945
2033	21,818	24,000	849,950	934,945
2034	21,818	24,000	871,769	958,945
2035	21,818	24,000	893,587	982,945
2036	21,818	24,000	915,405	1,006,945
2037	21,818	24,000	937,223	1,030,945
2038	21,818	24,000	959,041	1,054,945
2039	21,818	24,000	980,859	1,078,945
2040	21,818	24,000	1,002,678	1,102,945
2041	21,818	24,000	1,024,496	1,126,945
2042	21,818	24,000	1,046,314	1,150,945
2043	21,818	24,000	1,068,132	1,174,945
2044	21,818	24,000	1,089,950	1,198,945
2045	21,818	24,000	1,111,769	1,222,945
2046	0	0	1,133,587	1,246,945
2047	0	0	1,133,587	1,246,945
2048	0	0	1,133,587	1,246,945
2049	0	0	1,133,587	1,246,945
2050	0	0	1,133,587	1,246,945
2051	0	0	1,133,587	1,246,945
2052	0	0	1,133,587	1,246,945
2053	0	0	1,133,587	1,246,945
2054	0	0	1,133,587	1,246,945
2055	0	0	1,133,587	1,246,945
2056	0	0	1,133,587	1,246,945
2057	0	0	1,133,587	1,246,945

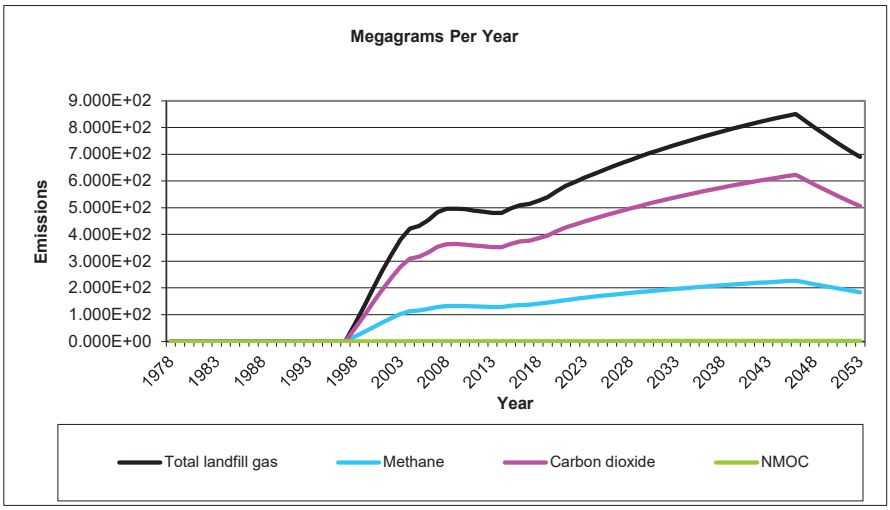
Pollutant Parameters

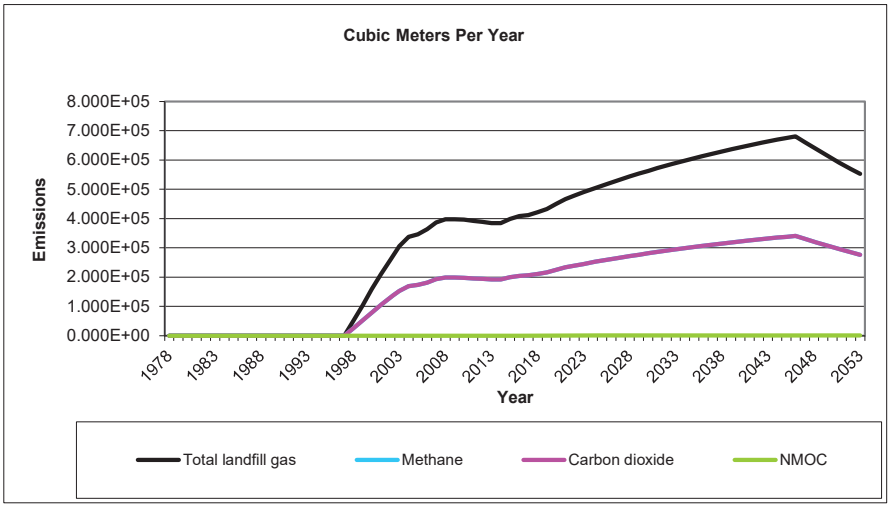
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

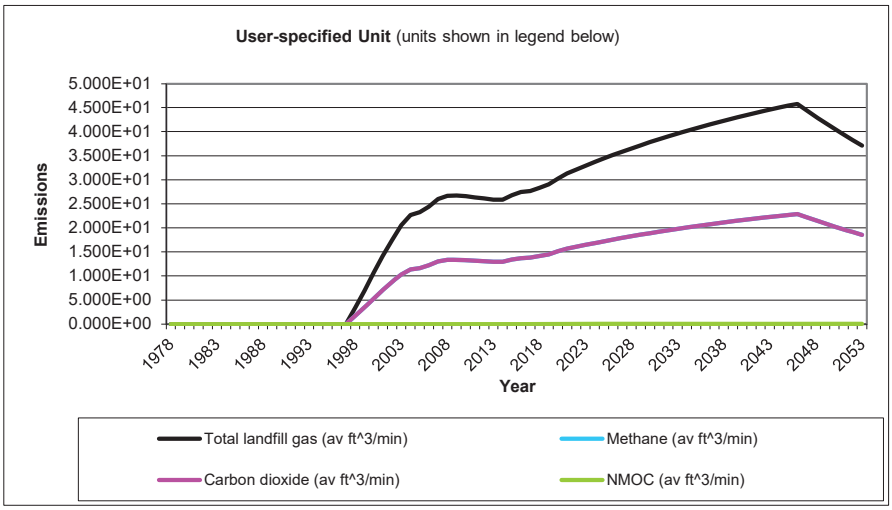
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
9.000E+02
8.000E+02
7.000E+02
6.000E+02
5.000E+02
4.000E+02
3.000E+02
2.000E+02
1.000E+02
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
8.000E+05
7.000E+05
6.000E+05
5.000E+05
4.000E+05
3.000E+05
2.000E+05
1.000E+05
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
5.000E+01
4.500E+01
4.000E+01
3.500E+01
3.000E+01
2.500E+01
2.000E+01
1.500E+01
1.000E+01
5.000E+00
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	6.276E+01	5.025E+04	3.377E+00	1.676E+01	2.513E+04	1.688E+00
1999	1.285E+02	1.029E+05	6.915E+00	3.433E+01	5.146E+04	3.458E+00
2000	1.982E+02	1.587E+05	1.066E+01	5.294E+01	7.936E+04	5.332E+00
2001	2.629E+02	2.105E+05	1.414E+01	7.022E+01	1.053E+05	7.072E+00
2002	3.236E+02	2.591E+05	1.741E+01	8.643E+01	1.296E+05	8.705E+00
2003	3.816E+02	3.056E+05	2.053E+01	1.019E+02	1.528E+05	1.027E+01
2004	4.218E+02	3.378E+05	2.270E+01	1.127E+02	1.689E+05	1.135E+01
2005	4.319E+02	3.459E+05	2.324E+01	1.154E+02	1.729E+05	1.162E+01
2006	4.535E+02	3.632E+05	2.440E+01	1.211E+02	1.816E+05	1.220E+01
2007	4.834E+02	3.871E+05	2.601E+01	1.291E+02	1.935E+05	1.300E+01
2008	4.961E+02	3.972E+05	2.669E+01	1.325E+02	1.986E+05	1.335E+01
2009	4.966E+02	3.977E+05	2.672E+01	1.327E+02	1.988E+05	1.336E+01
2010	4.945E+02	3.960E+05	2.660E+01	1.321E+02	1.980E+05	1.330E+01
2011	4.891E+02	3.917E+05	2.632E+01	1.307E+02	1.958E+05	1.316E+01
2012	4.855E+02	3.888E+05	2.612E+01	1.297E+02	1.944E+05	1.306E+01
2013	4.806E+02	3.848E+05	2.586E+01	1.284E+02	1.924E+05	1.293E+01
2014	4.804E+02	3.847E+05	2.585E+01	1.283E+02	1.923E+05	1.292E+01
2015	4.978E+02	3.986E+05	2.678E+01	1.330E+02	1.993E+05	1.339E+01
2016	5.100E+02	4.084E+05	2.744E+01	1.362E+02	2.042E+05	1.372E+01
2017	5.139E+02	4.115E+05	2.765E+01	1.373E+02	2.058E+05	1.382E+01
2018	5.266E+02	4.217E+05	2.833E+01	1.407E+02	2.109E+05	1.417E+01
2019	5.396E+02	4.321E+05	2.903E+01	1.441E+02	2.160E+05	1.452E+01
2020	5.623E+02	4.503E+05	3.025E+01	1.502E+02	2.251E+05	1.513E+01
2021	5.823E+02	4.663E+05	3.133E+01	1.555E+02	2.331E+05	1.566E+01
2022	5.973E+02	4.783E+05	3.214E+01	1.596E+02	2.392E+05	1.607E+01
2023	6.119E+02	4.900E+05	3.292E+01	1.635E+02	2.450E+05	1.646E+01
2024	6.261E+02	5.014E+05	3.369E+01	1.672E+02	2.507E+05	1.684E+01
2025	6.399E+02	5.124E+05	3.443E+01	1.709E+02	2.562E+05	1.721E+01
2026	6.532E+02	5.231E+05	3.514E+01	1.745E+02	2.615E+05	1.757E+01
2027	6.662E+02	5.334E+05	3.584E+01	1.779E+02	2.667E+05	1.792E+01

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2028	6.787E+02	5.435E+05	3.652E+01	1.813E+02	2.717E+05	1.826E+01
2029	6.909E+02	5.533E+05	3.717E+01	1.846E+02	2.766E+05	1.859E+01
2030	7.028E+02	5.627E+05	3.781E+01	1.877E+02	2.814E+05	1.891E+01
2031	7.143E+02	5.719E+05	3.843E+01	1.908E+02	2.860E+05	1.921E+01
2032	7.254E+02	5.809E+05	3.903E+01	1.938E+02	2.904E+05	1.951E+01
2033	7.362E+02	5.895E+05	3.961E+01	1.967E+02	2.948E+05	1.981E+01
2034	7.467E+02	5.979E+05	4.018E+01	1.995E+02	2.990E+05	2.009E+01
2035	7.569E+02	6.061E+05	4.072E+01	2.022E+02	3.031E+05	2.036E+01
2036	7.668E+02	6.140E+05	4.126E+01	2.048E+02	3.070E+05	2.063E+01
2037	7.764E+02	6.217E+05	4.177E+01	2.074E+02	3.109E+05	2.089E+01
2038	7.857E+02	6.292E+05	4.227E+01	2.099E+02	3.146E+05	2.114E+01
2039	7.948E+02	6.364E+05	4.276E+01	2.123E+02	3.182E+05	2.138E+01
2040	8.035E+02	6.434E+05	4.323E+01	2.146E+02	3.217E+05	2.162E+01
2041	8.120E+02	6.502E+05	4.369E+01	2.169E+02	3.251E+05	2.184E+01
2042	8.203E+02	6.569E+05	4.413E+01	2.191E+02	3.284E+05	2.207E+01
2043	8.283E+02	6.633E+05	4.457E+01	2.213E+02	3.316E+05	2.228E+01
2044	8.361E+02	6.695E+05	4.498E+01	2.233E+02	3.348E+05	2.249E+01
2045	8.436E+02	6.755E+05	4.539E+01	2.253E+02	3.378E+05	2.270E+01
2046	8.510E+02	6.814E+05	4.578E+01	2.273E+02	3.407E+05	2.289E+01
2047	8.258E+02	6.613E+05	4.443E+01	2.206E+02	3.306E+05	2.222E+01
2048	8.014E+02	6.417E+05	4.312E+01	2.141E+02	3.209E+05	2.156E+01
2049	7.777E+02	6.228E+05	4.184E+01	2.077E+02	3.114E+05	2.092E+01
2050	7.547E+02	6.044E+05	4.061E+01	2.016E+02	3.022E+05	2.030E+01
2051	7.324E+02	5.865E+05	3.941E+01	1.956E+02	2.933E+05	1.970E+01
2052	7.108E+02	5.692E+05	3.824E+01	1.899E+02	2.846E+05	1.912E+01
2053	6.898E+02	5.523E+05	3.711E+01	1.842E+02	2.762E+05	1.856E+01
2054	6.694E+02	5.360E+05	3.602E+01	1.788E+02	2.680E+05	1.801E+01
2055	6.496E+02	5.202E+05	3.495E+01	1.735E+02	2.601E+05	1.748E+01
2056	6.304E+02	5.048E+05	3.392E+01	1.684E+02	2.524E+05	1.696E+01
2057	6.118E+02	4.899E+05	3.292E+01	1.634E+02	2.449E+05	1.646E+01
2058	5.937E+02	4.754E+05	3.194E+01	1.586E+02	2.377E+05	1.597E+01
2059	5.762E+02	4.614E+05	3.100E+01	1.539E+02	2.307E+05	1.550E+01
2060	5.591E+02	4.477E+05	3.008E+01	1.493E+02	2.239E+05	1.504E+01
2061	5.426E+02	4.345E+05	2.919E+01	1.449E+02	2.172E+05	1.460E+01
2062	5.266E+02	4.216E+05	2.833E+01	1.407E+02	2.108E+05	1.417E+01
2063	5.110E+02	4.092E+05	2.749E+01	1.365E+02	2.046E+05	1.375E+01
2064	4.959E+02	3.971E+05	2.668E+01	1.325E+02	1.985E+05	1.334E+01
2065	4.812E+02	3.854E+05	2.589E+01	1.285E+02	1.927E+05	1.295E+01
2066	4.670E+02	3.740E+05	2.513E+01	1.247E+02	1.870E+05	1.256E+01
2067	4.532E+02	3.629E+05	2.438E+01	1.211E+02	1.815E+05	1.219E+01
2068	4.398E+02	3.522E+05	2.366E+01	1.175E+02	1.761E+05	1.183E+01
2069	4.268E+02	3.418E+05	2.296E+01	1.140E+02	1.709E+05	1.148E+01
2070	4.142E+02	3.317E+05	2.229E+01	1.106E+02	1.658E+05	1.114E+01
2071	4.020E+02	3.219E+05	2.163E+01	1.074E+02	1.609E+05	1.081E+01
2072	3.901E+02	3.124E+05	2.099E+01	1.042E+02	1.562E+05	1.049E+01
2073	3.786E+02	3.031E+05	2.037E+01	1.011E+02	1.516E+05	1.018E+01
2074	3.674E+02	2.942E+05	1.977E+01	9.813E+01	1.471E+05	9.883E+00
2075	3.565E+02	2.855E+05	1.918E+01	9.523E+01	1.427E+05	9.591E+00
2076	3.460E+02	2.770E+05	1.861E+01	9.241E+01	1.385E+05	9.307E+00
2077	3.358E+02	2.689E+05	1.806E+01	8.968E+01	1.344E+05	9.032E+00
2078	3.258E+02	2.609E+05	1.753E+01	8.703E+01	1.305E+05	8.765E+00

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	3.162E+02	2.532E+05	1.701E+01	8.446E+01	1.266E+05	8.506E+00
2080	3.069E+02	2.457E+05	1.651E+01	8.196E+01	1.229E+05	8.255E+00
2081	2.978E+02	2.385E+05	1.602E+01	7.954E+01	1.192E+05	8.011E+00
2082	2.890E+02	2.314E+05	1.555E+01	7.719E+01	1.157E+05	7.774E+00
2083	2.804E+02	2.246E+05	1.509E+01	7.491E+01	1.123E+05	7.544E+00
2084	2.722E+02	2.179E+05	1.464E+01	7.270E+01	1.090E+05	7.321E+00
2085	2.641E+02	2.115E+05	1.421E+01	7.055E+01	1.057E+05	7.105E+00
2086	2.563E+02	2.052E+05	1.379E+01	6.846E+01	1.026E+05	6.895E+00
2087	2.487E+02	1.992E+05	1.338E+01	6.644E+01	9.959E+04	6.691E+00
2088	2.414E+02	1.933E+05	1.299E+01	6.448E+01	9.664E+04	6.493E+00
2089	2.342E+02	1.876E+05	1.260E+01	6.257E+01	9.379E+04	6.302E+00
2090	2.273E+02	1.820E+05	1.223E+01	6.072E+01	9.102E+04	6.115E+00
2091	2.206E+02	1.767E+05	1.187E+01	5.893E+01	8.833E+04	5.935E+00
2092	2.141E+02	1.714E+05	1.152E+01	5.718E+01	8.571E+04	5.759E+00
2093	2.078E+02	1.664E+05	1.118E+01	5.549E+01	8.318E+04	5.589E+00
2094	2.016E+02	1.614E+05	1.085E+01	5.385E+01	8.072E+04	5.424E+00
2095	1.957E+02	1.567E+05	1.053E+01	5.226E+01	7.834E+04	5.263E+00
2096	1.899E+02	1.520E+05	1.022E+01	5.072E+01	7.602E+04	5.108E+00
2097	1.843E+02	1.476E+05	9.914E+00	4.922E+01	7.378E+04	4.957E+00
2098	1.788E+02	1.432E+05	9.621E+00	4.776E+01	7.160E+04	4.810E+00
2099	1.735E+02	1.390E+05	9.337E+00	4.635E+01	6.948E+04	4.668E+00
2100	1.684E+02	1.349E+05	9.061E+00	4.498E+01	6.743E+04	4.530E+00
2101	1.634E+02	1.309E+05	8.793E+00	4.365E+01	6.543E+04	4.396E+00
2102	1.586E+02	1.270E+05	8.533E+00	4.236E+01	6.350E+04	4.266E+00
2103	1.539E+02	1.232E+05	8.281E+00	4.111E+01	6.162E+04	4.140E+00
2104	1.494E+02	1.196E+05	8.036E+00	3.990E+01	5.980E+04	4.018E+00
2105	1.449E+02	1.161E+05	7.799E+00	3.872E+01	5.803E+04	3.899E+00
2106	1.407E+02	1.126E+05	7.568E+00	3.757E+01	5.632E+04	3.784E+00
2107	1.365E+02	1.093E+05	7.344E+00	3.646E+01	5.465E+04	3.672E+00
2108	1.325E+02	1.061E+05	7.127E+00	3.538E+01	5.304E+04	3.564E+00
2109	1.286E+02	1.029E+05	6.917E+00	3.434E+01	5.147E+04	3.458E+00
2110	1.248E+02	9.990E+04	6.712E+00	3.332E+01	4.995E+04	3.356E+00
2111	1.211E+02	9.695E+04	6.514E+00	3.234E+01	4.847E+04	3.257E+00
2112	1.175E+02	9.408E+04	6.321E+00	3.138E+01	4.704E+04	3.161E+00
2113	1.140E+02	9.130E+04	6.135E+00	3.046E+01	4.565E+04	3.067E+00
2114	1.107E+02	8.860E+04	5.953E+00	2.956E+01	4.430E+04	2.977E+00
2115	1.074E+02	8.598E+04	5.777E+00	2.868E+01	4.299E+04	2.889E+00
2116	1.042E+02	8.344E+04	5.607E+00	2.783E+01	4.172E+04	2.803E+00
2117	1.011E+02	8.098E+04	5.441E+00	2.701E+01	4.049E+04	2.720E+00
2118	9.814E+01	7.858E+04	5.280E+00	2.621E+01	3.929E+04	2.640E+00

Results (Continued)

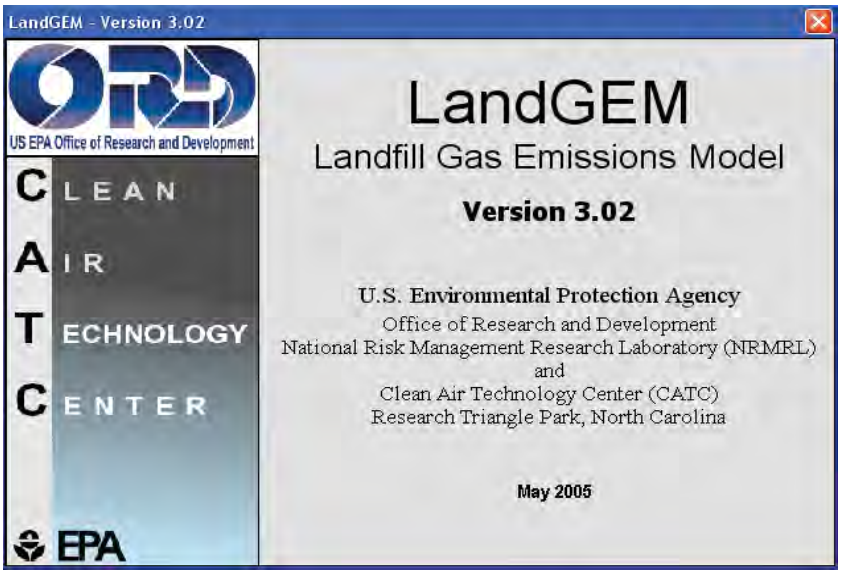
Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	4.599E+01	2.513E+04	1.688E+00	1.081E-01	3.015E+01	2.026E-03
1999	9.420E+01	5.146E+04	3.458E+00	2.213E-01	6.175E+01	4.149E-03
2000	1.453E+02	7.936E+04	5.332E+00	3.414E-01	9.523E+01	6.399E-03
2001	1.927E+02	1.053E+05	7.072E+00	4.527E-01	1.263E+02	8.486E-03
2002	2.371E+02	1.296E+05	8.705E+00	5.573E-01	1.555E+02	1.045E-02
2003	2.797E+02	1.528E+05	1.027E+01	6.572E-01	1.833E+02	1.232E-02
2004	3.092E+02	1.689E+05	1.135E+01	7.265E-01	2.027E+02	1.362E-02
2005	3.165E+02	1.729E+05	1.162E+01	7.438E-01	2.075E+02	1.394E-02
2006	3.324E+02	1.816E+05	1.220E+01	7.810E-01	2.179E+02	1.464E-02
2007	3.543E+02	1.935E+05	1.300E+01	8.325E-01	2.322E+02	1.560E-02
2008	3.636E+02	1.986E+05	1.335E+01	8.543E-01	2.383E+02	1.601E-02
2009	3.640E+02	1.988E+05	1.336E+01	8.553E-01	2.386E+02	1.603E-02
2010	3.624E+02	1.980E+05	1.330E+01	8.516E-01	2.376E+02	1.596E-02
2011	3.585E+02	1.958E+05	1.316E+01	8.424E-01	2.350E+02	1.579E-02
2012	3.559E+02	1.944E+05	1.306E+01	8.362E-01	2.333E+02	1.567E-02
2013	3.522E+02	1.924E+05	1.293E+01	8.276E-01	2.309E+02	1.551E-02
2014	3.521E+02	1.923E+05	1.292E+01	8.273E-01	2.308E+02	1.551E-02
2015	3.648E+02	1.993E+05	1.339E+01	8.573E-01	2.392E+02	1.607E-02
2016	3.738E+02	2.042E+05	1.372E+01	8.783E-01	2.450E+02	1.646E-02
2017	3.766E+02	2.058E+05	1.382E+01	8.850E-01	2.469E+02	1.659E-02
2018	3.860E+02	2.109E+05	1.417E+01	9.070E-01	2.530E+02	1.700E-02
2019	3.955E+02	2.160E+05	1.452E+01	9.293E-01	2.593E+02	1.742E-02
2020	4.121E+02	2.251E+05	1.513E+01	9.684E-01	2.702E+02	1.815E-02
2021	4.267E+02	2.331E+05	1.566E+01	1.003E+00	2.798E+02	1.880E-02
2022	4.378E+02	2.392E+05	1.607E+01	1.029E+00	2.870E+02	1.928E-02
2023	4.485E+02	2.450E+05	1.646E+01	1.054E+00	2.940E+02	1.975E-02
2024	4.589E+02	2.507E+05	1.684E+01	1.078E+00	3.008E+02	2.021E-02
2025	4.689E+02	2.562E+05	1.721E+01	1.102E+00	3.074E+02	2.066E-02
2026	4.787E+02	2.615E+05	1.757E+01	1.125E+00	3.138E+02	2.109E-02
2027	4.882E+02	2.667E+05	1.792E+01	1.147E+00	3.201E+02	2.150E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2028	4.974E+02	2.717E+05	1.826E+01	1.169E+00	3.261E+02	2.191E-02
2029	5.064E+02	2.766E+05	1.859E+01	1.190E+00	3.320E+02	2.230E-02
2030	5.151E+02	2.814E+05	1.891E+01	1.210E+00	3.376E+02	2.269E-02
2031	5.235E+02	2.860E+05	1.921E+01	1.230E+00	3.432E+02	2.306E-02
2032	5.316E+02	2.904E+05	1.951E+01	1.249E+00	3.485E+02	2.342E-02
2033	5.396E+02	2.948E+05	1.981E+01	1.268E+00	3.537E+02	2.377E-02
2034	5.473E+02	2.990E+05	2.009E+01	1.286E+00	3.588E+02	2.411E-02
2035	5.547E+02	3.031E+05	2.036E+01	1.304E+00	3.637E+02	2.443E-02
2036	5.620E+02	3.070E+05	2.063E+01	1.321E+00	3.684E+02	2.475E-02
2037	5.690E+02	3.109E+05	2.089E+01	1.337E+00	3.730E+02	2.506E-02
2038	5.758E+02	3.146E+05	2.114E+01	1.353E+00	3.775E+02	2.536E-02
2039	5.825E+02	3.182E+05	2.138E+01	1.369E+00	3.818E+02	2.566E-02
2040	5.889E+02	3.217E+05	2.162E+01	1.384E+00	3.861E+02	2.594E-02
2041	5.951E+02	3.251E+05	2.184E+01	1.398E+00	3.901E+02	2.621E-02
2042	6.012E+02	3.284E+05	2.207E+01	1.413E+00	3.941E+02	2.648E-02
2043	6.071E+02	3.316E+05	2.228E+01	1.426E+00	3.980E+02	2.674E-02
2044	6.128E+02	3.348E+05	2.249E+01	1.440E+00	4.017E+02	2.699E-02
2045	6.183E+02	3.378E+05	2.270E+01	1.453E+00	4.053E+02	2.723E-02
2046	6.237E+02	3.407E+05	2.289E+01	1.466E+00	4.088E+02	2.747E-02
2047	6.052E+02	3.306E+05	2.222E+01	1.422E+00	3.968E+02	2.666E-02
2048	5.873E+02	3.209E+05	2.156E+01	1.380E+00	3.850E+02	2.587E-02
2049	5.700E+02	3.114E+05	2.092E+01	1.339E+00	3.737E+02	2.511E-02
2050	5.531E+02	3.022E+05	2.030E+01	1.300E+00	3.626E+02	2.436E-02
2051	5.368E+02	2.933E+05	1.970E+01	1.261E+00	3.519E+02	2.364E-02
2052	5.209E+02	2.846E+05	1.912E+01	1.224E+00	3.415E+02	2.295E-02
2053	5.055E+02	2.762E+05	1.856E+01	1.188E+00	3.314E+02	2.227E-02
2054	4.906E+02	2.680E+05	1.801E+01	1.153E+00	3.216E+02	2.161E-02
2055	4.761E+02	2.601E+05	1.748E+01	1.119E+00	3.121E+02	2.097E-02
2056	4.620E+02	2.524E+05	1.696E+01	1.086E+00	3.029E+02	2.035E-02
2057	4.484E+02	2.449E+05	1.646E+01	1.054E+00	2.939E+02	1.975E-02
2058	4.351E+02	2.377E+05	1.597E+01	1.022E+00	2.852E+02	1.917E-02
2059	4.223E+02	2.307E+05	1.550E+01	9.922E-01	2.768E+02	1.860E-02
2060	4.098E+02	2.239E+05	1.504E+01	9.629E-01	2.686E+02	1.805E-02
2061	3.977E+02	2.172E+05	1.460E+01	9.344E-01	2.607E+02	1.752E-02
2062	3.859E+02	2.108E+05	1.417E+01	9.068E-01	2.530E+02	1.700E-02
2063	3.745E+02	2.046E+05	1.375E+01	8.800E-01	2.455E+02	1.650E-02
2064	3.634E+02	1.985E+05	1.334E+01	8.540E-01	2.383E+02	1.601E-02
2065	3.527E+02	1.927E+05	1.295E+01	8.288E-01	2.312E+02	1.554E-02
2066	3.423E+02	1.870E+05	1.256E+01	8.043E-01	2.244E+02	1.508E-02
2067	3.322E+02	1.815E+05	1.219E+01	7.805E-01	2.177E+02	1.463E-02
2068	3.223E+02	1.761E+05	1.183E+01	7.574E-01	2.113E+02	1.420E-02
2069	3.128E+02	1.709E+05	1.148E+01	7.351E-01	2.051E+02	1.378E-02
2070	3.036E+02	1.658E+05	1.114E+01	7.133E-01	1.990E+02	1.337E-02
2071	2.946E+02	1.609E+05	1.081E+01	6.923E-01	1.931E+02	1.298E-02
2072	2.859E+02	1.562E+05	1.049E+01	6.718E-01	1.874E+02	1.259E-02
2073	2.774E+02	1.516E+05	1.018E+01	6.519E-01	1.819E+02	1.222E-02
2074	2.692E+02	1.471E+05	9.883E+00	6.327E-01	1.765E+02	1.186E-02
2075	2.613E+02	1.427E+05	9.591E+00	6.140E-01	1.713E+02	1.151E-02
2076	2.536E+02	1.385E+05	9.307E+00	5.958E-01	1.662E+02	1.117E-02
2077	2.461E+02	1.344E+05	9.032E+00	5.782E-01	1.613E+02	1.084E-02
2078	2.388E+02	1.305E+05	8.765E+00	5.611E-01	1.565E+02	1.052E-02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	2.317E+02	1.266E+05	8.506E+00	5.445E-01	1.519E+02	1.021E-02
2080	2.249E+02	1.229E+05	8.255E+00	5.285E-01	1.474E+02	9.906E-03
2081	2.182E+02	1.192E+05	8.011E+00	5.128E-01	1.431E+02	9.613E-03
2082	2.118E+02	1.157E+05	7.774E+00	4.977E-01	1.388E+02	9.329E-03
2083	2.055E+02	1.123E+05	7.544E+00	4.830E-01	1.347E+02	9.053E-03
2084	1.995E+02	1.090E+05	7.321E+00	4.687E-01	1.308E+02	8.786E-03
2085	1.936E+02	1.057E+05	7.105E+00	4.548E-01	1.269E+02	8.526E-03
2086	1.878E+02	1.026E+05	6.895E+00	4.414E-01	1.231E+02	8.274E-03
2087	1.823E+02	9.959E+04	6.691E+00	4.284E-01	1.195E+02	8.029E-03
2088	1.769E+02	9.664E+04	6.493E+00	4.157E-01	1.160E+02	7.792E-03
2089	1.717E+02	9.379E+04	6.302E+00	4.034E-01	1.125E+02	7.562E-03
2090	1.666E+02	9.102E+04	6.115E+00	3.915E-01	1.092E+02	7.338E-03
2091	1.617E+02	8.833E+04	5.935E+00	3.799E-01	1.060E+02	7.121E-03
2092	1.569E+02	8.571E+04	5.759E+00	3.687E-01	1.029E+02	6.911E-03
2093	1.523E+02	8.318E+04	5.589E+00	3.578E-01	9.982E+01	6.707E-03
2094	1.478E+02	8.072E+04	5.424E+00	3.472E-01	9.687E+01	6.509E-03
2095	1.434E+02	7.834E+04	5.263E+00	3.370E-01	9.400E+01	6.316E-03
2096	1.392E+02	7.602E+04	5.108E+00	3.270E-01	9.123E+01	6.130E-03
2097	1.350E+02	7.378E+04	4.957E+00	3.173E-01	8.853E+01	5.948E-03
2098	1.311E+02	7.160E+04	4.810E+00	3.080E-01	8.591E+01	5.773E-03
2099	1.272E+02	6.948E+04	4.668E+00	2.989E-01	8.337E+01	5.602E-03
2100	1.234E+02	6.743E+04	4.530E+00	2.900E-01	8.091E+01	5.436E-03
2101	1.198E+02	6.543E+04	4.396E+00	2.815E-01	7.852E+01	5.276E-03
2102	1.162E+02	6.350E+04	4.266E+00	2.731E-01	7.620E+01	5.120E-03
2103	1.128E+02	6.162E+04	4.140E+00	2.651E-01	7.395E+01	4.968E-03
2104	1.095E+02	5.980E+04	4.018E+00	2.572E-01	7.176E+01	4.822E-03
2105	1.062E+02	5.803E+04	3.899E+00	2.496E-01	6.964E+01	4.679E-03
2106	1.031E+02	5.632E+04	3.784E+00	2.422E-01	6.758E+01	4.541E-03
2107	1.000E+02	5.465E+04	3.672E+00	2.351E-01	6.559E+01	4.407E-03
2108	9.709E+01	5.304E+04	3.564E+00	2.281E-01	6.365E+01	4.276E-03
2109	9.422E+01	5.147E+04	3.458E+00	2.214E-01	6.177E+01	4.150E-03
2110	9.143E+01	4.995E+04	3.356E+00	2.149E-01	5.994E+01	4.027E-03
2111	8.873E+01	4.847E+04	3.257E+00	2.085E-01	5.817E+01	3.908E-03
2112	8.611E+01	4.704E+04	3.161E+00	2.023E-01	5.645E+01	3.793E-03
2113	8.356E+01	4.565E+04	3.067E+00	1.964E-01	5.478E+01	3.681E-03
2114	8.109E+01	4.430E+04	2.977E+00	1.906E-01	5.316E+01	3.572E-03
2115	7.870E+01	4.299E+04	2.889E+00	1.849E-01	5.159E+01	3.466E-03
2116	7.637E+01	4.172E+04	2.803E+00	1.795E-01	5.007E+01	3.364E-03
2117	7.411E+01	4.049E+04	2.720E+00	1.742E-01	4.859E+01	3.265E-03
2118	7.192E+01	3.929E+04	2.640E+00	1.690E-01	4.715E+01	3.168E-03



Summary Report

Landfill Name or Identifier: MSW CB Landfill Model

Date: Monday, May 10, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation ($m^3/year$)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate ($year^{-1}$)

L_o = potential methane generation capacity (m^3/Mg)

M_i = mass of waste accepted in the ith year (Mg)

t_{ij} = age of the jth section of waste mass M_i accepted in the ith year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1978**	
Landfill Closure Year (with 80-year limit)	**2045**	
Actual Closure Year (without limit)	***2045***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity		*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.040**	*year^{-1}*
Potential Methane Generation Capacity, L_o	**110**	*m^3/Mg*
NMOC Concentration	**600**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**NMOC**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
1997	241,684	265,852	0	0
1998	257,632	283,395	241,684	265,852
1999	272,325	299,558	499,315	549,247
2000	256,927	282,620	771,641	848,805
2001	270,794	297,873	1,028,568	1,131,425
2002	279,144	307,058	1,299,362	1,429,298
2003	228,960	251,856	1,578,505	1,736,356
2004	380,068	418,075	1,807,465	1,988,212
2005	384,370	422,807	2,187,534	2,406,287
2006	408,215	449,037	2,571,904	2,829,095
2007	379,773	417,751	2,980,120	3,278,132
2008	332,140	365,354	3,359,893	3,695,882
2009	283,487	311,836	3,692,033	4,061,236
2010	277,094	304,803	3,975,520	4,373,072
2011	292,743	322,017	4,252,614	4,677,875
2012	302,796	333,075	4,545,357	4,999,893
2013	279,005	306,905	4,848,153	5,332,968
2014	307,494	338,243	5,127,157	5,639,873
2015	345,213	379,734	5,434,651	5,978,116
2016	380,642	418,706	5,779,863	6,357,850
2017	666,969	733,666	6,160,505	6,776,556

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2018	709,929	780,922	6,827,474	7,510,222
2019	697,614	767,375	7,537,403	8,291,143
2020	547,133	601,847	8,235,017	9,058,519
2021	512,727	564,000	8,782,150	9,660,365
2022	512,727	564,000	9,294,877	10,224,365
2023	512,727	564,000	9,807,605	10,788,365
2024	512,727	564,000	10,320,332	11,352,365
2025	512,727	564,000	10,833,059	11,916,365
2026	512,727	564,000	11,345,787	12,480,365
2027	512,727	564,000	11,858,514	13,044,365
2028	512,727	564,000	12,371,241	13,608,365
2029	512,727	564,000	12,883,968	14,172,365
2030	512,727	564,000	13,396,696	14,736,365
2031	512,727	564,000	13,909,423	15,300,365
2032	512,727	564,000	14,422,150	15,864,365
2033	512,727	564,000	14,934,877	16,428,365
2034	512,727	564,000	15,447,605	16,992,365
2035	512,727	564,000	15,960,332	17,556,365
2036	512,727	564,000	16,473,059	18,120,365
2037	512,727	564,000	16,985,787	18,684,365
2038	512,727	564,000	17,498,514	19,248,365
2039	512,727	564,000	18,011,241	19,812,365
2040	512,727	564,000	18,523,968	20,376,365
2041	512,727	564,000	19,036,696	20,940,365
2042	512,727	564,000	19,549,423	21,504,365
2043	512,727	564,000	20,062,150	22,068,365
2044	512,727	564,000	20,574,877	22,632,365
2045	512,727	564,000	21,087,605	23,196,365
2046	0	0	21,600,332	23,760,365
2047	0	0	21,600,332	23,760,365
2048	0	0	21,600,332	23,760,365
2049	0	0	21,600,332	23,760,365
2050	0	0	21,600,332	23,760,365
2051	0	0	21,600,332	23,760,365
2052	0	0	21,600,332	23,760,365
2053	0	0	21,600,332	23,760,365
2054	0	0	21,600,332	23,760,365
2055	0	0	21,600,332	23,760,365
2056	0	0	21,600,332	23,760,365
2057	0	0	21,600,332	23,760,365

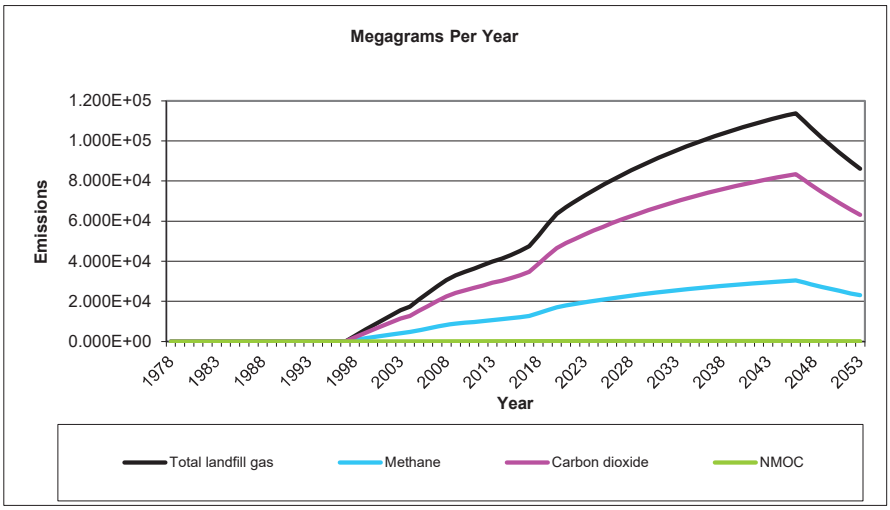
Pollutant Parameters

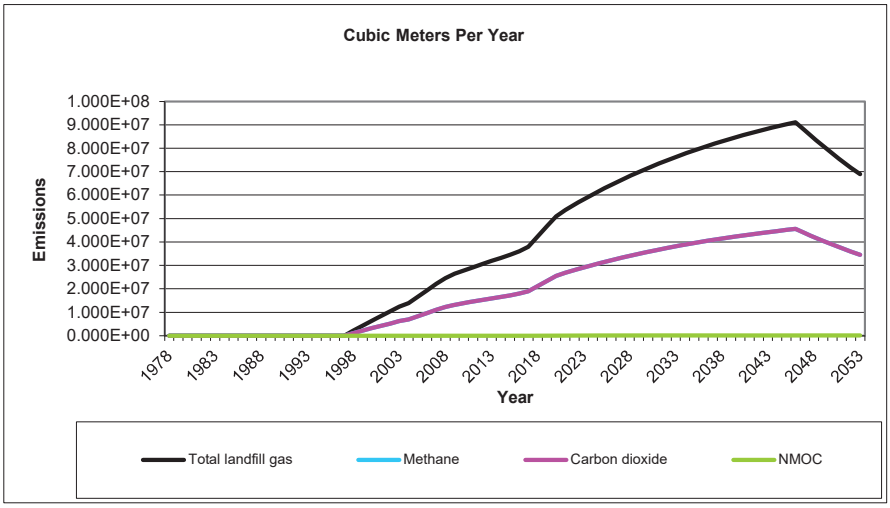
		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

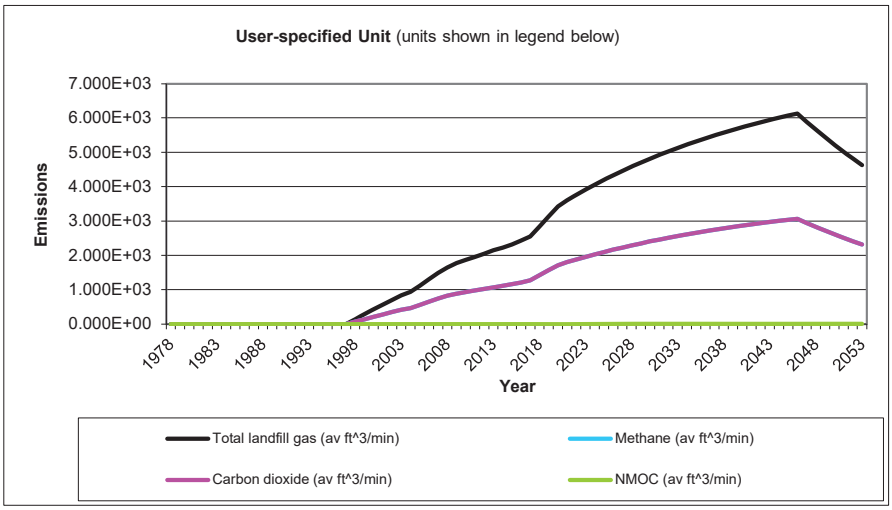
Pollutant Parameters (Continued)

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
1.200E+05
1.000E+05
8.000E+04
6.000E+04
4.000E+04
2.000E+04
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


Cubic Meters Per Year
Emissions
1.000E+08
9.000E+07
8.000E+07
7.000E+07
6.000E+07
5.000E+07
4.000E+07
3.000E+07
2.000E+07
1.000E+07
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas
Methane
Carbon dioxide
NMOC


User-specified Unit (units shown in legend below)
Emissions
7.000E+03
6.000E+03
5.000E+03
4.000E+03
3.000E+03
2.000E+03
1.000E+03
0.000E+00
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023
2028
2033
2038
2043
2048
2053
Year
Total landfill gas (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
NMOC (av ft^3/min)

Results

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	2.609E+03	2.089E+06	1.404E+02	6.968E+02	1.045E+06	7.018E+01
1999	5.287E+03	4.234E+06	2.845E+02	1.412E+03	2.117E+06	1.422E+02
2000	8.020E+03	6.422E+06	4.315E+02	2.142E+03	3.211E+06	2.157E+02
2001	1.048E+04	8.391E+06	5.638E+02	2.799E+03	4.195E+06	2.819E+02
2002	1.299E+04	1.040E+07	6.989E+02	3.470E+03	5.201E+06	3.495E+02
2003	1.549E+04	1.241E+07	8.336E+02	4.139E+03	6.204E+06	4.168E+02
2004	1.736E+04	1.390E+07	9.339E+02	4.637E+03	6.950E+06	4.670E+02
2005	2.078E+04	1.664E+07	1.118E+03	5.551E+03	8.320E+06	5.590E+02
2006	2.411E+04	1.931E+07	1.297E+03	6.441E+03	9.655E+06	6.487E+02
2007	2.758E+04	2.208E+07	1.484E+03	7.366E+03	1.104E+07	7.418E+02
2008	3.059E+04	2.450E+07	1.646E+03	8.172E+03	1.225E+07	8.230E+02
2009	3.298E+04	2.641E+07	1.774E+03	8.809E+03	1.320E+07	8.872E+02
2010	3.475E+04	2.782E+07	1.869E+03	9.281E+03	1.391E+07	9.347E+02
2011	3.637E+04	2.913E+07	1.957E+03	9.716E+03	1.456E+07	9.785E+02
2012	3.811E+04	3.052E+07	2.050E+03	1.018E+04	1.526E+07	1.025E+03
2013	3.988E+04	3.194E+07	2.146E+03	1.065E+04	1.597E+07	1.073E+03
2014	4.133E+04	3.310E+07	2.224E+03	1.104E+04	1.655E+07	1.112E+03
2015	4.303E+04	3.446E+07	2.315E+03	1.149E+04	1.723E+07	1.158E+03
2016	4.507E+04	3.609E+07	2.425E+03	1.204E+04	1.804E+07	1.212E+03
2017	4.741E+04	3.796E+07	2.551E+03	1.266E+04	1.898E+07	1.275E+03
2018	5.275E+04	4.224E+07	2.838E+03	1.409E+04	2.112E+07	1.419E+03
2019	5.835E+04	4.672E+07	3.139E+03	1.558E+04	2.336E+07	1.570E+03
2020	6.359E+04	5.092E+07	3.421E+03	1.698E+04	2.546E+07	1.711E+03
2021	6.700E+04	5.365E+07	3.605E+03	1.790E+04	2.683E+07	1.802E+03
2022	6.991E+04	5.598E+07	3.761E+03	1.867E+04	2.799E+07	1.881E+03
2023	7.270E+04	5.822E+07	3.912E+03	1.942E+04	2.911E+07	1.956E+03
2024	7.539E+04	6.036E+07	4.056E+03	2.014E+04	3.018E+07	2.028E+03
2025	7.796E+04	6.243E+07	4.195E+03	2.082E+04	3.121E+07	2.097E+03
2026	8.044E+04	6.441E+07	4.328E+03	2.149E+04	3.221E+07	2.164E+03
2027	8.282E+04	6.632E+07	4.456E+03	2.212E+04	3.316E+07	2.228E+03

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2028	8.511E+04	6.815E+07	4.579E+03	2.273E+04	3.408E+07	2.290E+03
2029	8.731E+04	6.991E+07	4.697E+03	2.332E+04	3.496E+07	2.349E+03
2030	8.942E+04	7.160E+07	4.811E+03	2.388E+04	3.580E+07	2.405E+03
2031	9.145E+04	7.323E+07	4.920E+03	2.443E+04	3.661E+07	2.460E+03
2032	9.339E+04	7.479E+07	5.025E+03	2.495E+04	3.739E+07	2.512E+03
2033	9.527E+04	7.629E+07	5.126E+03	2.545E+04	3.814E+07	2.563E+03
2034	9.707E+04	7.773E+07	5.222E+03	2.593E+04	3.886E+07	2.611E+03
2035	9.879E+04	7.911E+07	5.315E+03	2.639E+04	3.956E+07	2.658E+03
2036	1.005E+05	8.044E+07	5.405E+03	2.683E+04	4.022E+07	2.702E+03
2037	1.021E+05	8.172E+07	5.491E+03	2.726E+04	4.086E+07	2.745E+03
2038	1.036E+05	8.295E+07	5.573E+03	2.767E+04	4.147E+07	2.787E+03
2039	1.051E+05	8.412E+07	5.652E+03	2.806E+04	4.206E+07	2.826E+03
2040	1.065E+05	8.526E+07	5.728E+03	2.844E+04	4.263E+07	2.864E+03
2041	1.078E+05	8.635E+07	5.802E+03	2.880E+04	4.317E+07	2.901E+03
2042	1.091E+05	8.739E+07	5.872E+03	2.915E+04	4.370E+07	2.936E+03
2043	1.104E+05	8.840E+07	5.939E+03	2.949E+04	4.420E+07	2.970E+03
2044	1.116E+05	8.936E+07	6.004E+03	2.981E+04	4.468E+07	3.002E+03
2045	1.128E+05	9.029E+07	6.067E+03	3.012E+04	4.515E+07	3.033E+03
2046	1.139E+05	9.118E+07	6.127E+03	3.042E+04	4.559E+07	3.063E+03
2047	1.094E+05	8.761E+07	5.886E+03	2.922E+04	4.380E+07	2.943E+03
2048	1.051E+05	8.417E+07	5.656E+03	2.808E+04	4.209E+07	2.828E+03
2049	1.010E+05	8.087E+07	5.434E+03	2.698E+04	4.044E+07	2.717E+03
2050	9.703E+04	7.770E+07	5.221E+03	2.592E+04	3.885E+07	2.610E+03
2051	9.323E+04	7.465E+07	5.016E+03	2.490E+04	3.733E+07	2.508E+03
2052	8.957E+04	7.173E+07	4.819E+03	2.393E+04	3.586E+07	2.410E+03
2053	8.606E+04	6.891E+07	4.630E+03	2.299E+04	3.446E+07	2.315E+03
2054	8.269E+04	6.621E+07	4.449E+03	2.209E+04	3.311E+07	2.224E+03
2055	7.945E+04	6.362E+07	4.274E+03	2.122E+04	3.181E+07	2.137E+03
2056	7.633E+04	6.112E+07	4.107E+03	2.039E+04	3.056E+07	2.053E+03
2057	7.334E+04	5.873E+07	3.946E+03	1.959E+04	2.936E+07	1.973E+03
2058	7.046E+04	5.642E+07	3.791E+03	1.882E+04	2.821E+07	1.896E+03
2059	6.770E+04	5.421E+07	3.642E+03	1.808E+04	2.711E+07	1.821E+03
2060	6.504E+04	5.208E+07	3.500E+03	1.737E+04	2.604E+07	1.750E+03
2061	6.249E+04	5.004E+07	3.362E+03	1.669E+04	2.502E+07	1.681E+03
2062	6.004E+04	4.808E+07	3.230E+03	1.604E+04	2.404E+07	1.615E+03
2063	5.769E+04	4.619E+07	3.104E+03	1.541E+04	2.310E+07	1.552E+03
2064	5.543E+04	4.438E+07	2.982E+03	1.481E+04	2.219E+07	1.491E+03
2065	5.325E+04	4.264E+07	2.865E+03	1.422E+04	2.132E+07	1.433E+03
2066	5.117E+04	4.097E+07	2.753E+03	1.367E+04	2.049E+07	1.376E+03
2067	4.916E+04	3.936E+07	2.645E+03	1.313E+04	1.968E+07	1.322E+03
2068	4.723E+04	3.782E+07	2.541E+03	1.262E+04	1.891E+07	1.271E+03
2069	4.538E+04	3.634E+07	2.442E+03	1.212E+04	1.817E+07	1.221E+03
2070	4.360E+04	3.491E+07	2.346E+03	1.165E+04	1.746E+07	1.173E+03
2071	4.189E+04	3.354E+07	2.254E+03	1.119E+04	1.677E+07	1.127E+03
2072	4.025E+04	3.223E+07	2.165E+03	1.075E+04	1.611E+07	1.083E+03
2073	3.867E+04	3.097E+07	2.081E+03	1.033E+04	1.548E+07	1.040E+03
2074	3.715E+04	2.975E+07	1.999E+03	9.924E+03	1.488E+07	9.995E+02
2075	3.570E+04	2.858E+07	1.921E+03	9.535E+03	1.429E+07	9.603E+02
2076	3.430E+04	2.746E+07	1.845E+03	9.161E+03	1.373E+07	9.226E+02
2077	3.295E+04	2.639E+07	1.773E+03	8.802E+03	1.319E+07	8.865E+02
2078	3.166E+04	2.535E+07	1.703E+03	8.457E+03	1.268E+07	8.517E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	3.042E+04	2.436E+07	1.637E+03	8.125E+03	1.218E+07	8.183E+02
2080	2.923E+04	2.340E+07	1.572E+03	7.807E+03	1.170E+07	7.862E+02
2081	2.808E+04	2.249E+07	1.511E+03	7.501E+03	1.124E+07	7.554E+02
2082	2.698E+04	2.160E+07	1.452E+03	7.206E+03	1.080E+07	7.258E+02
2083	2.592E+04	2.076E+07	1.395E+03	6.924E+03	1.038E+07	6.973E+02
2084	2.491E+04	1.994E+07	1.340E+03	6.652E+03	9.971E+06	6.700E+02
2085	2.393E+04	1.916E+07	1.287E+03	6.392E+03	9.580E+06	6.437E+02
2086	2.299E+04	1.841E+07	1.237E+03	6.141E+03	9.205E+06	6.185E+02
2087	2.209E+04	1.769E+07	1.188E+03	5.900E+03	8.844E+06	5.942E+02
2088	2.122E+04	1.699E+07	1.142E+03	5.669E+03	8.497E+06	5.709E+02
2089	2.039E+04	1.633E+07	1.097E+03	5.447E+03	8.164E+06	5.485E+02
2090	1.959E+04	1.569E+07	1.054E+03	5.233E+03	7.844E+06	5.270E+02
2091	1.882E+04	1.507E+07	1.013E+03	5.028E+03	7.536E+06	5.064E+02
2092	1.808E+04	1.448E+07	9.730E+02	4.831E+03	7.241E+06	4.865E+02
2093	1.738E+04	1.391E+07	9.349E+02	4.641E+03	6.957E+06	4.674E+02
2094	1.669E+04	1.337E+07	8.982E+02	4.459E+03	6.684E+06	4.491E+02
2095	1.604E+04	1.284E+07	8.630E+02	4.284E+03	6.422E+06	4.315E+02
2096	1.541E+04	1.234E+07	8.291E+02	4.116E+03	6.170E+06	4.146E+02
2097	1.481E+04	1.186E+07	7.966E+02	3.955E+03	5.928E+06	3.983E+02
2098	1.423E+04	1.139E+07	7.654E+02	3.800E+03	5.696E+06	3.827E+02
2099	1.367E+04	1.094E+07	7.354E+02	3.651E+03	5.472E+06	3.677E+02
2100	1.313E+04	1.052E+07	7.065E+02	3.508E+03	5.258E+06	3.533E+02
2101	1.262E+04	1.010E+07	6.788E+02	3.370E+03	5.052E+06	3.394E+02
2102	1.212E+04	9.707E+06	6.522E+02	3.238E+03	4.854E+06	3.261E+02
2103	1.165E+04	9.327E+06	6.267E+02	3.111E+03	4.663E+06	3.133E+02
2104	1.119E+04	8.961E+06	6.021E+02	2.989E+03	4.480E+06	3.010E+02
2105	1.075E+04	8.610E+06	5.785E+02	2.872E+03	4.305E+06	2.892E+02
2106	1.033E+04	8.272E+06	5.558E+02	2.759E+03	4.136E+06	2.779E+02
2107	9.925E+03	7.948E+06	5.340E+02	2.651E+03	3.974E+06	2.670E+02
2108	9.536E+03	7.636E+06	5.131E+02	2.547E+03	3.818E+06	2.565E+02
2109	9.162E+03	7.337E+06	4.929E+02	2.447E+03	3.668E+06	2.465E+02
2110	8.803E+03	7.049E+06	4.736E+02	2.351E+03	3.524E+06	2.368E+02
2111	8.458E+03	6.772E+06	4.550E+02	2.259E+03	3.386E+06	2.275E+02
2112	8.126E+03	6.507E+06	4.372E+02	2.171E+03	3.253E+06	2.186E+02
2113	7.807E+03	6.252E+06	4.201E+02	2.085E+03	3.126E+06	2.100E+02
2114	7.501E+03	6.007E+06	4.036E+02	2.004E+03	3.003E+06	2.018E+02
2115	7.207E+03	5.771E+06	3.878E+02	1.925E+03	2.886E+06	1.939E+02
2116	6.925E+03	5.545E+06	3.726E+02	1.850E+03	2.772E+06	1.863E+02
2117	6.653E+03	5.327E+06	3.579E+02	1.777E+03	2.664E+06	1.790E+02
2118	6.392E+03	5.119E+06	3.439E+02	1.707E+03	2.559E+06	1.720E+02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1978	0	0	0	0	0	0
1979	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1980	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1981	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1982	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1983	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1984	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1985	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1986	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1987	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1988	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1989	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1990	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1991	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1992	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1993	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1994	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1995	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1996	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1997	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
1998	1.912E+03	1.045E+06	7.018E+01	4.493E+00	1.253E+03	8.422E-02
1999	3.875E+03	2.117E+06	1.422E+02	9.106E+00	2.540E+03	1.707E-01
2000	5.878E+03	3.211E+06	2.157E+02	1.381E+01	3.853E+03	2.589E-01
2001	7.680E+03	4.195E+06	2.819E+02	1.805E+01	5.034E+03	3.383E-01
2002	9.521E+03	5.201E+06	3.495E+02	2.237E+01	6.241E+03	4.194E-01
2003	1.136E+04	6.204E+06	4.168E+02	2.668E+01	7.444E+03	5.002E-01
2004	1.272E+04	6.950E+06	4.670E+02	2.989E+01	8.340E+03	5.604E-01
2005	1.523E+04	8.320E+06	5.590E+02	3.579E+01	9.984E+03	6.708E-01
2006	1.767E+04	9.655E+06	6.487E+02	4.153E+01	1.159E+04	7.785E-01
2007	2.021E+04	1.104E+07	7.418E+02	4.749E+01	1.325E+04	8.902E-01
2008	2.242E+04	1.225E+07	8.230E+02	5.269E+01	1.470E+04	9.876E-01
2009	2.417E+04	1.320E+07	8.872E+02	5.680E+01	1.584E+04	1.065E+00
2010	2.547E+04	1.391E+07	9.347E+02	5.984E+01	1.669E+04	1.122E+00
2011	2.666E+04	1.456E+07	9.785E+02	6.264E+01	1.748E+04	1.174E+00
2012	2.793E+04	1.526E+07	1.025E+03	6.563E+01	1.831E+04	1.230E+00
2013	2.923E+04	1.597E+07	1.073E+03	6.868E+01	1.916E+04	1.287E+00
2014	3.029E+04	1.655E+07	1.112E+03	7.118E+01	1.986E+04	1.334E+00
2015	3.154E+04	1.723E+07	1.158E+03	7.410E+01	2.067E+04	1.389E+00
2016	3.303E+04	1.804E+07	1.212E+03	7.761E+01	2.165E+04	1.455E+00
2017	3.475E+04	1.898E+07	1.275E+03	8.165E+01	2.278E+04	1.530E+00
2018	3.866E+04	2.112E+07	1.419E+03	9.084E+01	2.534E+04	1.703E+00
2019	4.276E+04	2.336E+07	1.570E+03	1.005E+02	2.803E+04	1.883E+00
2020	4.660E+04	2.546E+07	1.711E+03	1.095E+02	3.055E+04	2.053E+00
2021	4.910E+04	2.683E+07	1.802E+03	1.154E+02	3.219E+04	2.163E+00
2022	5.123E+04	2.799E+07	1.881E+03	1.204E+02	3.359E+04	2.257E+00
2023	5.328E+04	2.911E+07	1.956E+03	1.252E+02	3.493E+04	2.347E+00
2024	5.525E+04	3.018E+07	2.028E+03	1.298E+02	3.622E+04	2.434E+00
2025	5.714E+04	3.121E+07	2.097E+03	1.343E+02	3.746E+04	2.517E+00
2026	5.895E+04	3.221E+07	2.164E+03	1.385E+02	3.865E+04	2.597E+00
2027	6.070E+04	3.316E+07	2.228E+03	1.426E+02	3.979E+04	2.674E+00

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2028	6.238E+04	3.408E+07	2.290E+03	1.466E+02	4.089E+04	2.747E+00
2029	6.399E+04	3.496E+07	2.349E+03	1.504E+02	4.195E+04	2.818E+00
2030	6.553E+04	3.580E+07	2.405E+03	1.540E+02	4.296E+04	2.887E+00
2031	6.702E+04	3.661E+07	2.460E+03	1.575E+02	4.394E+04	2.952E+00
2032	6.845E+04	3.739E+07	2.512E+03	1.608E+02	4.487E+04	3.015E+00
2033	6.982E+04	3.814E+07	2.563E+03	1.641E+02	4.577E+04	3.075E+00
2034	7.114E+04	3.886E+07	2.611E+03	1.672E+02	4.664E+04	3.133E+00
2035	7.241E+04	3.956E+07	2.658E+03	1.701E+02	4.747E+04	3.189E+00
2036	7.362E+04	4.022E+07	2.702E+03	1.730E+02	4.826E+04	3.243E+00
2037	7.479E+04	4.086E+07	2.745E+03	1.757E+02	4.903E+04	3.294E+00
2038	7.592E+04	4.147E+07	2.787E+03	1.784E+02	4.977E+04	3.344E+00
2039	7.700E+04	4.206E+07	2.826E+03	1.809E+02	5.047E+04	3.391E+00
2040	7.803E+04	4.263E+07	2.864E+03	1.834E+02	5.115E+04	3.437E+00
2041	7.903E+04	4.317E+07	2.901E+03	1.857E+02	5.181E+04	3.481E+00
2042	7.999E+04	4.370E+07	2.936E+03	1.880E+02	5.244E+04	3.523E+00
2043	8.091E+04	4.420E+07	2.970E+03	1.901E+02	5.304E+04	3.564E+00
2044	8.179E+04	4.468E+07	3.002E+03	1.922E+02	5.362E+04	3.603E+00
2045	8.264E+04	4.515E+07	3.033E+03	1.942E+02	5.417E+04	3.640E+00
2046	8.346E+04	4.559E+07	3.063E+03	1.961E+02	5.471E+04	3.676E+00
2047	8.018E+04	4.380E+07	2.943E+03	1.884E+02	5.256E+04	3.532E+00
2048	7.704E+04	4.209E+07	2.828E+03	1.810E+02	5.050E+04	3.393E+00
2049	7.402E+04	4.044E+07	2.717E+03	1.739E+02	4.852E+04	3.260E+00
2050	7.112E+04	3.885E+07	2.610E+03	1.671E+02	4.662E+04	3.132E+00
2051	6.833E+04	3.733E+07	2.508E+03	1.606E+02	4.479E+04	3.010E+00
2052	6.565E+04	3.586E+07	2.410E+03	1.543E+02	4.304E+04	2.892E+00
2053	6.307E+04	3.446E+07	2.315E+03	1.482E+02	4.135E+04	2.778E+00
2054	6.060E+04	3.311E+07	2.224E+03	1.424E+02	3.973E+04	2.669E+00
2055	5.822E+04	3.181E+07	2.137E+03	1.368E+02	3.817E+04	2.565E+00
2056	5.594E+04	3.056E+07	2.053E+03	1.315E+02	3.667E+04	2.464E+00
2057	5.375E+04	2.936E+07	1.973E+03	1.263E+02	3.524E+04	2.367E+00
2058	5.164E+04	2.821E+07	1.896E+03	1.213E+02	3.385E+04	2.275E+00
2059	4.962E+04	2.711E+07	1.821E+03	1.166E+02	3.253E+04	2.185E+00
2060	4.767E+04	2.604E+07	1.750E+03	1.120E+02	3.125E+04	2.100E+00
2061	4.580E+04	2.502E+07	1.681E+03	1.076E+02	3.003E+04	2.017E+00
2062	4.401E+04	2.404E+07	1.615E+03	1.034E+02	2.885E+04	1.938E+00
2063	4.228E+04	2.310E+07	1.552E+03	9.935E+01	2.772E+04	1.862E+00
2064	4.062E+04	2.219E+07	1.491E+03	9.545E+01	2.663E+04	1.789E+00
2065	3.903E+04	2.132E+07	1.433E+03	9.171E+01	2.559E+04	1.719E+00
2066	3.750E+04	2.049E+07	1.376E+03	8.812E+01	2.458E+04	1.652E+00
2067	3.603E+04	1.968E+07	1.322E+03	8.466E+01	2.362E+04	1.587E+00
2068	3.462E+04	1.891E+07	1.271E+03	8.134E+01	2.269E+04	1.525E+00
2069	3.326E+04	1.817E+07	1.221E+03	7.815E+01	2.180E+04	1.465E+00
2070	3.195E+04	1.746E+07	1.173E+03	7.509E+01	2.095E+04	1.407E+00
2071	3.070E+04	1.677E+07	1.127E+03	7.214E+01	2.013E+04	1.352E+00
2072	2.950E+04	1.611E+07	1.083E+03	6.931E+01	1.934E+04	1.299E+00
2073	2.834E+04	1.548E+07	1.040E+03	6.660E+01	1.858E+04	1.248E+00
2074	2.723E+04	1.488E+07	9.995E+02	6.399E+01	1.785E+04	1.199E+00
2075	2.616E+04	1.429E+07	9.603E+02	6.148E+01	1.715E+04	1.152E+00
2076	2.514E+04	1.373E+07	9.226E+02	5.907E+01	1.648E+04	1.107E+00
2077	2.415E+04	1.319E+07	8.865E+02	5.675E+01	1.583E+04	1.064E+00
2078	2.320E+04	1.268E+07	8.517E+02	5.452E+01	1.521E+04	1.022E+00

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2079	2.229E+04	1.218E+07	8.183E+02	5.239E+01	1.461E+04	9.820E-01
2080	2.142E+04	1.170E+07	7.862E+02	5.033E+01	1.404E+04	9.435E-01
2081	2.058E+04	1.124E+07	7.554E+02	4.836E+01	1.349E+04	9.065E-01
2082	1.977E+04	1.080E+07	7.258E+02	4.646E+01	1.296E+04	8.709E-01
2083	1.900E+04	1.038E+07	6.973E+02	4.464E+01	1.245E+04	8.368E-01
2084	1.825E+04	9.971E+06	6.700E+02	4.289E+01	1.197E+04	8.040E-01
2085	1.754E+04	9.580E+06	6.437E+02	4.121E+01	1.150E+04	7.724E-01
2086	1.685E+04	9.205E+06	6.185E+02	3.959E+01	1.105E+04	7.422E-01
2087	1.619E+04	8.844E+06	5.942E+02	3.804E+01	1.061E+04	7.131E-01
2088	1.555E+04	8.497E+06	5.709E+02	3.655E+01	1.020E+04	6.851E-01
2089	1.494E+04	8.164E+06	5.485E+02	3.512E+01	9.797E+03	6.582E-01
2090	1.436E+04	7.844E+06	5.270E+02	3.374E+01	9.413E+03	6.324E-01
2091	1.380E+04	7.536E+06	5.064E+02	3.242E+01	9.043E+03	6.076E-01
2092	1.325E+04	7.241E+06	4.865E+02	3.114E+01	8.689E+03	5.838E-01
2093	1.273E+04	6.957E+06	4.674E+02	2.992E+01	8.348E+03	5.609E-01
2094	1.224E+04	6.684E+06	4.491E+02	2.875E+01	8.021E+03	5.389E-01
2095	1.176E+04	6.422E+06	4.315E+02	2.762E+01	7.706E+03	5.178E-01
2096	1.129E+04	6.170E+06	4.146E+02	2.654E+01	7.404E+03	4.975E-01
2097	1.085E+04	5.928E+06	3.983E+02	2.550E+01	7.114E+03	4.780E-01
2098	1.043E+04	5.696E+06	3.827E+02	2.450E+01	6.835E+03	4.592E-01
2099	1.002E+04	5.472E+06	3.677E+02	2.354E+01	6.567E+03	4.412E-01
2100	9.624E+03	5.258E+06	3.533E+02	2.262E+01	6.309E+03	4.239E-01
2101	9.247E+03	5.052E+06	3.394E+02	2.173E+01	6.062E+03	4.073E-01
2102	8.885E+03	4.854E+06	3.261E+02	2.088E+01	5.824E+03	3.913E-01
2103	8.536E+03	4.663E+06	3.133E+02	2.006E+01	5.596E+03	3.760E-01
2104	8.201E+03	4.480E+06	3.010E+02	1.927E+01	5.377E+03	3.612E-01
2105	7.880E+03	4.305E+06	2.892E+02	1.852E+01	5.166E+03	3.471E-01
2106	7.571E+03	4.136E+06	2.779E+02	1.779E+01	4.963E+03	3.335E-01
2107	7.274E+03	3.974E+06	2.670E+02	1.709E+01	4.769E+03	3.204E-01
2108	6.989E+03	3.818E+06	2.565E+02	1.642E+01	4.582E+03	3.078E-01
2109	6.715E+03	3.668E+06	2.465E+02	1.578E+01	4.402E+03	2.958E-01
2110	6.451E+03	3.524E+06	2.368E+02	1.516E+01	4.229E+03	2.842E-01
2111	6.199E+03	3.386E+06	2.275E+02	1.457E+01	4.063E+03	2.730E-01
2112	5.955E+03	3.253E+06	2.186E+02	1.399E+01	3.904E+03	2.623E-01
2113	5.722E+03	3.126E+06	2.100E+02	1.345E+01	3.751E+03	2.520E-01
2114	5.498E+03	3.003E+06	2.018E+02	1.292E+01	3.604E+03	2.422E-01
2115	5.282E+03	2.886E+06	1.939E+02	1.241E+01	3.463E+03	2.327E-01
2116	5.075E+03	2.772E+06	1.863E+02	1.193E+01	3.327E+03	2.235E-01
2117	4.876E+03	2.664E+06	1.790E+02	1.146E+01	3.196E+03	2.148E-01
2118	4.685E+03	2.559E+06	1.720E+02	1.101E+01	3.071E+03	2.063E-01

Coffin Butte 2021 Gas Generation Model

Assumptions and Notes

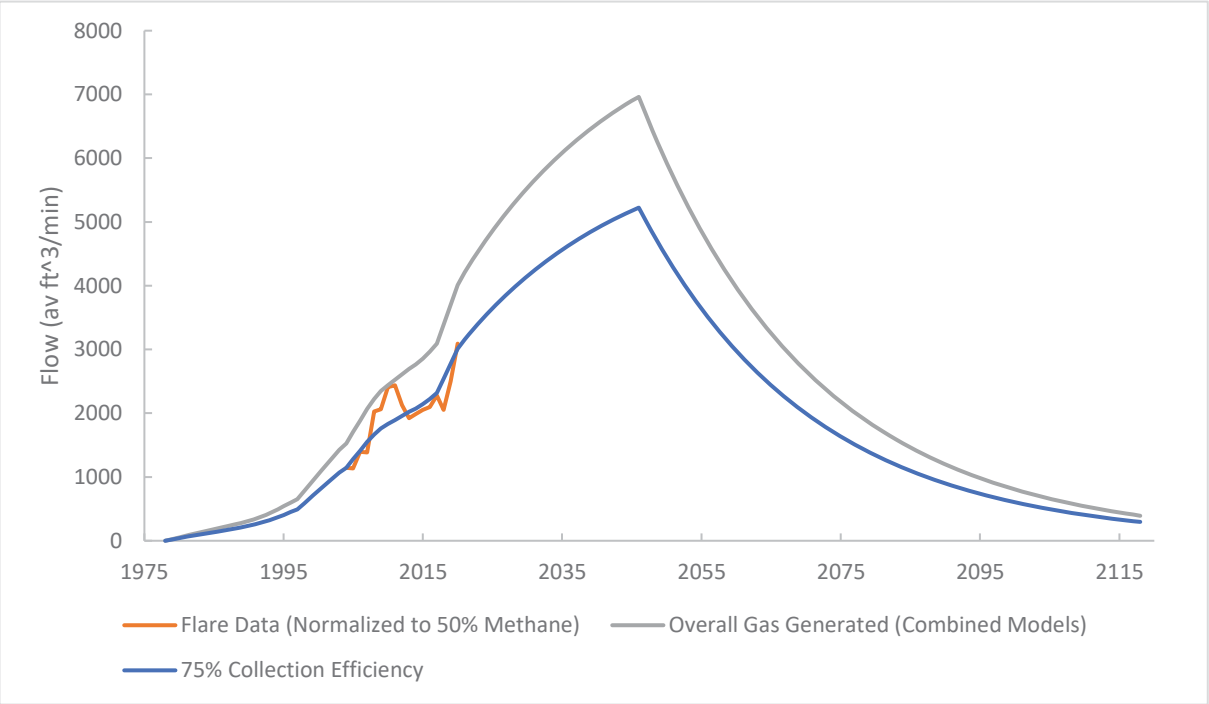
1) Waste composition from 2020 to end of model based on historical and current waste composition.
   - **MSW**: 70.5%, **C&D:** 3%, **Inert:** 15.5%, **Organics**: 3%, **Special:** 8%
2) Collection efficiency was calculated using historical collection data and the model's projected generation
3) Waste categories have the L_0 and k values listed in the "Gas Production by Waste Type" tab.
4) Waste acceptance in 2021 to end of of model will be 800,000 tons, as suggested by Republic
5) Flare data was provided by Republic from SCSe tools.

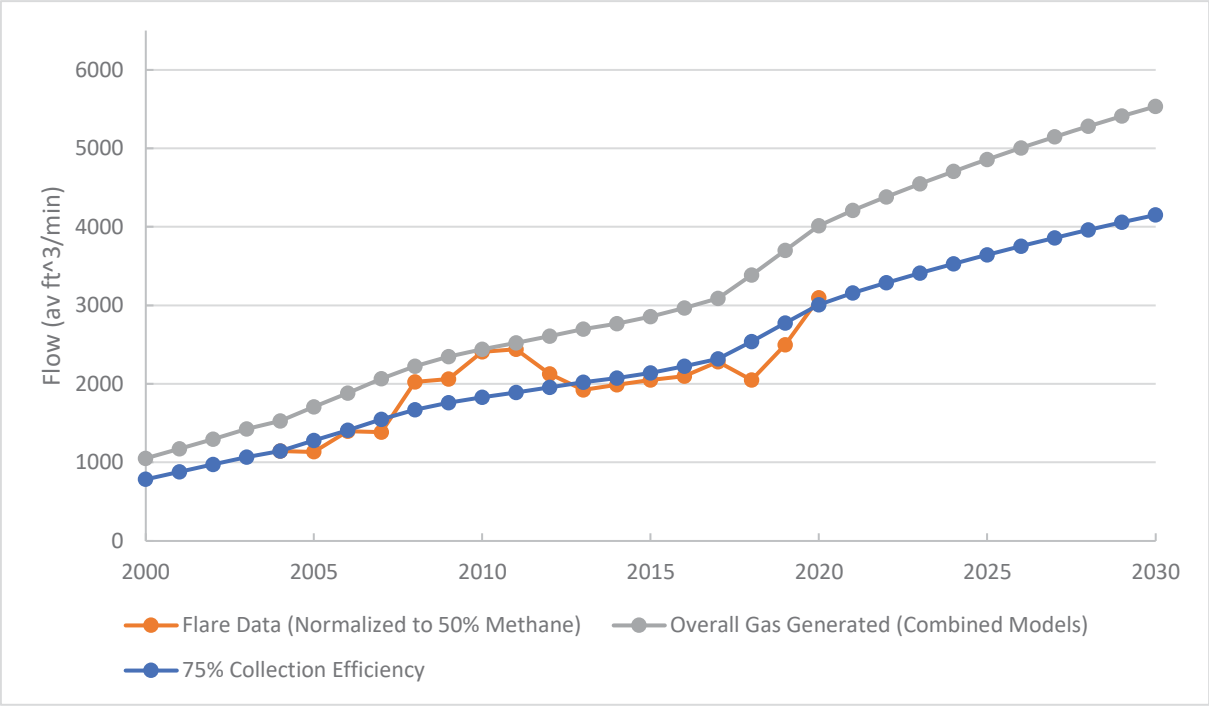
Year	Waste Accepted (tons)	Flare Data (Normalized to 50% Methane) (av ft^3/min)	Overall Gas Generated (Combined Models) (av ft^3/min)	Collection Efficiency (%)	75% Collection Efficiency (%)
1978	75000		0.00		0.00
1979	78000		25.92		19.44
1980	81000		51.86		38.89
1981	84000		77.82		58.36
1982	87000		103.79		77.84
1983	90000		129.79		97.34
1984	94000		154.07		115.55
1985	98000		178.71		134.03
1986	102000		203.69		152.77
1987	104000		228.99		171.74
1988	114000		253.96		190.47
1989	146000		279.02		209.26
1990	151000		312.93		234.69
1991	155000		347.04		260.28
1992	200000		381.05		285.78
1993	255937		427.54		320.66
1994	269063		484.48		363.36
1995	269063		542.97		407.23
1996	269063		599.16		449.37
1997	379210		653.16		489.87
1998	395447		780.92		585.69
1999	408055		913.21		684.91
2000	409851		1049.49		787.12
2001	425993		1171.20		878.40
2002	453458		1296.67		972.50
2003	550660		1424.75		1068.56
2004	586561.65	1146.03	1526.80	75.1%	1145.10
2005	572347.22	1134.59	1706.44	66.5%	1279.83
2006	618341.00	1396.16	1881.40	74.2%	1411.05
2007	546998.22	1386.53	2065.92	67.1%	1549.44
2008	527316.09	2024.98	2224.17	91.0%	1668.13
2009	500692.92	2060.32	2348.33	87.7%	1761.24
2010	458587.75	2407.60	2440.84	98.6%	1830.63
2011	483034.63	2439.52	2522.30	96.7%	1891.73
2012	473551.03	2126.14	2608.21	81.5%	1956.15
2013	479108.83	1922.90	2695.45	71.3%	2021.58
2014	499769.33	1988.07	2765.96	71.9%	2074.47
2015	528945.79	2049.93	2854.01	71.8%	2140.50
2016	555899.04	2099.45	2964.76	70.8%	2223.57
2017	944842.77	2279.49	3089.36	73.8%	2317.02
2018	1013887.57	2049.67	3385.14	60.5%	2538.86
2019	1043494.30	2496.95	3698.36	67.5%	2773.77
2020	859924.27	3094.66	4011.17	77.2%	3008.38
2021	800000		4209.18		3156.89
2022	800000		4381.42		3286.06

Year	Waste Accepted (tons)	Flare Data (Normalized to 50% Methane) (av ft^3/min)	Overall Gas Generated (Combined Models) (av ft^3/min)	Collection Efficiency (%)	75% Collection Efficiency (%)
2023	800000		4546.77		3410.07
2024	800000		4705.50		3529.12
2025	800000		4857.88		3643.41
2026	800000		5004.18		3753.13
2027	800000		5144.62		3858.47
2028	800000		5279.45		3959.59
2029	800000		5408.90		4056.68
2030	800000		5533.18		4149.88
2031	800000		5652.49		4239.37
2032	800000		5767.04		4325.28
2033	800000		5877.02		4407.77
2034	800000		5982.61		4486.96
2035	800000		6083.99		4562.99
2036	800000		6181.32		4635.99
2037	800000		6274.77		4706.08
2038	800000		6364.50		4773.37
2039	800000		6450.65		4837.99
2040	800000		6533.37		4900.02
2041	800000		6612.79		4959.59
2042	800000		6689.04		5016.78
2043	800000		6762.26		5071.70
2044	800000		6832.57		5124.43
2045	800000		6900.07		5175.06
2046			6964.89		5223.67
2047			6690.83		5018.12
2048			6427.59		4820.69
2049			6174.75		4631.06
2050			5931.89		4448.92
2051			5698.63		4273.97
2052			5474.57		4105.93
2053			5259.36		3944.52
2054			5052.64		3789.48
2055			4854.08		3640.56
2056			4663.35		3497.51
2057			4480.14		3360.11
2058			4304.17		3228.12
2059			4135.13		3101.35
2060			3972.75		2979.57
2061			3816.78		2862.59
2062			3666.96		2750.22
2063			3523.04		2642.28
2064			3384.79		2538.59
2065			3251.98		2438.99
2066			3124.41		2343.31
2067			3001.86		2251.40
2068			2884.14		2163.11
2069			2771.05		2078.29
2070			2662.42		1996.81
2071			2558.06		1918.54
2072			2457.80		1843.35
2073			2361.49		1771.12
2074			2268.97		1701.73
2075			2180.09		1635.07
2076			2094.71		1571.03

Year	Waste Accepted (tons)	Flare Data (Normalized to 50% Methane) (av ft^3/min)	Overall Gas Generated (Combined Models) (av ft^3/min)	Collection Efficiency (%)	75% Collection Efficiency (%)
2077			2012.68		1509.51
2078			1933.88		1450.41
2079			1858.17		1393.63
2080			1785.44		1339.08
2081			1715.57		1286.68
2082			1648.44		1236.33
2083			1583.95		1187.97
2084			1522.00		1141.50
2085			1462.47		1096.85
2086			1405.29		1053.97
2087			1350.35		1012.76
2088			1297.56		973.17
2089			1246.85		935.14
2090			1198.13		898.59
2091			1151.31		863.49
2092			1106.34		829.75
2093			1063.13		797.35
2094			1021.61		766.21
2095			981.72		736.29
2096			943.40		707.55
2097			906.58		679.93
2098			871.20		653.40
2099			837.20		627.90
2100			804.54		603.41
2101			773.16		579.87
2102			743.01		557.26
2103			714.04		535.53
2104			686.20		514.65
2105			659.45		494.59
2106			633.75		475.31
2107			609.06		456.79
2108			585.33		439.00
2109			562.53		421.90
2110			540.62		405.47
2111			519.57		389.68
2112			499.34		374.51
2113			479.90		359.93
2114			461.23		345.92
2115			443.28		332.46
2116			426.03		319.53
2117			409.46		307.10
2118			393.54		295.15

Overall Gas Generated





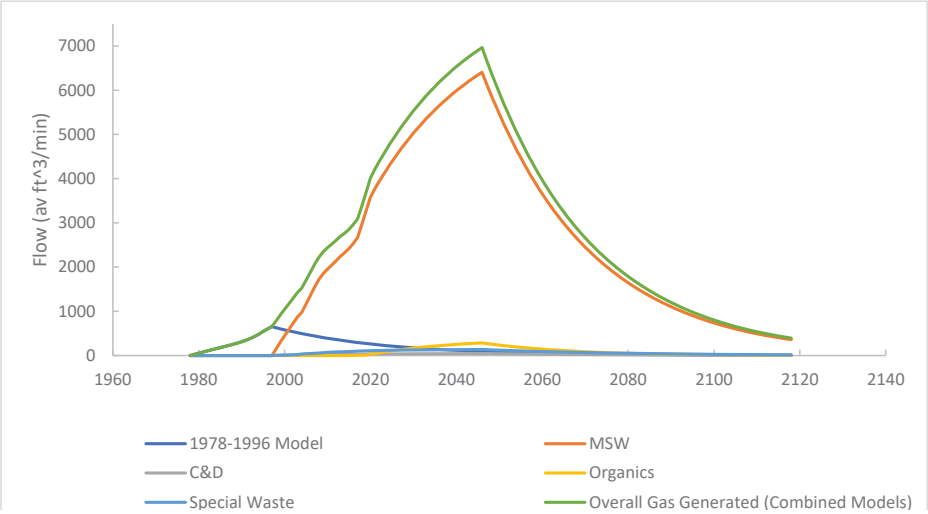
Gas Generation and Waste Accepted by Waste Type

	1978-1996 Model		MSW			C&D			Organics			Special Waste			Inert			Overall Gas Generated (Combined Models)	
	L_0: 80		L_0: 115			L_0: 20			L_0: 130			L_0: 20			L_0: 0				
	k: 0.04		k: 0.04			k: 0.03			k: 0.05			k: 0.03			k: 0				
Year	Waste Accepted (tons)	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	Flow (av ft^3/min)
1978	75000	0.00			0.00			0.00			0.00			0.00				75000.0	0.00
1979	78000	25.92			0.00			0.00			0.00			0.00				78000.0	25.92
1980	81000	51.86			0.00			0.00			0.00			0.00				81000.0	51.86
1981	84000	77.82			0.00			0.00			0.00			0.00				84000.0	77.82
1982	87000	103.79			0.00			0.00			0.00			0.00				87000.0	103.79
1983	90000	129.79			0.00			0.00			0.00			0.00				90000.0	129.79
1984	94000	154.07			0.00			0.00			0.00			0.00				94000.0	154.07
1985	98000	178.71			0.00			0.00			0.00			0.00				98000.0	178.71
1986	102000	203.69			0.00			0.00			0.00			0.00				102000.0	203.69
1987	104000	228.99			0.00			0.00			0.00			0.00				104000.0	228.99
1988	114000	253.96			0.00			0.00			0.00			0.00				114000.0	253.96
1989	146000	279.02			0.00			0.00			0.00			0.00				146000.0	279.02
1990	151000	312.93			0.00			0.00			0.00			0.00				151000.0	312.93
1991	155000	347.04			0.00			0.00			0.00			0.00				155000.0	347.04
1992	200000	381.05			0.00			0.00			0.00			0.00				200000.0	381.05
1993	255937	427.54			0.00			0.00			0.00			0.00				255937.0	427.54
1994	269063	484.48			0.00			0.00			0.00			0.00				269063.0	484.48
1995	269063	542.97			0.00			0.00			0.00			0.00				269063.0	542.97
1996	269063	599.16			0.00			0.00			0.00			0.00				269063.0	599.16
1997		653.16	265852.0	70.1	0.00	46690.0	12.3	0.00			0.00	45082.0	11.9	0.00	21586.0	5.7	0.00	379210.0	653.16
1998		627.55	283395.0	71.7	146.74	50312.0	12.7	3.38			0.00	38467.0	9.7	3.26	23273.0	5.9	0.00	395447.0	780.92
1999		602.94	299558.0	73.4	297.41	54668.0	13.4	6.92			0.00	36824.0	9.0	5.95	17005.0	4.2	0.00	408055.0	913.21
2000		579.30	282620.0	69.0	451.09	52476.0	12.8	10.66			0.00	39986.0	9.8	8.43	34769.0	8.5	0.00	409851.0	1049.49
2001		556.58	297873.0	69.9	589.40	50933.0	12.0	14.14			0.00	42110.0	9.9	11.08	35077.0	8.2	0.00	425993.0	1171.20
2002		534.76	307058.0	67.7	730.71	50287.0	11.1	17.41			0.00	76079.0	16.8	13.79	20034.0	4.4	0.00	453458.0	1296.67
2003		513.79	251856.0	45.7	871.54	38318.0	7.0	20.53			0.00	217707.0	39.5	18.89	42779.0	7.8	0.00	550660.0	1424.75
2004		493.64	418075.3	71.3	976.38	16772.0	2.9	22.70			0.00	96563.0	16.5	34.07	55151.4	9.4	0.00	586561.7	1526.80
2005		474.29	422807.3	73.9	1168.86	25573.2	4.5	23.24			0.00	83513.5	14.6	40.05	40453.2	7.1	0.00	572347.2	1706.44
2006		455.69	449037.0	72.6	1356.40	32200.0	5.2	24.40			0.00	102845.0	16.6	44.91	34259.0	5.5	0.00	618341.0	1881.40
2007		437.82	417750.7	76.4	1551.07	20066.6	3.7	26.01			0.00	89634.5	16.4	51.02	19546.5	3.6	0.00	546998.2	2065.92
2008		420.66	365353.5	69.3	1720.83	11307.4	2.1	26.69			0.00	111850.7	21.2	55.99	38804.5	7.4	0.00	527316.1	2224.17
2009		404.16	311835.9	62.3	1855.02	9334.0	1.9	26.72			0.00	151182.2	30.2	62.42	28340.8	5.7	0.00	500692.9	2348.33
2010		388.31	304803.2	66.5	1954.41	6884.0	1.5	26.60			0.00	103498.7	22.6	71.51	43401.8	9.5	0.00	458587.8	2440.84
2011		373.09	322017.5	66.7	2046.01	8090.8	1.7	26.32			0.00	75795.7	15.7	76.88	77130.6	16.0	0.00	483034.6	2522.30
2012		358.46	333075.3	70.3	2143.53	6963.0	1.5	26.12			0.00	57172.4	12.1	80.09	76340.4	16.1	0.00	473551.0	2608.21
2013		344.40	306905.1	64.1	2243.33	10436.7	2.2	25.86			0.00	69313.8	14.5	81.86	92453.3	19.3	0.00	479108.8	2695.45
2014		330.90	338242.9	67.7	2324.76	23514.0	4.7	25.85			0.00	97269.0	19.5	84.45	40743.4	8.2	0.00	499769.3	2765.96
2015		317.92	379734.0	71.8	2420.31	20019.7	3.8	26.78	2871.2	0.5	0.00	114271.8	21.6	88.99	12049.0	2.3	0.00	528945.8	2854.01
2016		305.46	418705.8	75.3	2535.00	14133.0	2.5	27.44	2958.6	0.5	2.23	72823.7	13.1	94.63	47278.0	8.5	0.00	555899.0	2964.76
2017		293.48	733666.1	77.6	2666.72	20768.3	2.2	27.65	3088.1	0.3	4.42	95369.3	10.1	97.10	91951.0	9.7	0.00	944842.8	3089.36
2018		281.97	780921.6	77.0	2967.11	21229.9	2.1	28.33	3059.1	0.3	6.60	135685.9	13.4	101.12	72991.0	7.2	0.00	1013887.6	3385.14
2019		270.92	767375.4	73.5	3281.81	28746.8	2.8	29.03	29816.3	2.9	8.65	107788.4	10.3	107.95	109767.4	10.5	0.00	1043494.3	3698.36
2020		260.29	601846.5	70.0	3576.69	27222.0	3.2	30.25	19517.9	2.3	31.38	67632.2	7.9	112.55	143705.6	16.7	0.00	859924.3	4011.17
2021		250.09	564000.0		3768.64	24000.0		31.33	24000.0		45.01	64000.0		114.12	124000.0		0.00	800000.0	4209.18
2022		240.28	564000.0		3932.18	24000.0		32.14	24000.0		61.45	64000.0		115.37	124000.0		0.00	800000.0	4381.42
2023		230.86	564000.0		4089.30	24000.0		32.92	24000.0		77.09	64000.0		116.59	124000.0		0.00	800000.0	4546.77
2024		221.81	564000.0		4240.27	24000.0		33.69	24000.0		91.96	64000.0		117.77	124000.0		0.00	800000.0	4705.50
2025		213.11	564000.0		4385.31	24000.0		34.43	24000.0		106.11	64000.0		118.92	124000.0		0.00	800000.0	4857.88
2026		204.76	564000.0		4524.67	24000.0		35.14	24000.0		119.57	64000.0		120.03	124000.0		0.00	800000.0	5004.18
2027		196.73	564000.0		4658.56	24000.0		35.84	24000.0		132.38	64000.0		121.12	124000.0		0.00	800000.0	5144.62
2028		189.01	564000.0		4787.20	24000.0		36.52	24000.0		144.56	64000.0		122.16	124000.0		0.00	800000.0	5279.45
2029		181.60	564000.0		4910.80	24000.0		37.17	24000.0		156.14	64000.0		123.18	124000.0		0.00	800000.0	5408.90
2030		174.48	564000.0		5029.55	24000.0		37.81	24000.0		167.16	64000.0		124.17	124000.0		0.00	800000.0	5533.18
2031		167.64	564000.0		5143.65	24000.0		38.43	24000.0		177.64	64000.0		125.13	124000.0		0.00	800000.0	5652.49
2032		161.07	564000.0		5253.27	24000.0		39.03	24000.0		187.62	64000.0		126.06	124000.0		0.00	800000.0	5767.04
2033		154.75	564000.0		5358.60	24000.0		39.61	24000.0		197.10	64000.0		126.96	124000.0		0.00	800000.0	5877.02
2034		148.68	564000.0		5459.79	24000.0		40.18	24000.0		206.12	64000.0		127.84	124000.0		0.00	800000.0	5982.61

	1978-1996 Model		MSW			C&D			Organics			Special Waste			Inert			Overall Gas Generated (Combined Models)	
	L_0:	80	L_0:		115	L_0:		20	L_0:		130	L_0:		20	L_0:		0		
	k:	0.04	k:		0.04	k:		0.03	k:		0.05	k:		0.03	k:		0		
Year	Waste Accepted (tons)	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	Flow (av ft^3/min)
2035		142.85	564000.0		5557.02	24000.0		40.72	24000.0		214.71	64000.0		128.69	124000.0		0.00	800000.0	6083.99
2036		137.25	564000.0		5650.43	24000.0		41.26	24000.0		222.87	64000.0		129.51	124000.0		0.00	800000.0	6181.32
2037		131.87	564000.0		5740.18	24000.0		41.77	24000.0		230.64	64000.0		130.31	124000.0		0.00	800000.0	6274.77
2038		126.70	564000.0		5826.41	24000.0		42.27	24000.0		238.02	64000.0		131.09	124000.0		0.00	800000.0	6364.50
2039		121.73	564000.0		5909.26	24000.0		42.76	24000.0		245.05	64000.0		131.84	124000.0		0.00	800000.0	6450.65
2040		116.96	564000.0		5988.86	24000.0		43.23	24000.0		251.73	64000.0		132.58	124000.0		0.00	800000.0	6533.37
2041		112.37	564000.0		6065.35	24000.0		43.69	24000.0		258.09	64000.0		133.29	124000.0		0.00	800000.0	6612.79
2042		107.97	564000.0		6138.83	24000.0		44.13	24000.0		264.14	64000.0		133.98	124000.0		0.00	800000.0	6689.04
2043		103.73	564000.0		6209.43	24000.0		44.57	24000.0		269.89	64000.0		134.64	124000.0		0.00	800000.0	6762.26
2044		99.67	564000.0		6277.26	24000.0		44.98	24000.0		275.37	64000.0		135.29	124000.0		0.00	800000.0	6832.57
2045		95.76	564000.0		6342.43	24000.0		45.39	24000.0		280.57	64000.0		135.92	124000.0		0.00	800000.0	6900.07
2046		92.00			6405.05			45.78			285.52			136.53					6964.89
2047		88.40			6153.90			44.43			271.60			132.50					6690.83
2048		84.93			5912.61			43.12			258.35			128.58					6427.59
2049		81.60			5680.77			41.84			245.75			124.78					6174.75
2050		78.40			5458.02			40.61			233.77			121.09					5931.89
2051		75.33			5244.01			39.41			222.37			117.52					5698.63
2052		72.37			5038.39			38.24			211.52			114.04					5474.57
2053		69.53			4840.83			37.11			201.21			110.67					5259.36
2054		66.81			4651.02			36.02			191.39			107.40					5052.64
2055		64.19			4468.65			34.95			182.06			104.23					4854.08
2056		61.67			4293.43			33.92			173.18			101.15					4663.35
2057		59.25			4125.09			32.92			164.73			98.16					4480.14
2058		56.93			3963.34			31.94			156.70			95.26					4304.17
2059		54.70			3807.93			31.00			149.06			92.44					4135.13
2060		52.55			3658.62			30.08			141.79			89.71					3972.75
2061		50.49			3515.17			29.19			134.87			87.06					3816.78
2062		48.51			3377.33			28.33			128.29			84.49					3666.96
2063		46.61			3244.91			27.49			122.04			81.99					3523.04
2064		44.78			3117.67			26.68			116.09			79.57					3384.79
2065		43.03			2995.43			25.89			110.42			77.21					3251.98
2066		41.34			2877.97			25.13			105.04			74.93					3124.41
2067		39.72			2765.13			24.38			99.92			72.72					3001.86
2068		38.16			2656.71			23.66			95.04			70.57					2884.14
2069		36.66			2552.53			22.96			90.41			68.48					2771.05
2070		35.23			2452.45			22.29			86.00			66.46					2662.42
2071		33.85			2356.29			21.63			81.80			64.49					2558.06
2072		32.52			2263.89			20.99			77.81			62.59					2457.80
2073		31.24			2175.13			20.37			74.02			60.74					2361.49
2074		30.02			2089.84			19.77			70.41			58.94					2268.97
2075		28.84			2007.89			19.18			66.98			57.20					2180.09
2076		27.71			1929.16			18.61			63.71			55.51					2094.71
2077		26.62			1853.52			18.06			60.60			53.87					2012.68
2078		25.58			1780.84			17.53			57.65			52.28					1933.88
2079		24.58			1711.01			17.01			54.83			50.73					1858.17
2080		23.61			1643.92			16.51			52.16			49.23					1785.44
2081		22.69			1579.47			16.02			49.62			47.78					1715.57
2082		21.80			1517.53			15.55			47.20			46.37					1648.44
2083		20.94			1458.03			15.09			44.89			45.00					1583.95
2084		20.12			1400.86			14.64			42.71			43.67					1522.00
2085		19.33			1345.93			14.21			40.62			42.38					1462.47
2086		18.57			1293.16			13.79			38.64			41.12					1405.29
2087		17.85			1242.45			13.38			36.76			39.91					1350.35
2088		17.15			1193.73			12.99			34.96			38.73					1297.56
2089		16.47			1146.93			12.60			33.26			37.58					1246.85
2090		15.83			1101.96			12.23			31.64			36.47					1198.13
2091		15.21			1058.75			11.87			30.09			35.40					1151.31
2092		14.61			1017.23			11.52			28.63			34.35					1106.34
2093		14.04			977.35			11.18			27.23			33.33					1063.13

	1978-1996 Model		MSW			C&D			Organics			Special Waste			Inert			Overall Gas Generated (Combined Models)	
	L_0: 80		L_0: 115			L_0: 20			L_0: 130			L_0: 20			L_0: 0				
	k: 0.04		k: 0.04			k: 0.03			k: 0.05			k: 0.03			k: 0				
Year	Waste Accepted (tons)	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	% Total	Flow (av ft^3/min)	Waste Accepted (tons)	Flow (av ft^3/min)
2094		13.49			939.02			10.85			25.90			32.35					1021.61
2095		12.96			902.21			10.53			24.64			31.39					981.72
2096		12.45			866.83			10.22			23.44			30.46					943.40
2097		11.96			832.84			9.91			22.29			29.56					906.58
2098		11.49			800.18			9.62			21.21			28.69					871.20
2099		11.04			768.81			9.34			20.17			27.84					837.20
2100		10.61			738.66			9.06			19.19			27.02					804.54
2101		10.19			709.70			8.79			18.25			26.22					773.16
2102		9.79			681.87			8.53			17.36			25.45					743.01
2103		9.41			655.14			8.28			16.52			24.69					714.04
2104		9.04			629.45			8.04			15.71			23.96					686.20
2105		8.69			604.77			7.80			14.94			23.26					659.45
2106		8.35			581.05			7.57			14.22			22.57					633.75
2107		8.02			558.27			7.34			13.52			21.90					609.06
2108		7.70			536.38			7.13			12.86			21.25					585.33
2109		7.40			515.35			6.92			12.24			20.63					562.53
2110		7.11			495.14			6.71			11.64			20.02					540.62
2111		6.83			475.73			6.51			11.07			19.43					519.57
2112		6.57			457.07			6.32			10.53			18.85					499.34
2113		6.31			439.15			6.13			10.02			18.29					479.90
2114		6.06			421.93			5.95			9.53			17.75					461.23
2115		5.82			405.39			5.78			9.06			17.23					443.28
2116		5.59			389.49			5.61			8.62			16.72					426.03
2117		5.38			374.22			5.44			8.20			16.23					409.46
2118		5.16			359.55			5.28			7.80			15.75					393.54

Gas Generation by Waste Type



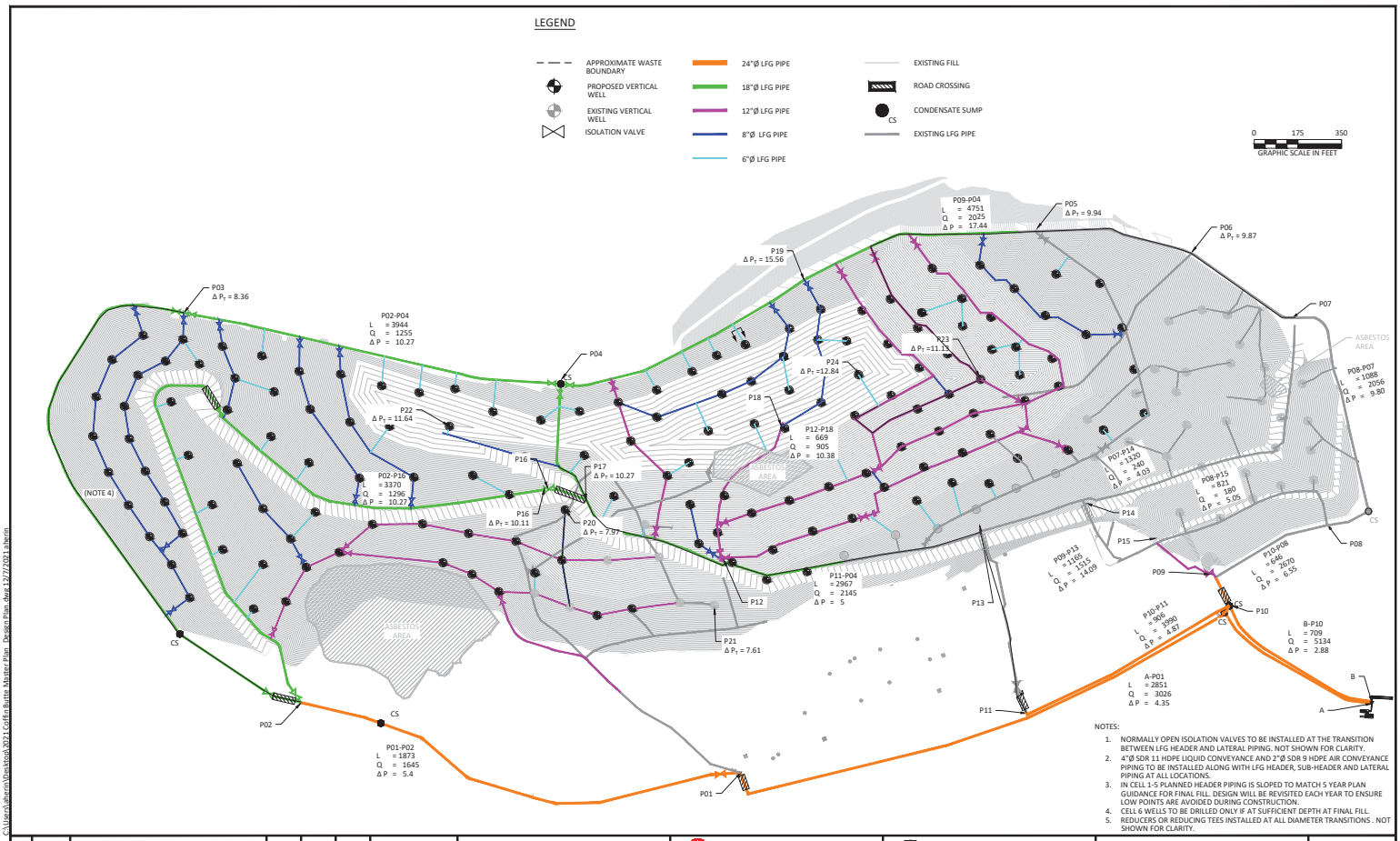
Appendix C: Pressure Loss Calculations for LFG Header and Lateral Piping

Coffin Butte Master Plan 2021

# Deep Wells	# Shallow Wells	Total Flow	LandGEM Flow (2047)
47	146	6965	6900

Blower Vacuum: 50" W.C.	**Flow per Well**	
Minimum Vacuum Need: 30" W.C.	Deep	Shallow
	55	30

Segments (Route from Facility to Point)						
Route	Deep	Shallow	Flow (Q)	Length (L)	Pipe Size (in)	Total Pressure Loss (ΔP_T)
A--1	17	55	2585	2851	24	4.4
B--10	30	91	4380	709	24	2.28
10--11	30	68	3690	906	24	4.87
9--13	15	23	1515	1165	12	14.09
11--4	15	44	2145	2967	18	5
1--2	7	42	1645	1873	24	5.4
2--4	7	29	1255	3944	18	10.27
2--16	19	10	1345	1296	18	10.11
11--12	8	33	1430	1815	18	8.01
12--18	11	10	905	669	12	10.38
18--19	5	1	305	657	8	15.56
9--4	15	40	2025	4751	18	17.44
7--14	0	8	240	1320	12	4.03
8--15	0	6	180	646	12	5.05
10--8	18	56	2670	646	18	6.55



REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	07/16/21	GCCS MASTER PLAN	PD	AH	CF

REPUBLIC SERVICES, INC.℠
28972 COFFIN BUTTE ROAD CORVALLIS OR 97330 PHONE: (541) 745-5792 FAX: (541) 745-3826

ENERGYNEERING SOLUTIONS INC
15820 BARCLAY DRIVE SISTERS, OR 97759 PHONE: (541) 549-8766 FAX: (541) 549-1901

CALCULATIONS

2021 MASTER PLAN
COFFIN BUTTE LANDFILL
CORVALLIS, OR

DRAWING NO.
M2.04

PROJECT NO.
014.524

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min

3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s

4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment A - 21

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		2851
Flow (SCFM)		3026
Fluid Velocity (ft/min)		1,640.62
Fluid Velocity (ft/s)		27.34
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		4.44
Pressure Loss_sum (in WC)		4.44

< 3,500 ft/min
< 58 ft/s
< 0.2269

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		2138
Flow (SCFM)		550
Fluid Velocity (ft/min)		1,042.58
Fluid Velocity (ft/s)		17.38
Pressure Loss/m (kPa/m)		0.0012
Pressure Loss (in WC)		3.17
Pressure Loss_sum (in WC)		7.61

< 3,500 ft/min
< 58 ft/s
< 0.2112

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White
Segment A - 20

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		2851
Flow (SCFM)		3026
Fluid Velocity (ft/min)		1,640.62
Fluid Velocity (ft/s)		27.34
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		4.44
Pressure Loss_sum (in WC)		4.44

< 3,500 ft/min
< 58 ft/s
< 0.2269

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		1565
Flow (SCFM)		635
Fluid Velocity (ft/min)		1,203.70
Fluid Velocity (ft/s)		20.06
Pressure Loss/m (kPa/m)		0.0016
Pressure Loss (in WC)		3.00
Pressure Loss_sum (in WC)		7.44

< 3,500 ft/min
< 58 ft/s
< 0.212

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		8
Pipe Length (ft)		338
Flow (SCFM)		200
Fluid Velocity (ft/min)		821.22
Fluid Velocity (ft/s)		13.69
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		0.53
Pressure Loss_sum (in WC)		7.97

< 3,500 ft/min
< 58 ft/s
< 0.2094

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment B - 24

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		**2,783.53** < 3,500 ft/min
Fluid Velocity (ft/s)		**46.39** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0033** < 0.2321
Pressure Loss (in WC)		**3.41**
Pressure Loss_sum (in WC)		**3.41**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		646
Flow (SCFM)		2670
Fluid Velocity (ft/min)		**2,547.37** < 3,500 ft/min
Fluid Velocity (ft/s)		**42.46** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0040** < 0.2165
Pressure Loss (in WC)		**3.14**
Pressure Loss_sum (in WC)		**6.55**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		1088
Flow (SCFM)		2056
Fluid Velocity (ft/min)		**1,943.30** < 3,500 ft/min
Fluid Velocity (ft/s)		**32.39** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0024** < 0.2003
Pressure Loss (in WC)		**3.25**

Pressure Loss_sum (in WC)	9.80

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment B - 23

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		3.41
Pressure Loss_sum (in WC)		3.41

< 3,500 ft/min
< 58 ft/s
< 0.2321

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		646
Flow (SCFM)		2670
Fluid Velocity (ft/min)		2,547.37
Fluid Velocity (ft/s)		42.46
Pressure Loss/m (kPa/m)		0.0040
Pressure Loss (in WC)		3.14
Pressure Loss_sum (in WC)		6.55

< 3,500 ft/min
< 58 ft/s
< 0.2165

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		1088
Flow (SCFM)		2056
Fluid Velocity (ft/min)		1,943.30
Fluid Velocity (ft/s)		32.39
Pressure Loss/m (kPa/m)		0.0024
Pressure Loss (in WC)		3.25
Pressure Loss_sum (in WC)		9.80

< 3,500 ft/min
< 58 ft/s
< 0.2003

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		496
Flow (SCFM)		390
Fluid Velocity (ft/min)		365.11

< 3,500 ft/min

Fluid Velocity (ft/s)	6.09	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0001	< 0.1999
Pressure Loss (in WC)	0.07	
Pressure Loss_sum (in WC)	9.87	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	18	
Pipe Length (ft)	636	
Flow (SCFM)	330	
Fluid Velocity (ft/min)	308.87	< 3,500 ft/min
Fluid Velocity (ft/s)	5.15	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0001	< 0.1995
Pressure Loss (in WC)	0.07	
Pressure Loss_sum (in WC)	9.94	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	18	
Pipe Length (ft)	677	
Flow (SCFM)	700	
Fluid Velocity (ft/min)	655.04	< 3,500 ft/min
Fluid Velocity (ft/s)	10.92	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0003	< 0.1981
Pressure Loss (in WC)	0.29	
Pressure Loss_sum (in WC)	10.23	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	12	
Pipe Length (ft)	712	
Flow (SCFM)	510	
Fluid Velocity (ft/min)	950.35	< 3,500 ft/min
Fluid Velocity (ft/s)	15.84	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0010	< 0.1937
Pressure Loss (in WC)	0.89	
Pressure Loss_sum (in WC)	11.13	

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment: B - 22

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		709
Flow (SCFM)		5134
Fluid Velocity (ft/min)		**2,783.53** < 3,500 ft/min
Fluid Velocity (ft/s)		**46.39** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0033** < 0.2348
Pressure Loss (in WC)		**2.88**
Pressure Loss_sum (in WC)		**2.88**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		906
Flow (SCFM)		3690
Fluid Velocity (ft/min)		**1,983.39** < 3,500 ft/min
Fluid Velocity (ft/s)		**33.06** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0018** < 0.2248
Pressure Loss (in WC)		**1.99**
Pressure Loss_sum (in WC)		**4.87**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		2630
Flow (SCFM)		1845
Fluid Velocity (ft/min)		**1,752.62** < 3,500 ft/min
Fluid Velocity (ft/s)		**29.21** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0020** < 0.1924
Pressure Loss (in WC)		**6.52**
Pressure Loss_sum (in WC)		**11.38**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		8
Pipe Length (ft)		487
Flow (SCFM)		110
Fluid Velocity (ft/min)		**446.47** < 3,500 ft/min

Fluid Velocity (ft/s)	7.44	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0004	< 0.1911
Pressure Loss (in WC)	0.26	
Pressure Loss_sum (in WC)	11.64	

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min

3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s

4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 10 - 8

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		3.41
Pressure Loss_sum (in WC)		3.41

< 3,500 ft/min
< 58 ft/s
< 0.2321

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		646
Flow (SCFM)		2670
Fluid Velocity (ft/min)		2,547.37
Fluid Velocity (ft/s)		42.46
Pressure Loss/m (kPa/m)		0.0040
Pressure Loss (in WC)		3.14
Pressure Loss_sum (in WC)		6.55

< 3,500 ft/min
< 58 ft/s
< 0.2165

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment: 8 - 15

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		3.41
Pressure Loss_sum (in WC)		3.41

< 3,500 ft/min
< 58 ft/s
< 0.2321

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		2670
Flow (SCFM)		760
Fluid Velocity (ft/min)		725.09
Fluid Velocity (ft/s)		12.08
Pressure Loss/m (kPa/m)		0.0004
Pressure Loss (in WC)		1.36
Pressure Loss_sum (in WC)		4.77

< 3,500 ft/min
< 58 ft/s
< 0.2253

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		821
Flow (SCFM)		240
Fluid Velocity (ft/min)		454.50
Fluid Velocity (ft/s)		7.58
Pressure Loss/m (kPa/m)		0.0003
Pressure Loss (in WC)		0.28
Pressure Loss_sum (in WC)		5.05

< 3,500 ft/min
< 58 ft/s
< 0.2239

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min

3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s

4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 7 - 14

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		3.41
Pressure Loss_sum (in WC)		3.41

< 3,500 ft/min
< 58 ft/s
< 0.2321

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		287
Flow (SCFM)		150
Fluid Velocity (ft/min)		285.22
Fluid Velocity (ft/s)		4.75
Pressure Loss/m (kPa/m)		0.0001
Pressure Loss (in WC)		0.04
Pressure Loss_sum (in WC)		3.45

< 3,500 ft/min
< 58 ft/s
< 0.2319

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		450
Flow (SCFM)		210
Fluid Velocity (ft/min)		399.26
Fluid Velocity (ft/s)		6.65
Pressure Loss/m (kPa/m)		0.0002
Pressure Loss (in WC)		0.12
Pressure Loss_sum (in WC)		3.57

< 3,500 ft/min
< 58 ft/s
< 0.2313

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		1354
Flow (SCFM)		240
Fluid Velocity (ft/min)		456.13

< 3,500 ft/min

Fluid Velocity (ft/s)	7.60	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0003	< 0.229
Pressure Loss (in WC)	0.46	
Pressure Loss_sum (in WC)	4.03	

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 9 - 4

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		3.41
Pressure Loss_sum (in WC)		3.41

< 3,500 ft/min
< 58 ft/s
< 0.2321

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		4751
Flow (SCFM)		2025
Fluid Velocity (ft/min)		1,932.00
Fluid Velocity (ft/s)		32.20
Pressure Loss/m (kPa/m)		0.0024
Pressure Loss (in WC)		14.03
Pressure Loss_sum (in WC)		17.44

< 3,500 ft/min
< 58 ft/s
< 0.1622

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment: 18-19

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	24	
Pipe Length (ft)	709	
Flow (SCFM)	5134	
Fluid Velocity (ft/min)	2,783.53	< 3,500 ft/min
Fluid Velocity (ft/s)	46.39	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0033	< 0.2348
Pressure Loss (in WC)	2.88	
Pressure Loss_sum (in WC)	2.88	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	24	
Pipe Length (ft)	906	
Flow (SCFM)	3990	
Fluid Velocity (ft/min)	2,144.64	< 3,500 ft/min
Fluid Velocity (ft/s)	35.74	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0021	< 0.2233
Pressure Loss (in WC)	2.29	
Pressure Loss_sum (in WC)	5.17	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	18	
Pipe Length (ft)	1815	
Flow (SCFM)	1430	
Fluid Velocity (ft/min)	1,357.17	< 3,500 ft/min
Fluid Velocity (ft/s)	22.62	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0013	< 0.2092
Pressure Loss (in WC)	2.84	
Pressure Loss_sum (in WC)	8.01	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	12	
Pipe Length (ft)	669	
Flow (SCFM)	905	
Fluid Velocity (ft/min)	1,697.47	< 3,500 ft/min

Fluid Velocity (ft/s)	28.29	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0029	< 0.1974
Pressure Loss (in WC)	2.37	
Pressure Loss_sum (in WC)	10.38	

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	8	
Pipe Length (ft)	657	
Flow (SCFM)	501	
Fluid Velocity (ft/min)	2,039.46	< 3,500 ft/min
Fluid Velocity (ft/s)	33.99	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0065	< 0.1716
Pressure Loss (in WC)	5.19	
Pressure Loss_sum (in WC)	15.56	

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 12 - 18

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		709
Flow (SCFM)		5134
Fluid Velocity (ft/min)		**2,783.53** < 3,500 ft/min
Fluid Velocity (ft/s)		**46.39** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0033** < 0.2348
Pressure Loss (in WC)		**2.88**
Pressure Loss_sum (in WC)		**2.88**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		906
Flow (SCFM)		3990
Fluid Velocity (ft/min)		**2,144.64** < 3,500 ft/min
Fluid Velocity (ft/s)		**35.74** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0021** < 0.2233
Pressure Loss (in WC)		**2.29**
Pressure Loss_sum (in WC)		**5.17**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		1815
Flow (SCFM)		1430
Fluid Velocity (ft/min)		**1,357.17** < 3,500 ft/min
Fluid Velocity (ft/s)		**22.62** < 58 ft/s
Pressure Loss/m (kPa/m)		**0.0013** < 0.2092
Pressure Loss (in WC)		**2.84**
Pressure Loss_sum (in WC)		**8.01**

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		669
Flow (SCFM)		905
Fluid Velocity (ft/min)		**1,697.47** < 3,500 ft/min

Fluid Velocity (ft/s)	28.29	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0029	< 0.1974
Pressure Loss (in WC)	2.37	
Pressure Loss_sum (in WC)	10.38	

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment: 11 - 12

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		709
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		2.88
Pressure Loss_sum (in WC)		2.88

< 3,500 ft/min
< 58 ft/s
< 0.2348

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		906
Flow (SCFM)		3990
Fluid Velocity (ft/min)		2,144.64
Fluid Velocity (ft/s)		35.74
Pressure Loss/m (kPa/m)		0.0021
Pressure Loss (in WC)		2.29
Pressure Loss_sum (in WC)		5.17

< 3,500 ft/min
< 58 ft/s
< 0.2233

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		1815
Flow (SCFM)		1430
Fluid Velocity (ft/min)		1,357.17
Fluid Velocity (ft/s)		22.62
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		2.84
Pressure Loss_sum (in WC)		8.01

< 3,500 ft/min
< 58 ft/s
< 0.2092

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 2 - 16

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		2851
Flow (SCFM)		3026
Fluid Velocity (ft/min)		1,640.62
Fluid Velocity (ft/s)		27.34
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		4.44
Pressure Loss_sum (in WC)		4.44

< 3,500 ft/min
< 58 ft/s
< 0.2269

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		1873
Flow (SCFM)		1645
Fluid Velocity (ft/min)		880.06
Fluid Velocity (ft/s)		14.67
Pressure Loss/m (kPa/m)		0.0004
Pressure Loss (in WC)		0.95
Pressure Loss_sum (in WC)		5.40

< 3,500 ft/min
< 58 ft/s
< 0.2222

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		3370
Flow (SCFM)		1345
Fluid Velocity (ft/min)		1,275.64
Fluid Velocity (ft/s)		21.26
Pressure Loss/m (kPa/m)		0.0011
Pressure Loss (in WC)		4.72
Pressure Loss_sum (in WC)		10.11

< 3,500 ft/min
< 58 ft/s
< 0.1987

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 2 - 4

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		2851
Flow (SCFM)		3026
Fluid Velocity (ft/min)		1,640.62
Fluid Velocity (ft/s)		27.34
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		4.44
Pressure Loss_sum (in WC)		4.44

< 3,500 ft/min
< 58 ft/s
< 0.2269

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		1873
Flow (SCFM)		1645
Fluid Velocity (ft/min)		880.06
Fluid Velocity (ft/s)		14.67
Pressure Loss/m (kPa/m)		0.0004
Pressure Loss (in WC)		0.95
Pressure Loss_sum (in WC)		5.40

< 3,500 ft/min
< 58 ft/s
< 0.2222

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		3944
Flow (SCFM)		1255
Fluid Velocity (ft/min)		1,190.28
Fluid Velocity (ft/s)		19.84
Pressure Loss/m (kPa/m)		0.0010
Pressure Loss (in WC)		4.88
Pressure Loss_sum (in WC)		10.27

< 3,500 ft/min
< 58 ft/s
< 0.1979

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment: 1 - 2

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		2851
Flow (SCFM)		3026
Fluid Velocity (ft/min)		**1,640.62**
Fluid Velocity (ft/s)		**27.34**
Pressure Loss/m (kPa/m)		**0.0013**
Pressure Loss (in WC)		**4.44**
Pressure Loss_sum (in WC)		**4.44**

< 3,500 ft/min
< 58 ft/s
< 0.2269

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		1873
Flow (SCFM)		1645
Fluid Velocity (ft/min)		**880.06**
Fluid Velocity (ft/s)		**14.67**
Pressure Loss/m (kPa/m)		**0.0004**
Pressure Loss (in WC)		**0.95**
Pressure Loss_sum (in WC)		**5.40**

< 3,500 ft/min
< 58 ft/s
< 0.2222

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 11 - 4

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		709
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		2.88
Pressure Loss_sum (in WC)		2.88

< 3,500 ft/min
< 58 ft/s
< 0.2348

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		906
Flow (SCFM)		3690
Fluid Velocity (ft/min)		1,983.39
Fluid Velocity (ft/s)		33.06
Pressure Loss/m (kPa/m)		0.0018
Pressure Loss (in WC)		1.99
Pressure Loss_sum (in WC)		4.87

< 3,500 ft/min
< 58 ft/s
< 0.2248

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		18
Pipe Length (ft)		2145
Flow (SCFM)		238
Fluid Velocity (ft/min)		226.08
Fluid Velocity (ft/s)		3.77
Pressure Loss/m (kPa/m)		0.0001
Pressure Loss (in WC)		0.14
Pressure Loss_sum (in WC)		5.00

< 3,500 ft/min
< 58 ft/s
< 0.2242

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min

3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s

4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 9 - 13

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		840
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		3.41
Pressure Loss_sum (in WC)		3.41

< 3,500 ft/min
< 58 ft/s
< 0.2321

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		12
Pipe Length (ft)		1165
Flow (SCFM)		1515
Fluid Velocity (ft/min)		2,880.73
Fluid Velocity (ft/s)		48.01
Pressure Loss/m (kPa/m)		0.0075
Pressure Loss (in WC)		10.69
Pressure Loss_sum (in WC)		14.09

< 3,500 ft/min
< 58 ft/s
< 0.1789

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min

3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s

4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment 10 - 11

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		709
Flow (SCFM)		5134
Fluid Velocity (ft/min)		2,783.53
Fluid Velocity (ft/s)		46.39
Pressure Loss/m (kPa/m)		0.0033
Pressure Loss (in WC)		2.88
Pressure Loss_sum (in WC)		2.88

< 3,500 ft/min
< 58 ft/s
< 0.2348

Length 2 (next closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		906
Flow (SCFM)		3690
Fluid Velocity (ft/min)		1,983.39
Fluid Velocity (ft/s)		33.06
Pressure Loss/m (kPa/m)		0.0018
Pressure Loss (in WC)		1.99
Pressure Loss_sum (in WC)		4.87

< 3,500 ft/min
< 58 ft/s
< 0.2248

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White
Segment: B - 1

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)	24	
Pipe Length (ft)	709	
Flow (SCFM)	5134	
Fluid Velocity (ft/min)	2,783.53	< 3,500 ft/min
Fluid Velocity (ft/s)	46.39	< 58 ft/s
Pressure Loss/m (kPa/m)	0.0033	< 0.2348
Pressure Loss (in WC)	2.88	
Pressure Loss_sum (in WC)	2.88	

LFG Header Pressure Loss Calculations

1. Input data into green text cells
2. LFG 'Rule of Thumb': Fluid Velocity < ~3,500 ft/min
3. Gases and Vapors General 'Rule of Thumb': Fluid Velocity < 15-30 m/s
4. Gases and Vapors General 'Rule of Thumb': kPa/m < 0.02 percent of line pressure

Fittings are not incorperated in this program

Equations Used:
Darcy-Weisbach
Colebrook-White

Assumptions
Standard Conditions
Temperature: 68
Relative Humidity: 0%
Barometric Pressure: 14.7 psi
Viscosity based off 50%CH4 + 50%CO2.
Density:

SCFM is assumed with Standard Conditions

Segment: A - 1

Site Conditions	
System Vacuum (in WC)	50
Fluid Temp (F)	100
Fluid Relative Humidity (%)	100%
Local Barometric Pressure (psi)	14.7

add equations Darcy, colebrook-white
refereance conditions
SCFM defined at 68, 0%, 14.7 psi
add "no fittings"
Verify density
add "viscosity 50%50%"

Length 1 (closest to vacuum source)		
Type of Pipe	SDR_17_HDPE	
Pipe Size (in)		24
Pipe Length (ft)		2851
Flow (SCFM)		3026
Fluid Velocity (ft/min)		1,640.62
Fluid Velocity (ft/s)		27.34
Pressure Loss/m (kPa/m)		0.0013
Pressure Loss (in WC)		4.44
Pressure Loss_sum (in WC)		4.44

< 3,500 ft/min
< 58 ft/s
< 0.2269

Appendix D: Radius of Influence Calculations

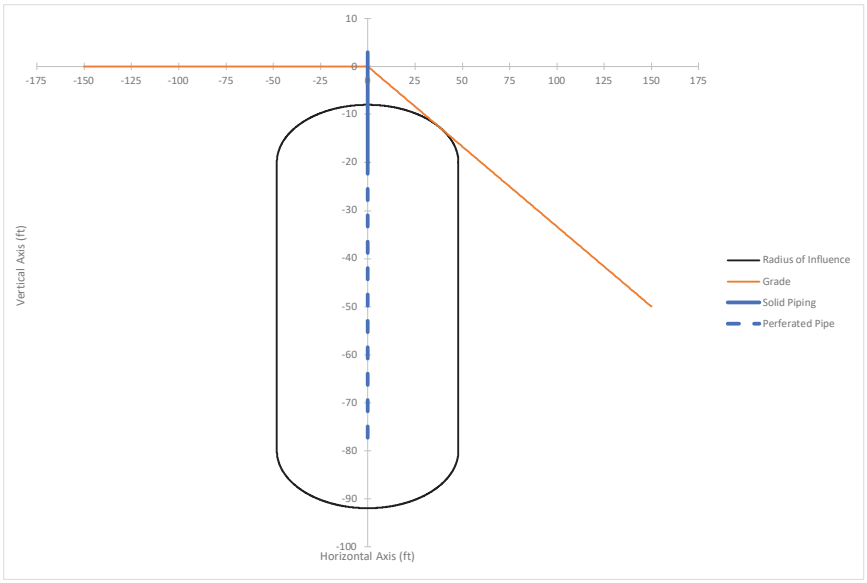
ESI Radius of Influence Calculator

Site: Coffin Butte Landfill
Location: Corvallis, Oregon
Project: 2021 GCCS Design Plan

How to use program:
1. Input length of solid pipe. (Min 20 feet)
2. Select a Permeability Ratio.
3. Select the type of grade if near a slope, or flat surface.
4. Selete type of Landfill Conditions, or Select "User Input" if the conditions are known.
Assumptions:
-Verticle Well located at the edge of slope (if a slope is used).
-The location of the pressure is a foot away from the center of the pipe and assuming. the edge of the ROI is zero. Pressure at well head would need to be slightly higher than the one calculated.

The drawing on the right will automatically update as inputs are calculated. This gives a basic visual representation of what is happening inside of the landfill.

Pipe Conditions		
Length of Solid Pipe (ft)	20	MIN. 20 ft
Length of Perferated Pipe (ft)	60	
Permeability Ratio	4:1 (Average)	
Slope of Grade	3:1 (Typical)	
Landfill Conditions		
Waste Type	Higher Density	Values based on Selected Waste Type
G_M (User Input Only) (ft^3/lb·yr)		G_M 0.1
ρ_w (User Input Only) (lb/yd^3)		ρ_w 2000
K (User Input Only) (cm/sec)		K 0.0005
Max Radius of Influence		
Max Radius of Influence (ft)	48.0	
Vacuum Pressure Needed to obtain ROI		
Vacuum Pressure (in WC)	-0.72	



Definitions:
G_M = LFG generation rate per unit mass
ρ_w = Waste Density
K = Horizontal or radial landfill permeability with respect to LFG
If user is unsure about these values or conditions of the landfill, use the typical value where needed.
Equation Used:

$$\Delta\Psi = \frac{1}{3}\frac{G_M \rho_w}{K}\left(R_l^2 \ln R_l - \frac{1}{2} R_l^2 + \frac{1}{2}\right)$$

R_l = Radius of Influence
$\Delta\Psi$ = Vacuum Headed
*Refer to Dillah-McCarron-Balwinder SCS Model Report

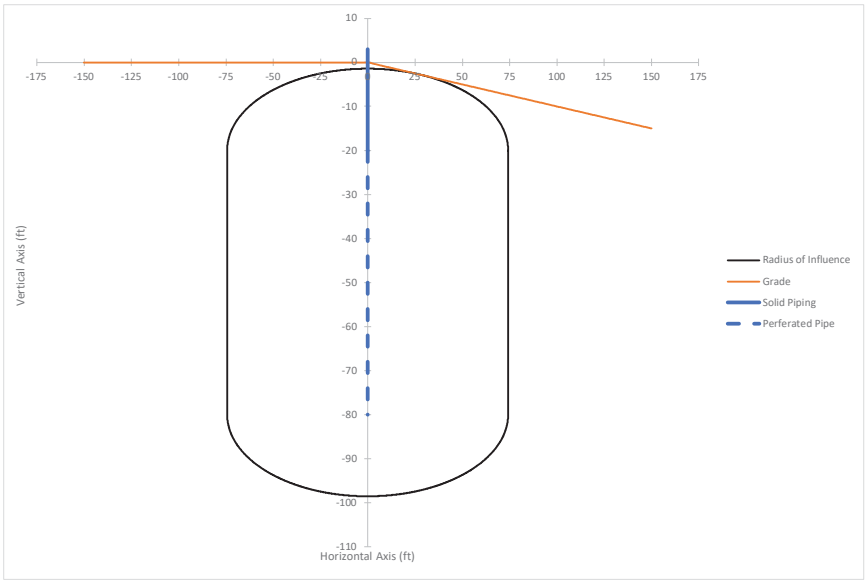
ESI Radius of Influence Calculator

Site: Coffin Butte Landfill
Location: Corvallis, Oregon
Project: 2021 GCCS Design Plan

How to use program:
1. Input length of solid pipe. (Min 20 feet)
2. Select a Permeability Ratio.
3. Select the type of grade if near a slope, or flat surface.
4. Selete type of Landfill Conditions, or Select "User Input" if the conditions are known.
Assumptions:
-Verticle Well located at the edge of slope (if a slope is used).
-The location of the pressure is a foot away from the center of the pipe and assuming. the edge of the ROI is zero. Pressure at well head would need to be slightly higher than the one calculated.

The drawing on the right will automatically update as inputs are calculated. This gives a basic visual representation of what is happening inside of the landfill.

Pipe Conditions		
Length of Solid Pipe (ft)	20	MIN. 20 ft
Length of Perferated Pipe (ft)	60	
Permeability Ratio	4:1 (Average)	
Slope of Grade	10:1 (Slight Slope)	
Landfill Conditions		
Waste Type	Higher Density	Values based on Selected Waste Type
G_M (User Input Only) (ft^3/lb·yr)		G_M 0.1
ρ_w (User Input Only) (lb/yd^3)		ρ_w 2000
K (User Input Only) (cm/sec)		K 0.0005
Max Radius of Influence		
Max Radius of Influence (ft)	74.3	
Vacuum Pressure Needed to obtain ROI		
Vacuum Pressure (in WC)	-1.96	



Definitions:
G_M = LFG generation rate per unit mass
ρ_w = Waste Density
K = Horizontal or radial landfill permeability with respect to LFG
If user is unsure about these values or conditions of the landfill, use the typical value where needed.
Equation Used:

$$\Delta\Psi = \frac{1}{3}\frac{G_M \rho_w}{K}\left(R_l^2 \ln R_l - \frac{1}{2} R_l^2 + \frac{1}{2}\right)$$

R_l = Radius of Influence
$\Delta\Psi$ = Vacuum Headed
*Refer to Dillah-McCarron-Balwinder SCS Model Report

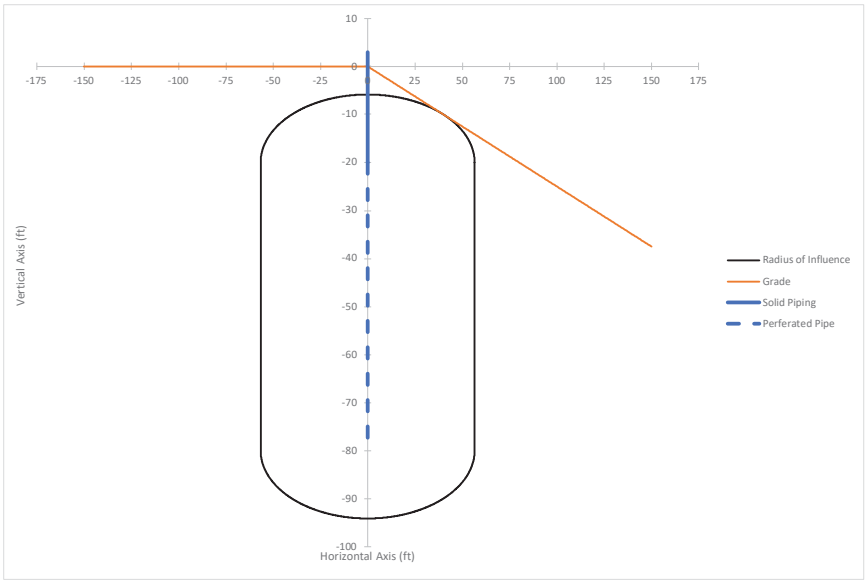
ESI Radius of Influence Calculator

Site: Coffin Butte Landfill
Location: Corvallis, Oregon
Project: 2021 GCCS Design Plan

How to use program:
1. Input length of solid pipe. (Min 20 feet)
2. Select a Permeability Ratio.
3. Select the type of grade if near a slope, or flat surface.
4. Selete type of Landfill Conditions, or Select "User Input" if the conditions are known.
Assumptions:
-Verticle Well located at the edge of slope (if a slope is used).
-The location of the pressure is a foot away from the center of the pipe and assuming. the edge of the ROI is zero. Pressure at well head would need to be slightly higher than the one calculated.

The drawing on the right will automatically update as inputs are calculated. This gives a basic visual representation of what is happening inside of the landfill.

Pipe Conditions		
Length of Solid Pipe (ft)	20	MIN. 20 ft
Length of Perferated Pipe (ft)	60	
Permeability Ratio	4:1 (Average)	
Slope of Grade	4:1 (Gradual)	
Landfill Conditions		
Waste Type	Higher Density	Values based on Selected Waste Type
G_M (User Input Only) (ft^3/lb·yr)		G_M 0.1
ρ_w (User Input Only) (lb/yd^3)		ρ_w 2000
K (User Input Only) (cm/sec)		K 0.0005
Max Radius of Influence		
Max Radius of Influence (ft)	56.6	
Vacuum Pressure Needed to obtain ROI		
Vacuum Pressure (in WC)	-1.06	



Definitions:
G_M = LFG generation rate per unit mass
ρ_w = Waste Density
K = Horizontal or radial landfill permeability with respect to LFG
If user is unsure about these values or conditions of the landfill, use the typical value where needed.
Equation Used:

$$\Delta\Psi = \frac{1}{3}\frac{G_M \rho_w}{K}\left(R_l^2 \ln R_l - \frac{1}{2} R_l^2 + \frac{1}{2}\right)$$

R_l = Radius of Influence
$\Delta\Psi$ = Vacuum Headed
*Refer to Dillah-McCarron-Balwinder SCS Model Report

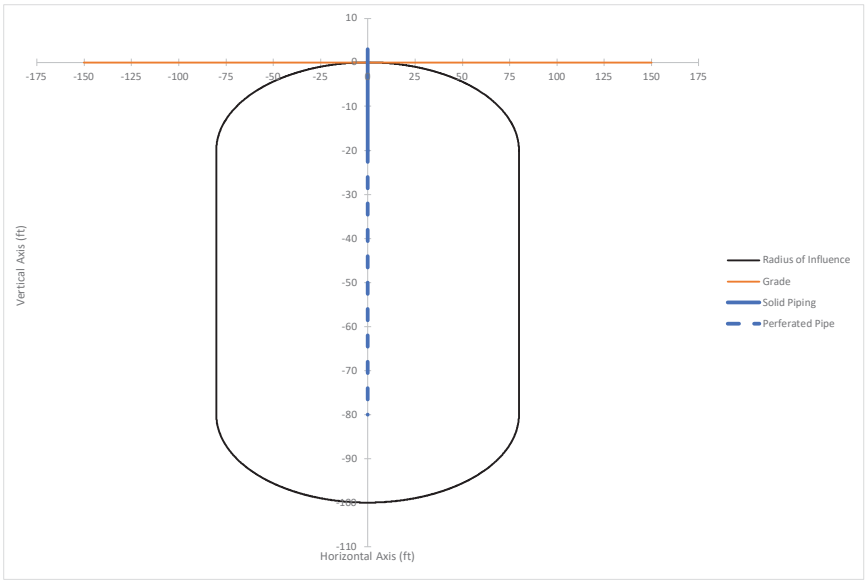
ESI Radius of Influence Calculator

Site: Coffin Butte Landfill
Location: Corvallis, Oregon
Project: 2021 GCCS Design Plan

How to use program:
1. Input length of solid pipe. (Min 20 feet)
2. Select a Permeability Ratio.
3. Select the type of grade if near a slope, or flat surface.
4. Selete type of Landfill Conditions, or Select "User Input" if the conditions are known.
Assumptions:
-Verticle Well located at the edge of slope (if a slope is used).
-The location of the pressure is a foot away from the center of the pipe and assuming. the edge of the ROI is zero. Pressure at well head would need to be slightly higher than the one calculated.

The drawing on the right will automatically update as inputs are calculated. This gives a basic visual representation of what is happening inside of the landfill.

Pipe Conditions		
Length of Solid Pipe (ft)	20	MIN. 20 ft
Length of Perferated Pipe (ft)	60	
Permeability Ratio	4:1 (Average)	
Slope of Grade	1:0 (Flat)	
Landfill Conditions		
Waste Type	Higher Density	Values based on Selected Waste Type
G_M (User Input Only) (ft^3/lb·yr)		G_M 0.1
ρ_w (User Input Only) (lb/yd^3)		ρ_w 2000
K (User Input Only) (cm/sec)		K 0.0005
Max Radius of Influence		
Max Radius of Influence (ft)	80.0	
Vacuum Pressure Needed to obtain ROI		
Vacuum Pressure (in WC)	-2.32	



Definitions:
G_M = LFG generation rate per unit mass
ρ_w = Waste Density
K = Horizontal or radial landfill permeability with respect to LFG
If user is unsure about these values or conditions of the landfill, use the typical value where needed.
Equation Used:

$$\Delta\Psi = \frac{1}{3}\frac{G_M \rho_w}{K}\left(R_l^2 \ln R_l - \frac{1}{2} R_l^2 + \frac{1}{2}\right)$$

R_l = Radius of Influence
$\Delta\Psi$ = Vacuum Headed
*Refer to Dillah-McCarron-Balwinder SCS Model Report

APPENDIX E: COMPRESSOR SIZING CALCULATIONS

ESI Air Compressor System Sizing Calculator

Input value
Calculated value
Selected Equipment

Project: Coffin Butte Landfill
Date: 4/5/2021

Assumptions:
1) All wells that have pumps cycle simlutaneously.
2) The QED AP4.5 Ultra pump is used in all wells with 1" I.D. discharge pipe.
3) Average well depth is modeled as 120 ft.

Calculations

Description	Value	Notes
Air Usage (scf/gal)	1.1	From QED AP4.5 Ultra Specification Sheet
Liquid Discharge rate (gpm)	5	Based on typical usage (pump cycles at ~40% capacity)
System Air Pressure (psig)	100	Pressure that will be used to operate the pumps
Air Flow Req. per Pump (scfm)	5.5	See Equation 1
Percent of Wells with Pumps	***70%***	
Compressor Used	Sullair 3709VB Series	

Results

Years from Present	# of Wells[A]	Air Flow Req.[B] (SCFM)	Air Flow Req. @ 100 psig[C] (ACFM)	Capacity of wells pumped simultaneously
5	110	424	62	100%
10	130	501	74	100%
15	160	616	91	100%

[A] Values from the 2016 GCCS Master Plan and 2020 5-year plan. Includes only vertical wells.
[B] See Equation 2
[C] See Equation 3

Equations

Equation 1
$$\left(\frac{SCF}{gal}/pump\right) * \left(\frac{gal}{min}\right) = SCFM/\text{Pump}$$

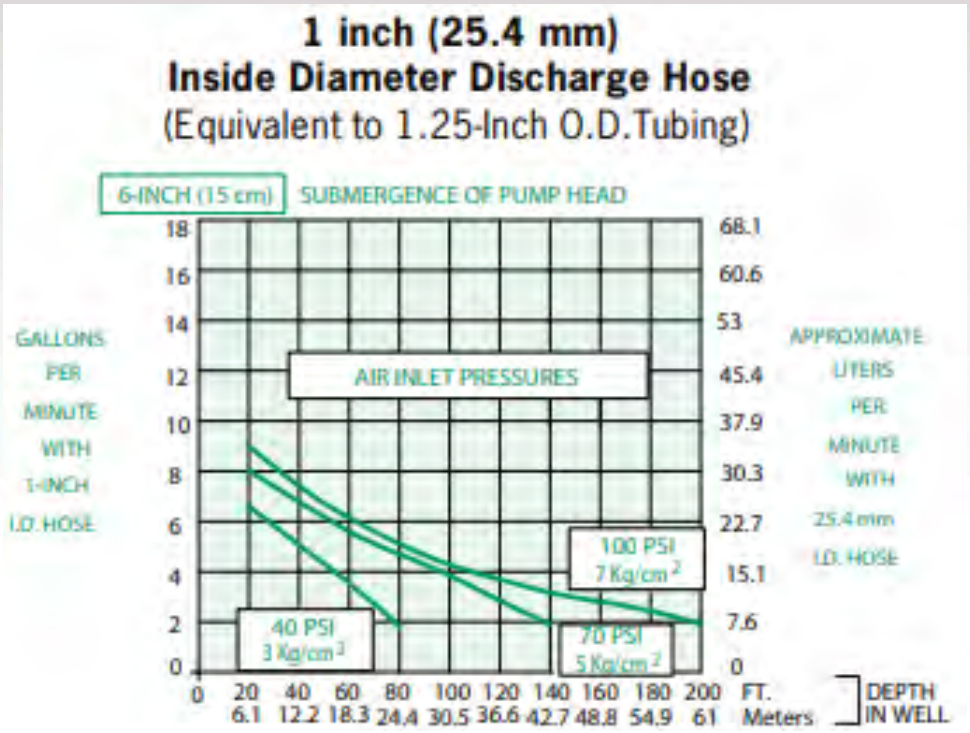
Equation 2
$$\left(\frac{SCFM}{\text{Pump}}\right) * \#\text{ of wells} = \text{SCFM req.}$$

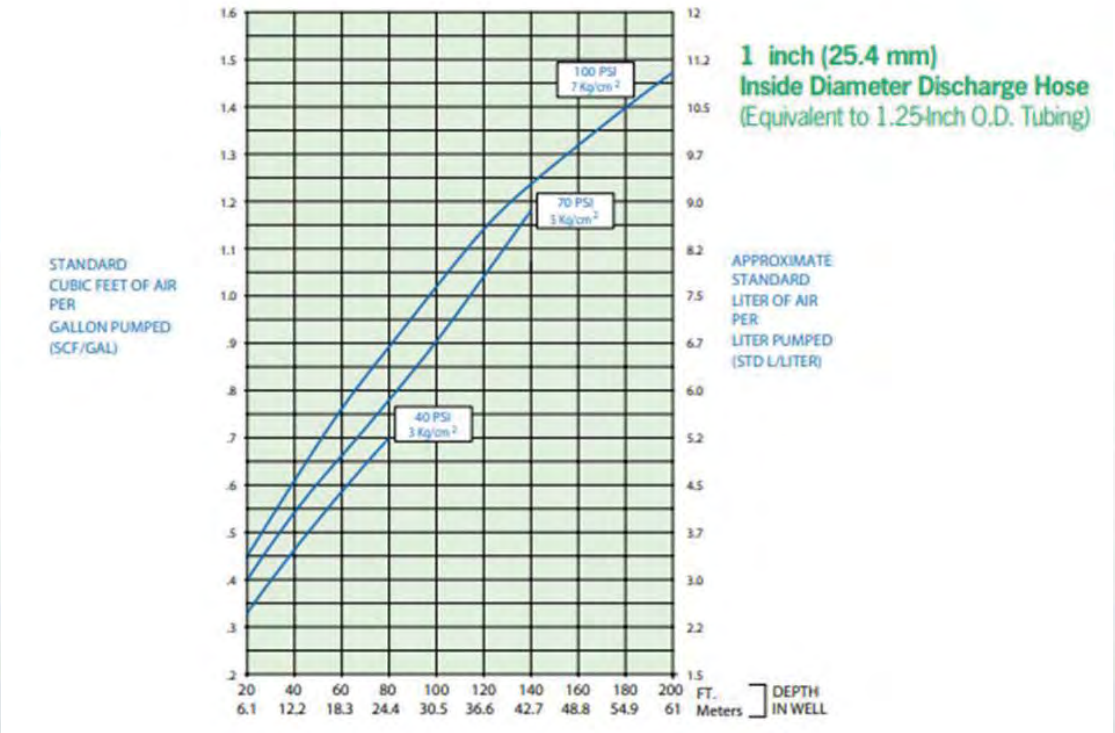
Equation 3
$$\text{SCFM req.} * \left(\frac{14.7}{100}\right) = \text{ACFM req.}$$

Preferred Equipment - Reference Values

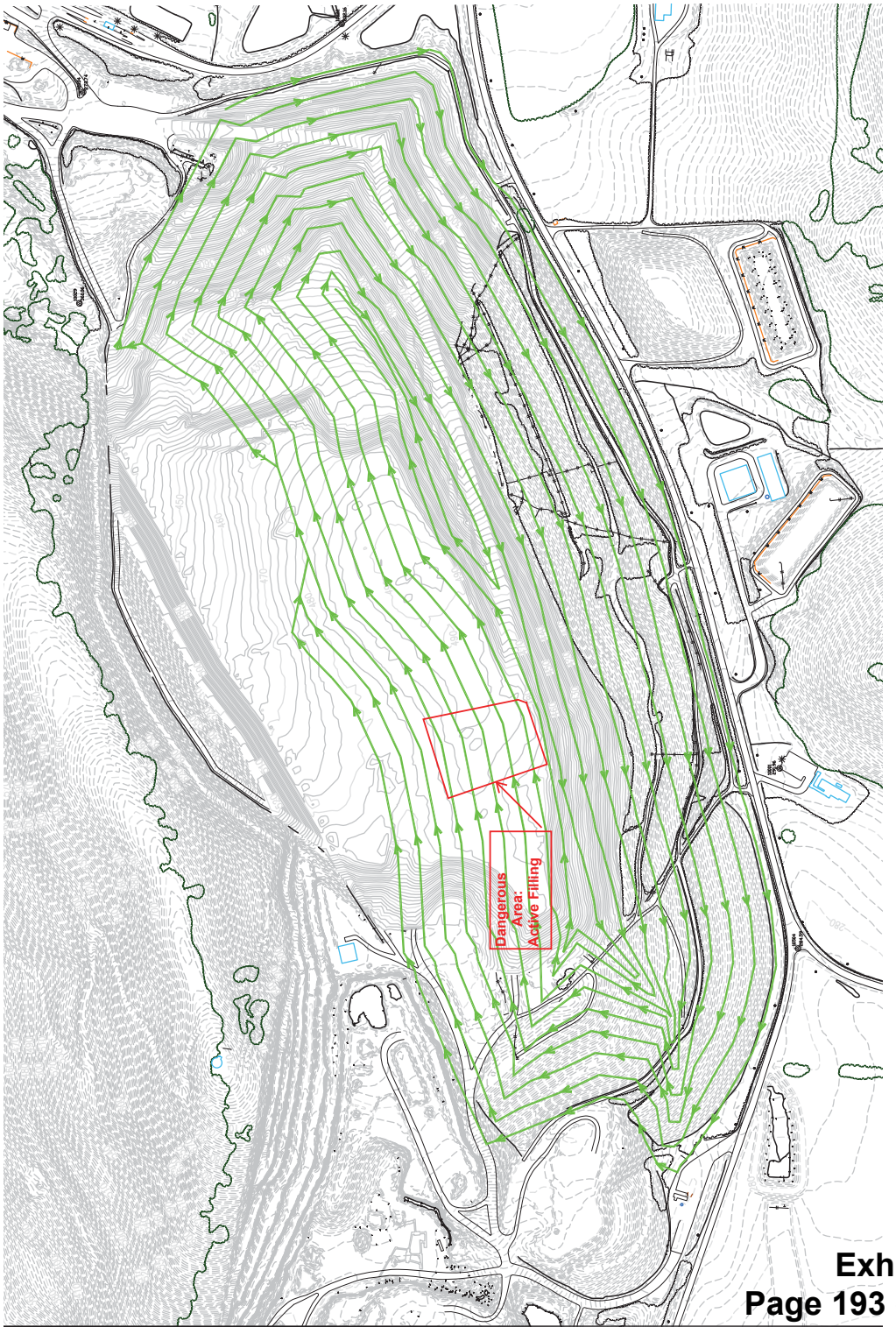
Compressor Options	Installed HP	ACFM (@100 psig)	Max Pressure (psig)
Sullair ST2208	30	127	175
Sullair 3709VB Series	50	225	210

QED AP4+ Pneumatic Pump Curves





Appendix F: Surface Emission Monitoring Plan


LEGEND:
EXISTING CONTOUR 4/7/20
300
EXISTING CONTOUR 1/14/21
470
SEM WALKING PATH
0
200
400
SCALE IN FEET
Dangerous Area: Active Filling

APPENDIX G: ALTERNATIVE OPERATION AND MONITORING PLAN (AOMP)

E ALTERNATIVES TO THE NSPS

> **§60.752(b)(2)(i)(B)** The collection and control system design plan shall include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, record keeping or reporting provisions of §60.753 through §60.758 proposed by the owner or operator.

Per 40 CFR §60.752(b)(2)(i)(B), the design plan includes proposed alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping, and reporting provisions of §60.753 through §60.758 of the NSPS. This section addresses exemptions/alternatives proposed in this submittal. All of these alternatives are acceptable to and have previously been approved by the USEPA for municipal solid waste landfills in areas of the United States.

E.1 Exclude Steep Slopes and Dangerous Areas from Surface Scan Monitoring Requirements

> **§60.753(d) Operational Standards:** "A surface monitoring design plan shall be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the thirty meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing."

The Coffin Butte Landfill is proposing to widen the spacing between intervals from 30-meters to 60-meters in areas that have a geomembrane final cover system placed. The geomembrane cover is expected to provide an excellent barrier to surface emissions, to be demonstrated by routine surface emissions monitoring conducted at the facility. The facility proposes to demonstrate this to the Oregon Department of Environmental Quality (ODEQ) by conducting surface scans initially using a 30-meter spacing. Upon demonstration that the geomembrane-covered areas are compliant for three consecutive quarters, the facility petitions to widen the spacing to 60-meters in these areas.

The facility also proposes to exclude dangerous areas such as roads, the active fill area, truck traffic areas, construction areas, areas with snow or ice cover, and slopes steeper than or equal to 5:1 from surface testing.

E.2 Determination of Oxygen Levels at LFG Monitoring Points

> **§60.753(c)(2) Operational Standards:** "Unless an alternative test method is established as allowed by § 60.752(b)(2)(i) of this subpart, the oxygen shall be determined by an oxygen meter using Method 3A or 3C..."

When applicable, the Coffin Butte Landfill is proposing to use an on-site multi-gas analyzer, in lieu of a laboratory method, for determining the oxygen content of the

landfill gas at each well and monitoring point. The site will be using a portable meter, such as a Landtec GEM-500 or equivalent, calibrated to the manufacturer's specifications, to determine the oxygen content of the gas.

E.3 Operation of Passive Wells Installed in Areas Outside of Condition 13.4

Coffin Butte Landfill requested alternative operation of the passive wells installed in areas outside of condition 13.4, Oregon Title V Operation Permit number 02-9502. This request was approved in June 9, 2006 by ODEQ. The attached request letter and approval letter can be found following this appendix.

E.4 Surface Emissions Monitoring Correction Variance

> *§60.755(c)(4): "Any reading of 500 ppm or more...shall be recorded as a monitored exceedance...cover maintenance or adjustments to the vacuum....shall be made and the location shall be remonitored within 10 calendar days after detecting the exceedance..."*

Coffin Butte Landfill is proposing for the Landfill that a variance to the 10 day window be allotted for adjustments to the cover and/or collection system. Industry experience with facilities suggests that this 10 day time frame is not reasonable to effect comprehensive repairs during all quarters of a typical year. For example, if the Landfill experiences a precipitation event following a surface scan, it may take several days or even weeks for the side slopes of the landfill to dry out enough to support construction equipment for cover repairs. If the side slopes are not sufficiently dry, the repair equipment can cause more damage to the cover (and subsequently higher emissions) than the original erosion or crack.

Poor weather conditions can prevent cover maintenance, leading the follow-up rescans 10 days later to automatically fail. This can ultimately force the installation of an unneeded extraction well, when all that was really required was enough time to make a cover repair.

Coffin Butte Landfill is therefore requesting that the 10 day rescan time frame be extended by an additional two weeks, in the event of adverse weather conditions after a quarterly surface scan (should it be determined that the cover was the cause of the failing reading). Coffin Butte Landfill is proposing to receive this two week extension automatically, upon providing written notification to the ODEQ that the extra time is needed due to adverse weather conditions. Coffin Butte Landfill will place the notification letter in the NSPS files, along with a summary of the adverse weather conditions or other condition creating the need for additional time.

E.5 Monitoring and New/Extended Extraction Wells

> *§60.756: "Except as provided in §60.752(b)(2)(i)(B),*
> *(a) Each owner or operator seeking to comply with §60.752(b)(2)(ii)(A) for an*

active gas collection system shall install a sampling port and a thermometer or other temperature measuring device at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in §60.755(a)(3); and
(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in §60.755(a)(5); and
(3) Monitor temperature of the landfill gas on a monthly basis as provided in §60.755(a)(5)."

New vertical LFG extraction wells are often placed in the active area of the landfill several years before the waste has reached final grades. This is in compliance with the NSPS. However, since the wells are placed in active areas, they periodically need to be "raised" (i.e., the well casing extended 15 to 25 feet vertically) in order to not be buried under later lifts of waste. When they are raised, the HDPE lateral line which provides the applied vacuum is temporarily disconnected until the surrounding lift of trash is brought high enough to reconnect the well. The time frame between when a well is disconnected and raised, and when the waste height is high enough to reconnect the lateral, can often range from a few weeks to a few months. This can result in missed monthly readings at the well, since the well casing is too high for the technician to safely reach.

Since the NSPS allows for exclusion of surface monitoring in "dangerous areas" of the site, Coffin Butte Landfill believes it is reasonable to request exclusion to monitoring the wells raised in active areas. The facility proposes that readings will be missed at a particular well as long as the well cannot be safely accessed. If the facility cannot bring the waste height up to the new grade and re-attach the well within a reasonable amount of time (4 months), then modifications to the lateral/wellhead, such as lowering the wellhead monitoring equipment, will be made for monitoring purposes. This request is in accordance with §60.752(b)(2)(i)(B), which allows the facility to propose alternatives to the monitoring procedures in the NSPS.

E.6 Start-Up of New Wells or Collection System

§60.755(a)(4) does not require the landfill to expand the well field due to positive pressure within the first 180 days of system operation. During the first 180 days of collection and control system operations, where oxygen and/or temperature exceedances are monitored, Coffin Butte Landfill proposes to apply all applicable corrective measures to achieve the operating standards with the following exception: expansion of the collection system to address the exceedances within 120 days. In addition, for new individual wells installed at the Landfill, Coffin Butte Landfill proposes to not expand the well field during the first 180 days of operation for any individual well in which pressure, temperature and/ or either oxygen exceedances are monitored.

E.7 Monitoring of New or Replacement Extraction Wells

GCCSs are typically built in phases to accommodate for sequential waste placement as well as to replace various wells from time to time due to damage from settlement, etc. Installation of only a few additional wells can cause challenges with balancing the entire GCCS and therefore additional time may be needed to not only achieve negative pressure in all wells but to also maintain the operating standard for oxygen and/or temperature.

Per §60.755(a)(4), Coffin Butte Landfill is not required to expand the system during the first 180 days after GCCS start-up where pressure exceedances were recorded at one or more wells. SWANA recommends that, given the well field balancing challenges, USEPA should clarify that the exemption from system expansion applies to any individual well or series of wells associated with the new well(s) upon start-up.

USEPA Response: *Request approval for alternative timeline procedure as part of the Design Plan or amendment to the Design Plan.*

Pursuant to this response from the USEPA, Coffin Butte Landfill proposes to bring new and replacement wells into compliance within 180 days of installation. During this time period, the extraction wells will be monitored, however they will not be subject to the operational and monitoring constraints under §60.753.

E.8 Monitoring of Interim LFG Collectors

SWANA has requested clarification from the USEPA as to whether additional wells or collectors, voluntarily established by the landfill operator, but not specified by the Gas Collection and Control System (GCCS) Design Plan, are subject to NSPS Operational Requirements.

This issue frequently arises when "extra" collectors are added or the leachate collection system is connected to the GCCS to control odors, to increase the quantity of LFG available for beneficial use, or to meet other landfill operating needs beyond regulatory compliance with the rule. Since a professional engineer certified that the GCCS Design Plan would meet the required level of LFG control without the use of the "extra" collectors and the Administrator approved the Design Plan, SWANA does not believe that the operating requirements should be beyond that required by the NSPS rule. Further, because these devices are installed for purposes other than to meet the requirements of the NSPS rule (i.e., odor control, energy recovery projects, etc), their design may preclude their ability to meet the stipulated operation requirements.

An example of this situation is when the leachate collection system is connected to the GCCS for odor mitigation purposes. Because the leachate collection layer extends close to the landfill surface and during initial cell development portions may even be exposed directly to air, a large amount of air can be drawn directly through the leachate system causing elevated oxygen concentrations at the wellhead. In this situation it is often impossible to limit the oxygen concentration to less than the regulatory standard of 5 percent. This, however, does not cause an operational problem as the air never moves through the waste and therefore does not increase the risk of a subsurface fire.

Another example is when LFG is collected from the leachate collection system and the leachate level rises above the perforated portion of the leachate collection riser pipe. In this situation, LFG does not move through the riser and an unrepresentative but elevated oxygen concentration can be measured if a small quantity of air accidentally enters the top of the riser.

Yet a third example is where a landfill owner or operator decides to install and operate wells in areas not yet required to have collection (i.e., initial waste placed is less than 5 years old in active fill area). There is no obligation to collect the LFG and therefore, there should be no monitoring requirements for these wells until the age of the initial waste requires such operation.

Although the NSPS rules may allow for regulatory approval of alternative oxygen standards to resolve some of theses issues, regulatory agencies have been extremely reluctant to grant such alternatives due to unfamiliarity with LFG control technology. A simpler solution would be to clarify in guidance that additional voluntary wells on collectors may be excluded from the performance standards used for wells to establish NSPS compliance.

USEPA Response: *If the collectors are located in an area of the landfill not yet required to have control (i.e., initial waste in place is not yet 2 years in closed or final grade area or 5 years old in active areas) then the monitoring and operational requirements would not apply. If however, the collectors are located in areas of the landfill which require gas control, then the collectors must be monitored and achieve operating limits for pressure, oxygen and temperature. Alternative monitoring procedures and/or operating parameters for these collectors may be requested as part of the Design Plan or addendum to the Design Plan.*

Pursuant to this response from the USEPA, Coffin Butte Landfill proposes that all GCCS connections to leachate management structures or to interim LFG collectors located in an area of the landfill not yet required to have control (i.e., initial waste in place is not yet 2 years old in closed or final grade area or 5 years old in active areas) be excluded from the NSPS operating and monitoring requirements at the Landfill.

E.9 Decommissioning LFG Collectors

Filling around LFG wells may lead to numerous vertical extensions of the vertical LFG collectors. With differential settlement that may occur with time, some vertical LFG wells may fail and cease to provide significant LFG flow. In this situation, LFG does not move through the LFG wellhead and an unrepresentative but elevated oxygen concentration can be measured if a small quantity of air accidentally enters the top of the LFG wellhead. As wells are documented to provide little or no LFG flow, the vertical wells will be decommissioned. Decommissioned wells will be documented in the site records and the semi-annual reports. No additional approval or documentation will be required to decommission wells. No future LFG wellhead monitoring will be conducted on decommissioned LFG wells. Should surface emissions or other NSPS requirements

warrant, replacement wells will be added in accordance with the NSPS to replace decommissioned wells.

The following steps will be taken when a well is decommissioned:

- Close valves;
- Disconnection of well from collection system (removal of flex hose, capping of header lateral, etc.);
- Once disconnected, monthly wellhead monitoring will not be performed on the well; and
- Physical abandonment (i.e., cut off wellhead below ground, cap and backfill). Physical abandonment may not be performed immediately following well disconnection. Timing of the physical abandonment of the well will depend on weather and landfill operating conditions or the potential for the well to recover sufficient LFG flows.

A decommissioned well may be reconnected to the system at a later date if LFG flows recover. This may be possible where a pinched well casing later shears allowing the now open pipe to extract LFG from the surrounding gravel pack. At this time monthly wellhead monitoring will be resumed.

E.10 Additional Alternatives

Coffin Butte Landfill may request additional Alternatives to the NSPS from the USEPA under a site-specific determination request. Alternatives that are subsequently approved by the USEPA will be submitted to the ODEQ as an amendment to this GCCS Design Plan.

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
Western Region - Salem Office
750 Front St. NE, Ste. 120
Salem, OR 97301-1039
(503) 378-8240
(503) 378-3684 TTY

June 9, 2006

Clyde Moore, PE
Farallon Consulting
320 3rd Ave. NE
Issaquah, WA 98027

RE: AQ-Valley Landfills
Title V Permit 02-9502
Benton County
Operation of Passive Landfill Gas Wells

Dear Mr. Moore:

The Department has received and reviewed your letter of 6/7/06 regarding operation of the passive landfill gas wells at the Valley Landfills, Coffin Butte Landfill. The Department agrees with your assessment that these passive gas wells do not need to be operated in accordance with the requirements in permit conditions 13.8 and 13.9. Because these passive gas wells are not required under condition 13.4 of the permit, they do not have to meet the New Source Performance Subpart WWW requirements.

The Department commends Valley Landfills for its ongoing efforts to reduce odorous emissions from the landfill by installing gas collection systems well in advance of any rule requirements.

If you have any questions regarding this approval, please do not hesitate to call me at 503/378-8240, ext. 234.

Sincerely,

Gary Andes
Natural Resource Specialist

Cc: Brian May
Valley Landfills
28972 Coffin Butte Road
Corvallis, OR 97330

Melissa Green
Valley Landfills
28972 Coffin Butte Road
Corvallis, OR 97330

DEQ/WVR-101 1-03

FARALLON CONSULTING
Quality Service for Environmental Solutions

COPY

320 3rd Ave. N.E.
Issaquah, WA 98027

T: 425.427.0061
F: 425.427.0067

June 7, 2006

Mr. Gary Andes
Oregon Department of Environmental Quality
750 Front Street NE
Salem, Oregon 97301-1039

RE: REQUEST FOR APPROVAL OF CHANGE IN OPERATION OF PASSIVE WELLS INSTALLED IN AREAS OUTSIDE CONDITION 13.4, OREGON TITLE V OPERATING PERMIT NUMBER 02-9502 COFFIN BUTTE LANDFILL HIGHWAY 99 AND COFFIN BUTTE ROAD, CORVALLIS, OREGON FARALLON PN: 845-002

Dear Mr. Andes:

On behalf of Valley Landfills, Inc. (VLI), Farallon Consulting, L.L.C. (Farallon) is writing to request approval of special operation of landfill gas wells located outside the areas prescribed by Condition 13.4 of Title V Operating Permit Number 02-9502 for the Coffin Butte Landfill in Corvallis, Oregon, last updated October 27, 2004 (Operating Permit). The requested change applies to certain surface and near-surface horizontal landfill gas (LFG) collection wells and pertains to the following issues:

- Operating the LFG control system with negative pressure at each well-head;
- Maintaining nitrogen concentrations in the LFG to less than 20 percent at the well-head; and
- Maintaining oxygen concentrations in the LFG to less than 5 percent at the well-head.

The basis for the requested change is provided below. The requested change does not include a request for an increase in allowable emission rates for any pollutants. Rather, the requested change actually would result in collection of a greater amount of generated LFG.

VLI is attempting to prevent emission of LFG that could potentially cause problematic odors from all areas of the Coffin Butte Landfill. Initial steps to accomplish this goal included more aggressive installation of vertical LFG collection wells in 2003, and installation of deep horizontal LFG collection pipe wells in 2005. The deep horizontal perforated pipes are installed before additional lifts of solid waste are placed, and only the connector pipes extend to the new landfill surface.

VLI personnel frequently monitor the landfill surface for odors to assess whether additional collection facilities are needed. The monitoring conducted by VLI includes the portions of the landfill where LFG collection wells are not yet required by the Operating Permit, as specified in

Permit Condition 13.4. In some cases, in areas where LFG collection wells are not required by Permit Condition 13.4, VLI would like to install passive LFG collection wells where monitoring has determined that one or more of the following limiting conditions make standard LFG well installations impractical:

- The solid waste depth is too shallow to install vertical LFG collection wells;
- Vertical LFG wells would be buried by additional solid waste layers within 6 months; and
- Deep horizontal LFG collection pipes cannot be installed because overlaying solid waste has already been placed.

In locations outside the areas where LFG wells are required by Permit Condition 13.4 and where one or more of these limiting conditions exist, VLI is installing near-surface horizontal LFG collection perforated pipes in shallow trenches or on the surface of the landfill to collect LFG and to control odors. These collection pipes either will be surrounded by gravel and covered with soil, or will be covered with a temporary membrane cap. VLI refers to these near-surface LFG collection wells as "passive wells." The basic purpose of the passive wells is to collect LFG emissions and control odors in areas where control using other means is not practical.

The operation of passive wells will exhibit a very large LFG flow response to applied vacuum because the soil or a temporary membrane cap seal over the perforated collector pipes will be only partially effective. It will be impossible to develop any significant vacuum in the passive wells because of this weak seal. In addition, the passive wells do not create a vacuum within the underlying solid waste. Even a small applied vacuum in a passive well will draw a large flow, and has the potential to quickly draw excessive air into the collection pipe. Therefore, only a very mild vacuum, enough to produce adequate flow to collect LFG emissions from the landfill surface, would be applied to the passive wells. The mild vacuum applied typically will not be strong enough to be measured using standard LFG monitoring equipment.

Properly designed and maintained passive wells will not operate within some of the parameters required under the Operating Permit. Specifically, the following Operating Permit conditions would not be achievable for proper operation of the passive wells:

- Operating Permit Condition 13.8: "Operate the LFG control system with negative pressure at each well-head."

  The intent of Condition 13.8 is to ensure that adequate LFG control system vacuum is available at every well-head, and that no LFG pressure builds up within the well in the solid waste. Vacuums at other landfills often are considered adequate with at least 10 inches of water column. The Coffin Butte LFG control system has an unusually strong vacuum of 35 inches of water column available throughout the well field; therefore, the adequacy of available vacuum is not in question. The passive wells are installed at or very near the top of the solid waste; therefore, properly designed and maintained passive wells will exhibit little, if any, vacuum, which may not be measurable.

APPENDIX H: COMPLIANCE REVIEW TABLE

Compliance Summary of Landfill Gas Collection and Control System Design Plan

Regulatory Citation	Report Section References	Report Appendix References	Regulatory Requirement	Implementation Summary
OAR 340-239-0110(1)(a)	N/A		If a gas collection and control system which meets the requirements of section (2) of this rule has not been installed, the owner or operator of a landfill must submit a Design Plan to DEQ within one year of becoming subject to this rule.	The GCCS at CBLF is an existing system that now is subject to this rule.
OAR 340-239-0110(1)(b)	1.1		If an owner or operator of a landfill is modifying an existing gas collection and control system to meet the requirements of this division, the owner or operator must submit an amended Design Plan to DEQ that includes any necessary updates or addenda, in accordance with OAR 340-239-0700(3)(j).	This amended design plan was submittied to DEQ within one year of CBLF becoming subject to this rule.
OAR 340-239-0110(1)(c)(A)	1.3 & 4	A	The Design Plan must be prepared and certified by a professional engineer. The following issues must be addressed in the design: Depths of solid waste, solid waste gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, resistance to the solid waste decomposition heat, and ability to isolate individual components or sections for repair or troubleshooting without shutting down entire collection system.	This plan was prepared and certified by a registered Professional Engineer licensed in the state of Oregon. The design considerations in Section 4 of this plan address all requirements liste din this rule.
OAR 340-239-0110(1)(c)(B)	3, 4, 5, 6	A, B, C, D, E, F, G	The Design Plan must provide for the control of the collected gas through the use of a gas collection and control system meeting the requirements of OAR 340-239-0110(2) or an alternative method approved pursuant to OAR 340-239-0500.	The design plan meets all requirements pursuant to OAR 340-239-0110(2). The Alternative monitoring and operation plan in Appendix G is in pursuant of OAR 340-239-0500.
OAR 340-239-0110(1)(c)(D)	6.4	G	The Design Plan must include any proposed alternatives to the requirements, justification for the need for any proposed alternatives, test methods, procedures, compliance measures, monitoring, and recordkeeping or reporting requirements pursuant to OAR 340-239-0500.	The exisiting AOMP plan was approved by DEQ in 2006.
OAR 340-239-0110(1)(c)(E)	6.2		The Design Plan must include a description of potential mitigation measures to be used to prevent the release of methane or other pollutants into the atmosphere during the installation or preparation of wells, piping, or other equipment; during repairs or the temporary shutdown of gas collection system components; or, when solid waste is to be excavated and moved.	CQA and operations follow the guidelines detailed in Section 6.2 of this plan.
OAR 340-239-0110(1)(c)(F)	6.3	A	For active landfills, the design plan must identify areas of the landfill that are closed or inactive.	There are currently no inactive areas at CBLF. Closed areas are detailed on drawing M1.00

OAR 340-239-0110(1)(c)(G)	5, 6.1	A, B, C, F	The gas collection and control system must be designed to collect gas at an extraction rate to comply with the surface methane emission limits in OAR 340-239-0200, component leak standard in OAR 340-239-0600(2)(c), and be sufficient to meet all operational and performance standards in this division. The expected gas generation flow rate from the landfill must be calculated pursuant to OAR 340-239-0800(5).	The GCCS is sized to accommodate the maximum gas generation projected in the LandGEM. New protocols for SEM monitoring and leak standards are detailed in Section 6.1
OAR 340-239-0110(1)(c)(I)	4.8, 4.13.5, 4.13.6, 5.4, 6.1, 6.2	B, C, D, G	The gas collection and control system must be designed to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions	LFG piping is sized to maintain at least 30" W.C. at maximum projected LFG generation. ROIs and perforations of wells are calculated and sized to mitigate air intrustion.
OAR 340-239-0110(1)(c)(H)	6.3	A	Any areas of the landfill that contain only asbestos-containing waste, or nondecomposable solid waste may be excluded from collection provided that the owner or operator submits documentation to DEQ containing the nature of the waste, date of deposition, location and amount of asbestos or non-decomposable solid waste deposited in the area. This documentation may be included as part of the Design Plan.	Asbestos areas are detailed in GCCS layout drawings. Republic tracks waste composition at scale house and deposits asbestos-containing waste within designated areas only.
OAR 340-239-0110(1)(c)(J)	3.1, 3.2, 3.3, 4.13.5, 4.14.1	A, D	The density of wells, horizontal collectors, surface collectors, or other gas extraction devices necessary to achieve compliance with section (2) of this rule.	Wells and collectors are placed according to ROI to ensure proper coverage of active areas.
OAR 340-239-0110(1)(d)	2.2, 2.3	A	The owner or operator of an active landfill must install and operate a gas collection and control system not later than 18 months after the date that the landfill is required to comply with this rule.	CBLF has an active GCCS system and currently meets all requirements with the expection of control devices that meet the requirements of OAR 340-239-0110(2)(c)(b). Republic is planning on fullfilling this requirement via the installation of new control devices prior to the 1/1/24 deadline.
OAR 340-239-0110(1)(e)	N/A	N/A	The owner or operator of a closed or inactive landfill must install and operate a gas collection and control system not later than 30 months after the date that the landfill is required to comply with this rule.	CBLF currently operates an active GCCS.
OAR 340-239-0110(1)(f)	4.4	A	The owner or operator of a controlled landfill must place each well or design component as specified in the approved Design Plan. Following initial construction, each new component must be installed no later than 60 days after the date on which the area controlled by the well is required to be controlled pursuant to this division.	All wells and design components are installed as specified in this design plan. New components are installed within 60 days of an area becoming controlled.
OAR 340-239-0110(1)(g)	2.1, 6		The owner or operator of a landfill must operate, maintain and expand the gas collection system in accordance with the procedures and schedules in the approved Design Plan.	Republic currently operates the landfill according to this design plan.
OAR 340-239-0110(2)(a)(A)	2.3	A	Route all collected gas to a gas control device or devices, and operate the gas collection and control system continuously except as provided in sections (4) and (5) of this rule.	All collected LFG will continue to be continuously diverted to the PNCG plant and/or the exisiting destruction devices except in the case of emergency shutdowns or required maintenance and expansions.

OAR 340-239-0110(2)(a)(C)	2.3	A	Design and operate the gas collection system to draw all the gas toward the gas control device or devices.	All collected LFG will continue to be continuously diverted to the PNCG plant and/or the exisiting destruction devices.
OAR 340-239-0110(2)(a)(D)	4.3, 4.14.1, 4.14.3, 6.1, 6.2	A, F	Design and operate the gas collection system to minimize off-site and on-site migration of subsurface gas in compliance with OAR chapter 340, divisions 093, 094, and 095.	The GGC is designed to provide LFG collection to all controlled areas. Surface emission testing is used to verify that the system is functioning as intended.
OAR 340-239-0110(2)(a)(E)	2.3		In the event the collection or control system is inoperable, the gas mover system shall be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere shall be closed within one hour of the collection or control system not operating.	If the flame is not detected at the flare, power is cut to the LFG blowers and the LFG inlet valve closes immediatley.
OAR 340-239-0110(2)(a)(F)	4.12, 6.6, 6.7		Efforts to repair the collection or control system must be initiated and completed in a manner such that downtime is kept to a minimum, and the collection and control system must be returned to operation.	Republic currently operates the GCCS according to minimize system downtime, operating the GCCS in sections if necessary to minimize total system shutdowns.
OAR 340-239-0110(2)(a)(G)	4.5	A	Install all passive collection systems with liners on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under 40 C.F.R. § 258.40.	The current leachate control system is designed according to Subtitle D standards, which fullfill 40 C.F.R. § 258.40.
OAR 340-239-0110(2)(a)(H)	6.3	A	Any area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than one percent (1%) of the total amount of methane emissions from the landfill. The amount, location, and age of the material must be documented and provided to DEQ. If data on actual amounts and age is not available, the landfill owner or operator must estimate based on known information and provide all documentation used to make the estimates. A separate methane emissions estimate must be made for each section proposed for exclusion, and the sum of all such sections must be compared to the methane emissions estimate for the entire landfill, and all calculations, data and documentation used to perform the calculations must be submitted to DEQ. The methane emissions from each section proposed for exclusion must be computed using the methods provided in OAR 340-239-0800(5).	CBLF currenlty has no inactive areas. Any future areas will be submitted for approval by DEQ as per OAR 340-239-0800(5) .
OAR 340-239-0110(2)(a)(I)	4.13, 5.1, 5.3	A, D	The landfill gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: Convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system must extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated with regard to the need to prevent excessive air infiltration.	Republic currently follows these sections of the design plan. Perforations are calculated and designed in such a way to minimize air infiltration.

OAR 340-239-0110(2)(a)(J)	3.1, 3.2, 3.3.1, 4.14	A, D	Vertical wells must be placed so as not to endanger underlying liners and must address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors must be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices must be designed so as not to allow indirect short circuiting of air into the cover, into the solid waste, into the collection system, or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.	Republic currently operates according to these rules. Fullfillment of each item is found in section 4.14 and its subsections.
OAR 340-239-0110(2)(a)(K)	3.4, 4.15	A	Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly must include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices must be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.	Republic currently implements this approach in their GCCS design.
OAR 340-239-0110(2)(a)(L)(i)	4.2, 5.2	B	For existing collection systems, the flow data must be used to project the maximum flow rate. If no flow data exists, the procedures in subparagraph (2)(a)(L)(ii) of this rule must be used	The design engineer uses flow data from the PNCG facility flowmeters at the generation plant and flares to compare to modeled projections generated by the EPA LandGEM.
OAR 340-239-0110(2)(a)(L)(ii)	N/A	N/A	For new collection systems, the maximum flow rate must be determined in accordance with OAR 340-239-0800(5).	CBLF has an existing GCCS.
OAR 340-239-0110(2)(b)	N/A	N/A	Requirements for Enclosed Flares. A landfill owner or operator who operates an enclosed flare must route the collected gas to an enclosed flare that meets all of the following requirements:	CBLF does not currently have enclosed flares.
OAR 340-239-0110(2)(c)	2.3		Requirements for open flares: A landfill owner or operator who operates an open flare must route the collected gas to an open flare that meets the requirements of 40 C.F.R. § 60.18.	CBLF has two open flares, both of which comply with 40 C.F.R. § 60.18.
OAR 340-239-0110(2)(c)(A)	2.3		(A) Install, calibrate, maintain, and operate the following equipment according to the manufacturer's specifications: (i) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame; and (ii) A device that records flow to the flare and bypass of the flare (if applicable). The owner or operator must: (I) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the control device at least every 15 minutes; and (II) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.	The existing flares have thermocouples, flowmeters, and UV flame detectors that operate continuously. Flowmeters are calibrated in accordance to manufactuer's specifications. A visual inspection of all mechanisms is performed monthly. There are no bypass lines around the control devices.

OAR 340-239-0110(2)(c)(B)	2.3		An open flare installed and operating prior to August 1, 2021, may operate until January 1, 2024, but is thereafter prohibited except as provided in paragraph (2)(c)(C) of this rule.	Both flares operating at CBLF were installed prior to 8/1/2021. They will be replaced by control devices that meet DEQ requirements before 1/1/24.
OAR 340-239-0110(2)(c)(C)	2.3		Operation of an open flare on or after January 1, 2024, is only allowed with DEQ's written approval, which DEQ will determine based on whether the owner or operator demonstrates to the satisfaction of DEQ that one of the following conditions apply: (i) The methane generation rate is less than 664 metric tons per year pursuant to OAR 340-239-800(2) and is insufficient to support the continuous operation of an enclosed flare or other gas control device; (ii) The owner or operator is seeking to temporarily operate an open flare during the repair or maintenance of the gas control system, or while awaiting the installation of an enclosed flare, or to address offsite gas migration issues. An owner seeking to temporarily operate an open flare under this subparagraph must submit a written request to DEQ pursuant to OAR 340-239-0500; (iii) The owner or operator has landfill gas emissions that are unable to be controlled using enclosed flare gas control devices in the gas control system. These emissions being controlled using an open flare may not exceed 664 metric tons (732 tons) per year of methane. An owner seeking to operate an open flare under this subparagraph must submit a written request to DEQ pursuant to OAR 340-239-0500. The request must include an analysis verifying that there is no feasible alternative control device configuration that would use the landfill gas emissions without use of an open flare; or (iv) The owner or operator otherwise has received written approval from DEQ to operate an open flare pursuant to OAR 340-239-0500.	Republic will replace the exisiting flares with control devices that meet these requirements prior to the 1/1/24 deadline.
OAR 340-239-0110(2)(d)(B)(i)	2.3		(B) Route the collected gas to an energy recovery device, or series of devices that meets all of the following requirements: (i) Achieves a methane destruction efficiency of at least 99 percent by weight pursuant to OAR 340-239-0800(6). Lean burn internal combustion engines must reduce the outlet methane concentration to less than 3,000 ppmv, dry basis, corrected to 15 percent oxygen.	CBLF diverts a majority of LFG generated to the PNCG power facility which uses lean burn internal combustion engines that meet these requirements. All remaining LFg is combusted by the flares.
OAR 340-239-0110(2)(d)(B)(ii)	2.3		For new gas control devices, the destruction efficiency or parts per million by volume required according to OAR 340-239-0110(2)(d)(A)(i) must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in OAR 340-239-0800(6) and the DEQ Source Test Manual.	New control equipment will be selected based off on manufactuer's specifications and emission reduction guarantees. Performance testing will be performed following the commissioning phase of new control devices using methods in the DEQ Source Test Manual within 180 days of startup.
OAR 340-239-0110(2)(d)(B)(iii)	2.3		Existing gas control devices must demonstrate compliance with this rule not later than 180 days from the effective date of this rule using the performance test methods specified in OAR 340-239-0800(6) and the DEQ Source Test Manual.	The current flares have a methane destruction effiency of 98 percent. They are to be replaced by new control devices that meet these requirements.

OAR 340-239-0110(2)(d)(B)(iv)	2.3		Operate the gas control device within the parameter ranges established during the initial or most recent performance test that demonstrates compliance with the standard in OAR 340-239- 0110(2)(d)(A)(i). Until a performance test is performed, operate the gas control device within engineering or manufacturer's established parameter ranges.	All control devices are currently operated according to this rule.
OAR 340-239-0110(2)(d)(C)	N/A	N/A	Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be controlled according to either subsection (2)(b), (2)(c) or (2)(d) of this rule. All emissions vented to the atmosphere from the gas treatment system are subject to the requirements of subsection (2)(b) or (2)(c) of this rule. The owner or operator must prepare a site-specific treatment monitoring plan to include all of the following: (i) Monitoring records of parameters that are identified in the treatment system monitoring plan and that ensure the treatment system is operating properly for each intended end use of the treated landfill gas. At a minimum, records must include records of filtration, de-watering, and compression parameters. 14 (ii) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for each intended end use of the treated landfill gas. (iii) Documentation of the monitoring methods and ranges, along with justification for their use. (iv) List of responsible staff (by name and job title) for data collection. (v) Processes and methods used to collect the necessary data. (vi) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems (CMS).	CBLF does not ultilize a gas treatment system. All LFG collected is diverted to the PNGC facility and/or the flares.

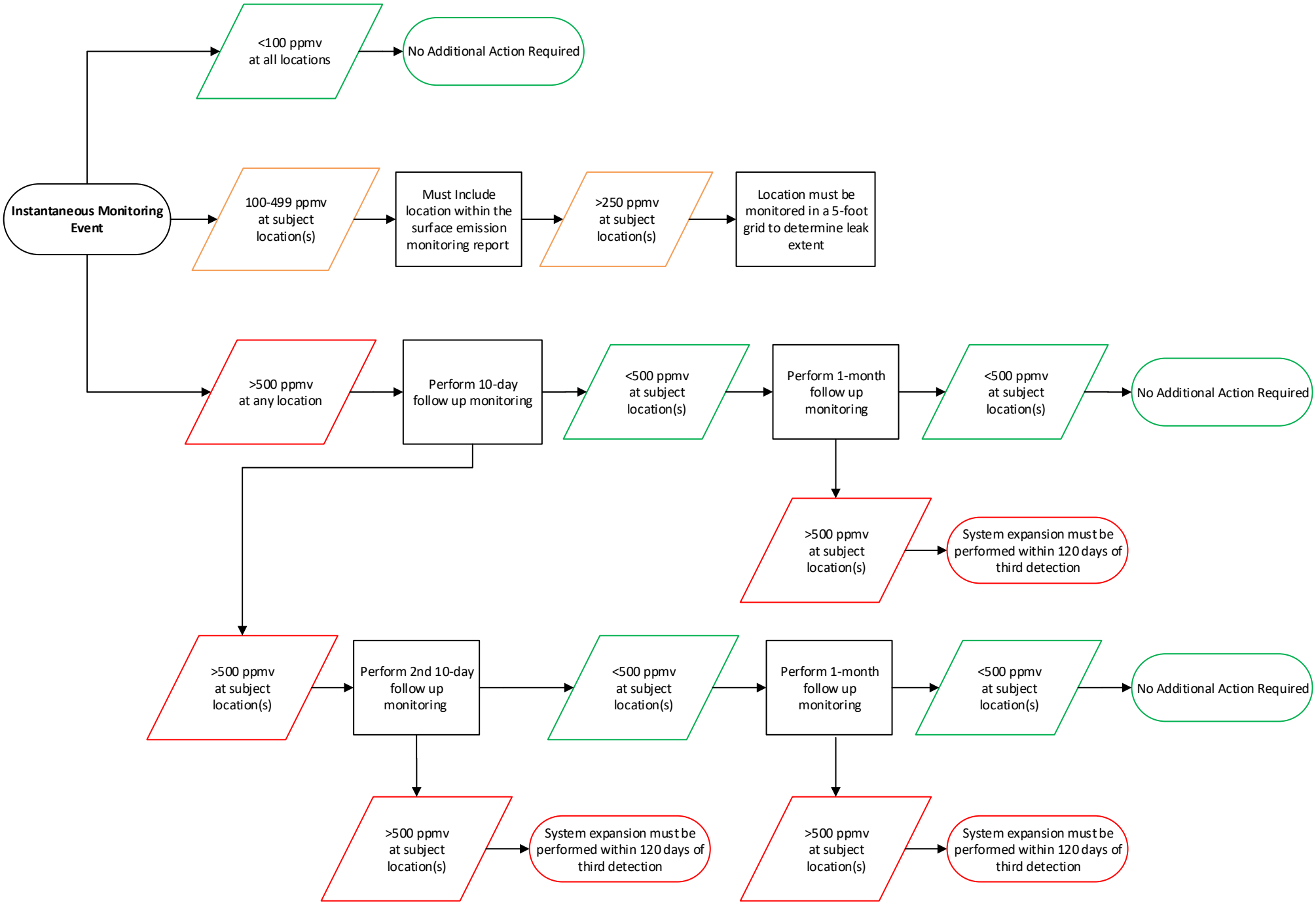
OAR 340-239-0110(2)(d)(e)	N/A	N/A	The owner or operator complying with section (2)(d) of this rule by using a landfill gas treatment system must calibrate, maintain, and operate according to the manufacturer's specifications a device that records flow to the treatment system and bypass of the treatment system (if applicable). The owner or operator must maintain and operate all monitoring systems associated with the treatment system in accordance with the site-specific treatment system monitoring plan required by paragraph (2)(d)(C) of this rule. The owner or operator must: (A) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the treatment system at least every 15 minutes; (B) Install liners or equivalent non-permeable materials on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under 40 C.F.R. 258.40; and (C) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.	CBLF does not ultilize a gas treatment system. All LFG collected is diverted to the PNGC facility and/or the flares.
OAR 340-239-0110(2)(d)(f)	2.3		Performance Test Requirements. The owner or operator must conduct annual performance tests for any gas control device(s) subject to the requirements of section (2) of this rule using the test methods identified in OAR 340-239-0800(6). Following an initial performance test, the owner or operator must conduct a complete annual performance test each calendar year, no later than 45 days after the anniversary date of the initial performance test. Performance tests must be conducted in compliance with all of the following requirements:	Annual performance testing is performed on all destruction devices annually. The current flares in operation do not meet the 99 percent methane destruction efficiency. New destruction devices that do meet these requirements will be installed and operational prior to the 1/1/24 deadline.
OAR 340-239-0110(3)	3.4, 6.5, 6.7	A	Wellhead sampling. A landfill owner or operator required to comply with section (2) of this rule for an active gas collection system must install a sampling port and measuring devices, or an access port for measuring devices, at each wellhead and comply with the following, using measuring devices that meet the requirements of OAR 340-239-0800(7):(a) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as provided in OAR 340-239-0600(3); (b) Monitor temperature of the landfill gas on a monthly basis as provided in OAR 340-239-0600(3); and (c) Measure the gauge pressure in the gas collection header on a monthly basis as provided in OAR 340-239-0600(2)(d).	All active wellheads have 3 sampling ports, a temperature port, and integrated flow devices. These ports allow for temperature, oxygen, nitrogen, methane, gauge pressure and flow to be monitored and recorded. Current operations monitor each wellhead at minimum once monthly.

OAR 340-239-0110(3)	6.6		Well Raising. The requirements of paragraph (2)(a)(A), paragraph (2)(a)(B), and section (3) of this rule do not apply to individual wells involved in well raising provided the following conditions are met: (a) New fill is being added or compacted in the immediate vicinity around the well; and (b) Once installed, a gas collection well extension is sealed or capped until the raised well is reconnected to a vacuum source.	Republic currently operates under this rule.
OAR 340-239-0110(4)	6.2.1, 6.2.2		Repairs and Temporary Shutdown of Gas Collection System Components: The requirements of paragraphs (2)(a)(A) and (2)(a)(B) do not apply to individual landfill gas collection system components that must be temporarily shut down in order to repair the components due to emergencies, catastrophic events such as earthquakes, to extinguish landfill fires, to prevent landfill fires, to connect new landfill gas collection system components to the existing system, to perform construction activities pursuant to OAR 340-239-0300, or to conduct performance testing, provided the following requirements are met: 16 (a) Any new gas collection system components required to maintain compliance with this division must be included in the most recent Design Plan pursuant to section (1) of this rule. The owner or operator must comply with applicable provisions of the Notice of Construction requirements in OAR chapter 340, division 210 and permit modification requirements of OAR chapter 340, division 216 or 218 prior to the construction, installation and operation of new landfill gas collection system components; (b) Methane emissions are minimized during shutdown pursuant to paragraph (1)(a)(E) of this rule; and (c) The owner or operator must submit a notification to DEQ after any temporary shutdown due to an emergency, catastrophic event or landfill fires in accordance with OAR 340-239- 0700(3)(n).	Republic currently operates under this rule.

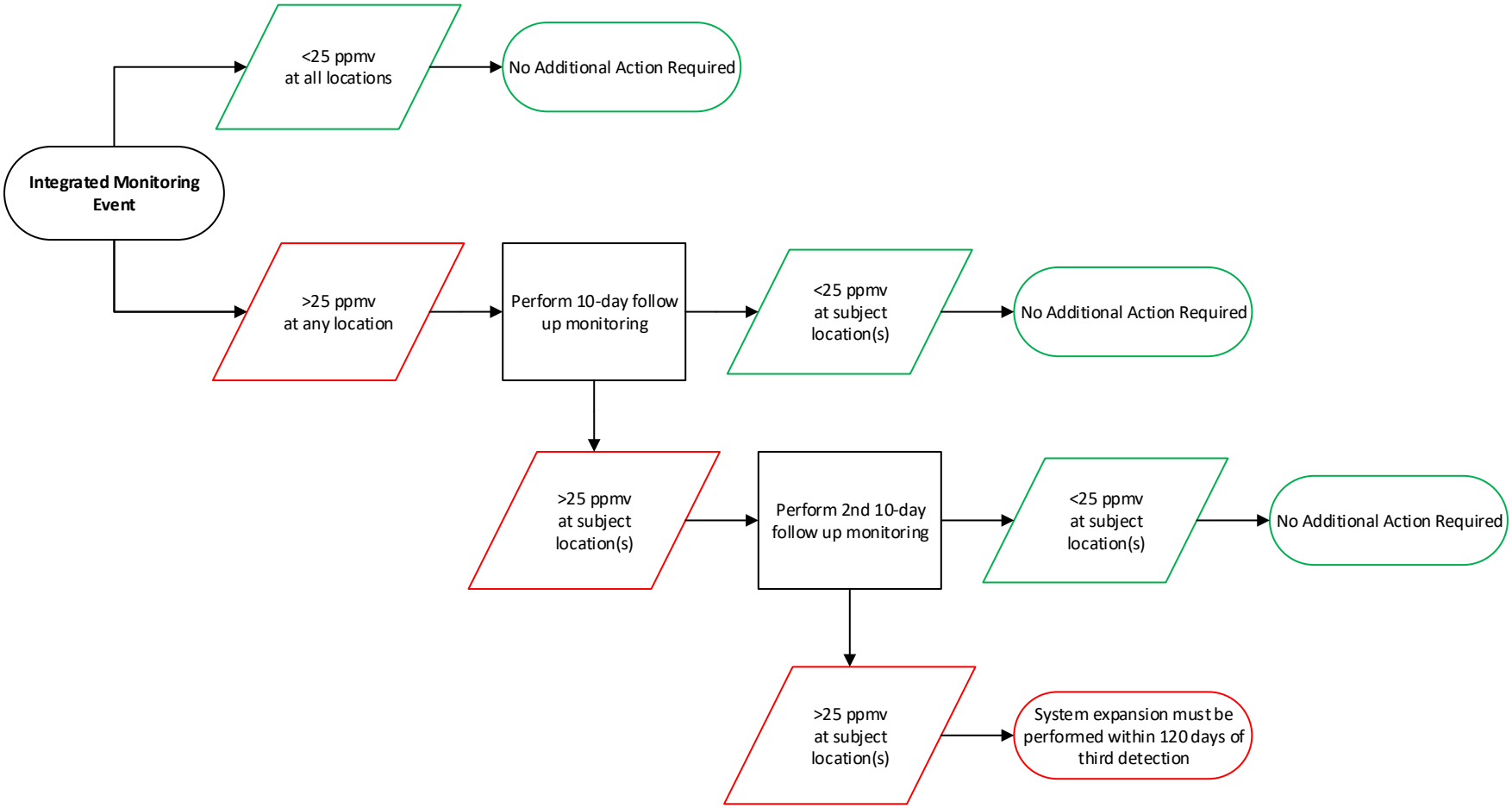
APPENDIX D

Instantaneous and Integrated Monitoring Flowcharts

Oregon Landfill Gas Instantaneous Monitoring Flowchart



Oregon Landfill Gas Integrated Monitoring Flowchart



APPENDIX E

Table 1 - Instantaneous & Integrated Exceedances - Methane Surface Emissions

	Table 1 - Instantaneous & Integrated Exceedances of - Methane Surface Emissions									
	Instantaneous Exceedances (Number of Individual Readings >500 ppmv)					Integrated Exceedances (Number of Grids with Average Readings >25 ppmv)				Pressurized Piping (>500 ppmv)
Monitoring Period	Initial	1st 10-day Re-Monitoring	2nd 10-day Re-Monitoring	1-Month Re-Monitoring	System Expansion Required (Y/N)	Initial	1st 10-day Re-Monitoring	2nd 10-day Re-Monitoring	System Expansion Required (Y/N)	Initial
Q3 2022*	101	27	0	0	N	19	14	See notes	Y	0
Notes:	No exceedances above 500 ppmv were identified in the 2nd 10-day or the 1-month re-monitoring events following system adjustments and remediation by SCS and site personnel.					SCS-FS notes within their report that a second 10-day re-monitoring event was conducted, but the report only presents results for completing the first 10-day remonitoring event. The gas collection and control system was expanded in November 2022 in the subject area.				NA
Q4 2022*	18	0	NA	NA	N	23	See notes	See notes	Y	0
Notes:	No exceedances above 500 ppmv were identified in the first 10-day re-monitoring following system adjustments and remediation by SCS and site personnel.					SCS-FS notes the required first and second 10-day follow-up monitoring events were unable to be performed due to weather. Based on these monitoring results with accordance with the OMR, (with initial concentrations in exceedance not corrected) the site is required to perform a system expansion within 120-days of the third detected exceedance. The gas collection and control system was expanded in the subject areas in November 2022.				NA
Q1 2023*	6	0	NA	NA	N	15	15	11	Y	0
Notes:	No exceedances above 500 ppmv were identified in the first 10-day re-monitoring following system adjustments and remediation by SCS and site personnel.					Based on these monitoring results with accordance with the OMR, (with initial concentrations in exceedance not corrected) the site is required to perform a system expansion within 120-days of the third detected exceedance. The gas collection and control system was expanded in the subject areas in March 2023.				NA
Q2 2023*	18	14	4	4	Y	19	13	11	Y	0
Notes:	In accordance with requirements for expansion and remediation, the instantaneous locations need to be remediated and returned to compliance in accordance with the rule (expansion of the collection system or an alternative compliance option if approved by the OAR) within 120 days after the third integrated exceedance. The gas collection and control system was expanded in the subject areas in June 2023.					Based on these monitoring results with accordance with the OMR, (with initial concentrations in exceedance not corrected) the site is required to perform a system expansion within 120-days of the third detected exceedance. SCS-FS report appears to have a typographic error where they note only two (2) of the nineteen integrated exceedances were reduced below the 25 ppmv threshhold following completion of the 1st and 2nd 10-day re-monitoring events; however, Table 2 within Attachment 4 provides all measurements and following completion of both monitoring events, eleven (11) integrated monitoring results remain above the 25 ppmv threshhold. The gas collection and control system was expanded in the subject areas in June 2023.				NA
Q3 2023*	1	0	NA	0	N	5	3	3	Y	0
Notes:	No exceedances above 500 ppmv were identified in the first 10-day or the 1-month re-monitoring events following system adjustments and remediation by SCS and site personnel.					Based on these monitoring results with accordance with the OMR, (with initial concentrations in exceedance not corrected) the site is required to perform a system expansion within 120-days of the third detected exceedance. The gas collection and control system was expanded in the subject area in September 2023.				NA
Q4 2023*	5	3	2	2	Y	8	4	1	Y	0
Notes:	In accordance with requirements for expansion and remediation, the instantaneous locations need to be remediated and returned to compliance in accordance with the rule (expansion of the collection system or an alternative compliance option if approved by the OAR) within 120 days after the third integrated exceedance. The gas collection and control system was expanded in the subject areas in March 2024.					Based on these monitoring results with accordance with the OMR, (with initial concentrations in exceedance not corrected) the site is required to perform a system expansion within 120-days of the third detected exceedance. The gas collection and control system was expanded in the subject areas in March 2024.				NA
Q1 2024*	11	9	8	See notes	Y	4	0	NA	N	0
Notes:	need to be remediated and returned to compliance in accordance with the rule (expansion of the collection system or an alternative compliance option if approved by the OAR) within 120 days after the third integrated exceedance. SCS doesn't report results of the 1-month remonitoring event in the subject quarterly report and it's unclear if/why it wasn't conducted. Regardless, the gas collection and control system was expanded in the subject areas in March 2024.					No exceedances above 25 ppmv were identified in the first 10-day re-monitoring event following system adjustments and remediation by SCS and site personnel; therefore, no additional monitoring was required for the quarter.				NA
Q2 2024* EPA conducted initial monitoring event, SCS conducted the re-monitoring events	41	2	1	1	Y	Integrated data not prepared/available for the monitoring performed by the EPA				0
Notes:	In accordance with requirements for expansion and remediation, the instantaneous locations need to be remediated and returned to compliance in accordance with the rule (expansion of the collection system or an alternative compliance option if approved by the OAR) within 120 days after the third integrated exceedance. No system expansion reported during Q2 2024, although system expansions were performed in the last month of Q1 2024 (March) and the last month of Q3 2024 (September).									NA
Q2 2024* SCS monitoring data only	22	15	15	15	Y	3	0	NA	N	0
Notes:	In accordance with requirements for expansion and remediation, the instantaneous locations need to be remediated and returned to compliance in accordance with the rule (expansion of the collection system or an alternative compliance option if approved by the OAR) within 120 days after the third integrated exceedance. No system expansion reported during Q2 2024, although system expansions were performed in the last month of Q1 2024 (March) and the last month of Q3 2024 (September).					No exceedances above 25 ppmv were identified in the first 10-day re-monitoring event following system adjustments and remediation by SCS and site personnel; therefore, no additional monitoring was required for the quarter.				NA

* Quarterly report notes several grids were not monitored, in accordance with the OAR, due to active landfilling activities, unsafe conditions, overgrown vegetation, or no waste in place.

APPENDIX E

Table 2 – Roseburg Landfill & CBL – Methane Exceedance Comparison

Table 2 - Roseburg Landfill & CBL – Methane Exceedance Comparison			
		Coffin Butte Landfill	**Roseburg Landfill**
Total Measurements	Instantaneous	39	19
	Instantaneous*	80	NA
	Integrated (# of Grids Monitored)	42	44
Exceedances	Initial Instantaneous >500 ppmv	22	12
	Initial Instantaneous >500 ppmv*	63	NA
	% exceedance of instantaneous measurements	56.41%	63.16%
	% exceedance of instantaneous measurements*	78.75%	NA
	1st 10-Day Re-Monitoring Event >500 ppmv*	17	0
	2nd 10-Day Re-Monitoring Event >500 ppmv*	16	N/A
	1-month Re-Monitoring Event*	16	N/A
	Integrated >25 ppmv	3	0
	1st 10-Day Re-Monitoring Event >25 ppmv	0	NA
	% exceedance of integrated grids	7.14%	0.00%

* Includes EPA instantaneous readings collected at CBL. The EPA did not collect integrated measurements.

APPENDIX F

Roseburg Landfill Q2 2024 SEM Report

May 17, 2024
File No. 04217027.23

Mr. Nick Frisinger
Roseburg Landfill 1036 SE
Douglas Ave RM 308 Roseburg
OR, 97470

Subject: Roseburg Landfill– Roseburg, Oregon

Surface Emissions Monitoring for the Second Quarter of 2024.

Dear Mr. Nick Frisinger,

SCS Field Services (SCS-FS) is pleased to provide the Douglas County Solid Waste Department with the enclosed report summarizing the surface emissions monitoring services performed by SCS-FS at Roseburg Landfill (Site) during the second quarter of 2024. This report includes the results of the surface scan, component emissions, and blower/flare station emissions monitoring for the Site.

SCS-FS appreciates the opportunity to be of assistance to Roseburg Landfill on this project. As you review the enclosed information, please contact Stephen Harquail at (503) 867-2369 or Max Polkabla at (510) 277-5122 if you have any questions or comments.

Sincerely,

Max Polkabla

Max Polkabla
Senior Data Analyst
SCS Field Services

Stephen Harquail
PNW Region Manager
SCS Field Services

Roseburg Landfill
Oregon Landfill Gas Emissions Rule (OAR) and Surface Emissions Monitoring

Second Quarter 2024

Presented to:

Nick Frisinger
Douglas County Solid Waste Director
1036 SE Douglas Ave RM 308
Roseburg OR, 97470

SCS FIELD SERVICES

File No. 04217027.23 | May 17, 2024

SCS FIELD SERVICES
15949 SW 72nd Ave
Portland, Or 97224

Roseburg Landfill

Oregon Landfill Gas Emissions Rule (OAR) and Surface Emissions Monitoring
Second Quarter 2024

INTRODUCTION

This letter provides the results of April 8, 9, 16, and May 8, 2024, OAR landfill surface emissions monitoring (SEM) performed by SCS Field Services (SCS) at the Roseburg Landfill. All work was performed in accordance with our approved Work Scope, and the OAR requirements.

SITE BACKGROUND

Roseburg Landfill began receiving waste in 1932 and was privately owned and operated until 1975. The County purchased the landfill in 1975 and has operated the facility since that time.

From 1932 until the 1960s, Roseburg Landfill was operated as a burning dump. Disposal operations proceeded past the current landfill entrance gate westward up the valley of the Main Fill. Additionally, some ash and unburnt waste disposal occurred in the area now occupied by the Lateral Expansion. In the late 1960s operations changed from burning to conventional waste disposal (e.g., landfilling). Waste disposal operations shifted to the main valley (now called the Main Fill). Between 1997 and 2000, the County constructed the Lateral Expansion that is adjacent to and hydraulically upgradient to cross-gradient of the Main Fill. The Lateral Expansion is approximately 20 acres and is constructed to Subtitle D standards and comprised of three lined cells: Cell 1, Cell 2, and Cell 3. Groundwater drainage systems were constructed beneath the Lateral Expansion that includes the GWC and SDS.

In 2000 and 2001, the County installed seven LFG extraction wells in the Main Fill, just south of the interface with the Lateral Expansion, and a candle stick flare southwest of PV-1. Before waste was placed in the Lateral Expansion, VOCs were detected in discharges from the GWC, SDS, and SLCS. After the LFG collection and control system (GCCS) was installed and operating, VOCs were either no longer detected or only sporadically detected in liquid samples from these locations. A private entity, Roseburg LFG Energy, LLC, operates and maintains the GCCS, which now consists of over 50 LFG extraction wells and a landfill gas-to-energy plant.

2024 State Regulatory Applicability

Roseburg Landfill is subject to the Oregon-specific landfill gas emission regulations in OAR Chapter 340 Division 239. These SEM regulations are detailed below.

SURFACE EMISSION METHANE CONCENTRATION LIMITS

> *340-239-0200 (1) Surface Emission Methane Concentration Limits. Except as provided in OAR 340-239-0110(4), 340-239-0110(5), 340-239-0300, and 340-239-0600(1), beginning August 1, 2022, or upon commencing operation of a newly installed gas collection and control system or modification of an existing gas collection and control system pursuant to OAR 340-239-*

0110(1), whichever is later, no location on the landfill surface may exceed either of the following methane concentration limits:

(a) 500 ppmv, other than nonrepeatable, momentary readings, as determined by instantaneous surface emissions monitoring conducted in accordance with OAR 340-239-0800(3)(b);

(b) An average methane concentration limit of 25 ppmv as determined by integrated surface emissions monitoring conducted in accordance with OAR 340-239-800(3)(c).

The 500 ppmv limit is already a requirement in the Federal (NESHAP) regulations above, but an average methane concentration limit of 25 ppmv will be adhered to as required.

SURFACE EMISSION RECORDKEEPING

340-239-0700(2)(a)(C) All instantaneous surface readings of 100 ppmv methane or greater. All exceedances of the limits in OAR 340-239-0100(6)(b) and 340-239-0200, including the location of the leak (or affected grid), leak concentration in ppmv methane, date and time of measurement, the action taken to repair the leak, date of repair, any required remonitoring and the remonitored concentration in ppmv methane, wind speed during surface sampling, and the installation date and location of each well installed as part of a gas collection system expansion;

In compliance with OAR, all emissions points 100 ppmv or over will be documented. All repeatable instantaneous records of 100 ppm or higher (taken during SEM) must be kept for 5 years AND recorded in the semi-annual reports.

SUMMARY AND CONCLUSIONS

As stipulated in OAR, if uncorrectable exceedances within the 10-day limitation are detected or emissions are discovered during an inspection by Regulatory Agencies, the landfill must perform monitoring on a 25-foot pathway on a quarterly basis for active disposal sites. Upon completion of four consecutive SEM events without an uncorrectable exceedance of the 25 ppmv or 500 ppmv standards, other than non-repeatable momentary readings, the landfill may perform the monitoring on a 100-foot spacing on an annual basis for closed landfills or quarterly for active disposal sites. In accordance with the provisions of the OAR, the monitoring of the Roseburg landfill was done on a 25-foot pathway based on no prior inspections provided.

On April 8, and 9, 2024, SCS performed second quarter 2024 surface emissions monitoring testing as required by the Oregon Landfill Gas Emission Rule. Instantaneous surface emissions monitoring results indicated that twelve (12) locations exceeded the 500 ppmv maximum concentration on the above-mentioned dates (Table 1 in Attachment 3). The required first 10-day (OAR) monitoring indicated that all areas returned to below regulatory compliance limits following system adjustments and remediation by site personnel. Based on these monitoring results no additional follow-up testing was required.

Also, during the instantaneous monitoring event, SCS performed integrated monitoring of the landfill surface. As required by the OAR, the landfill was divided into 50,000 square foot areas. The Douglas County/Roseburg Landfill surface is divided into 54 grids, as shown in Figure 1 in Attachment 1. During this monitoring event, several grids were not monitored, in accordance with the regulations, due to ongoing active landfilling activities, unsafe conditions, or there was no waste in place prior to the monitoring event.

During the monitoring event, there were no areas observed to exceed the 25 ppmv OAR integrated average threshold (Table 2 in Attachment 4). These results are discussed in a subsequent section of this report.

In addition, quarterly monitoring of the pressurized piping or components of the Gas Collection and Control System (GCCS) under positive pressure must be performed quarterly. Results of the testing of the landfill gas (LFG) Blower Flare Station (BFS) pressurized pipe and components indicated that all test locations were in compliance with the 500 ppmv requirements.

Further, as required under the OAR, any location on the landfill that has an observed instantaneous methane concentration above 100 ppmv must be included within the surface emission monitoring report. If any instantaneous location records above 250 ppmv, it must be monitored in a 5-foot grid around the location to determine the extent of the methane leak. During this reporting period, six (6) locations were observed showing elevated concentrations between 100-499 ppmv, of the reporting threshold. When these readings are observed to be repeatable, they are reported to site personnel for tracking and/or remediation and will be reported in the next submittal of the annual OAR report. Finally, to help prevent potential future exceedances, SCS recommends that the landfill surface be routinely inspected and any observed surface erosion be routinely repaired.

SURFACE EMISSIONS MONITORING

On April 8, 9, 16, and May 8, 2024, the instantaneous and integrated SEM was performed over the surface of the subject site. The monitoring intended to identify any specific locations or areas of the landfill surface with organic compound concentrations exceeding the OAR threshold limit values of 500 ppmv measured as methane for instantaneous monitoring, or an average methane concentration of 25 ppmv for the integrated monitoring in the 50,000 square foot grids as required under the OAR. During this event, SCS performed the monitoring on a 25-foot pathway as required.

EMISSIONS TESTING INSTRUMENTATION/CALIBRATION

The instruments used to perform the landfill surface emission testing consisted of the following:

- Thermo Scientific TVA 2020 portable Flame Ionization Detector (FID). This instrument measures methane in the air over a range of 1 to 50,000 ppmv. The TVA 2020 meets the State of California Air Resources Board (CARB) requirements for combined instantaneous and integrated monitoring and was calibrated in accordance with the United States Environmental Protection Agency (US EPA) Method 21.

- Weather Anemometer with continuous recorder for meteorological conditions in accordance with the OAR.

Instrument calibration logs and weather information are shown in Attachments 5 and 6.

SURFACE EMISSIONS MONITORING PROCEDURES

Surface emissions monitoring was conducted in accordance with the OAR and SEM requirements. Monitoring was performed with the FID inlet held within 2 inches of the landfill surface while a technician walked a grid in parallel paths not more than 25 feet apart over the landfill's surface. Cracks, holes, and other cover penetrations in the surface were also tested. Surface emissions readings were monitored continuously and recorded every 5 seconds. Any areas exceeding the 100 or 500 ppmv standards

(reporting and compliance levels, respectively) would be GPS-tagged and stake-marked for on-site personnel to perform remediation or repairs.

The integrated average is based on the readings stored on the instrument, which are recorded every 5 seconds. The readings are then downloaded and the averages are calculated for each grid using SCS eTools®. All readings are maintained in this secure SCS Database. The readings are not provided in the report due to the volume of readings but can be furnished upon request.

Recorded wind speed results are shown in Attachment 6. Wind speed averages were observed to remain below the alternative threshold of 10 miles per hour, and no instantaneous speeds exceeded 20 miles per hour. No rainfall occurred within 72 hours of the monitoring events. Therefore, site meteorological conditions were within the alternatives of the OAR requirements on the above-mentioned dates.

TESTING RESULTS

During this event, SCS performed the monitoring on a 25-foot pathway as required under the OAR. The monitoring intended to identify any specific locations or areas of the landfill surface with organic compound concentrations exceeding the OAR or NSPS threshold limit values of 500 ppmv measured as methane for instantaneous monitoring, or an average methane concentration of 25 ppmv for the integrated monitoring (OAR).

On April 8, and 9, 2024, SCS performed the second quarter of 2024 instantaneous emissions monitoring testing as required by the Oregon DEQ/OAR. During this monitoring, surface emissions results indicated that twelve (12) locations exceeded the 500 ppmv maximum concentration. The required first 10-day (OAR) follow-up monitoring performed on April 16th, 2024, and the 1-month (OAR) follow-up monitoring event performed on May 8, 2024, indicated that all locations returned below compliance limits as required, following system adjustments and remediation by site personnel. Results of the initial and follow-up monitoring are shown in Attachment 3 (Table 1). Calibration logs for the monitoring equipment are provided in Attachment 5. Results of the monitoring are shown in Attachments 2 and 3 (Table 1).

During this monitoring event, several grids were not monitored, in accordance with the OAR, due to active landfilling activities, unsafe conditions, overgrown vegetation, or no waste in place. SCS will continue to monitor all accessible locations during the third quarter of 2024.

PRESSURIZED PIPE AND COMPONENT LEAK MONITORING

On April 9, 2024, quarterly leak monitoring was performed in accordance with the OAR. SCS performed LFG pressurized pipe and component leak monitoring at the BFS. Monitoring was performed with the detector inlet held one-half of an inch from the pressurized pipe and associated components. No locations exceeding the 500 ppmv threshold were observed during our monitoring event. The maximum reading, which was 5.00 ppmv, was well below the maximum threshold (see Table 1 for component results). Therefore, all pressurized pipes and components located at the LFG BFS were in compliance at the time of our testing.

PROJECT SCHEDULE

According to the OAR, surface emissions monitoring at active landfills is required to be performed on a quarterly basis. Therefore, in accordance with our approved Work Scope, the third quarter of 2024 surface emissions testing event is scheduled to be performed by the end of September 2024.

STANDARD PROVISIONS

This report addresses the conditions of the subject site during the testing dates only. Accordingly, we assume no responsibility for any changes that may occur subsequent to our testing which could affect the surface emissions at the subject site or adjacent properties.

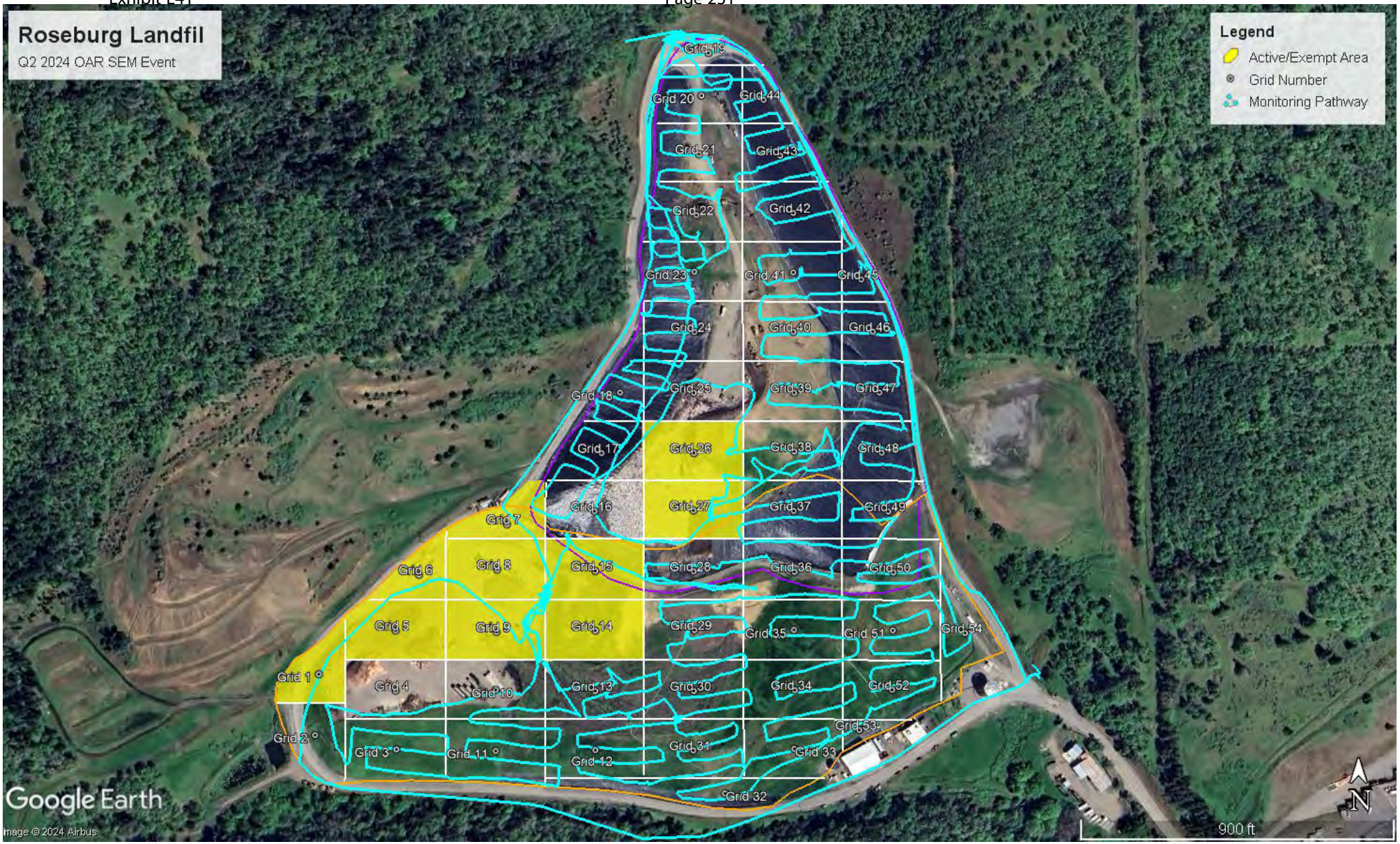
Attachment 1

Landfill Grid

Roseburg Landfil
Surface Emissions Monitoring Grid Map
Legend
Grid Line
Grid Number
Grid 19
Grid 20
Grid 44
Grid 21
Grid 43
Grid 22
Grid 42
Grid 23
Grid 41
Grid 45
Grid 24
Grid 40
Grid 46
Grid 18
Grid 25
Grid 39
Grid 47
Grid 17
Grid 26
Grid 38
Grid 48
Grid 16
Grid 27
Grid 37
Grid 49
Grid 7
Grid 6
Grid 8
Grid 15
Grid 28
Grid 36
Grid 50
Grid 5
Grid 9
Grid 14
Grid 29
Grid 35
Grid 51
Grid 54
Grid 1
Grid 4
Grid 10
Grid 13
Grid 30
Grid 34
Grid 52
Grid 2
Grid 3
Grid 11
Grid 12
Grid 31
Grid 33
Grid 53
Grid 32
Google Earth
Image © 2024 Airbus
900 ft
N

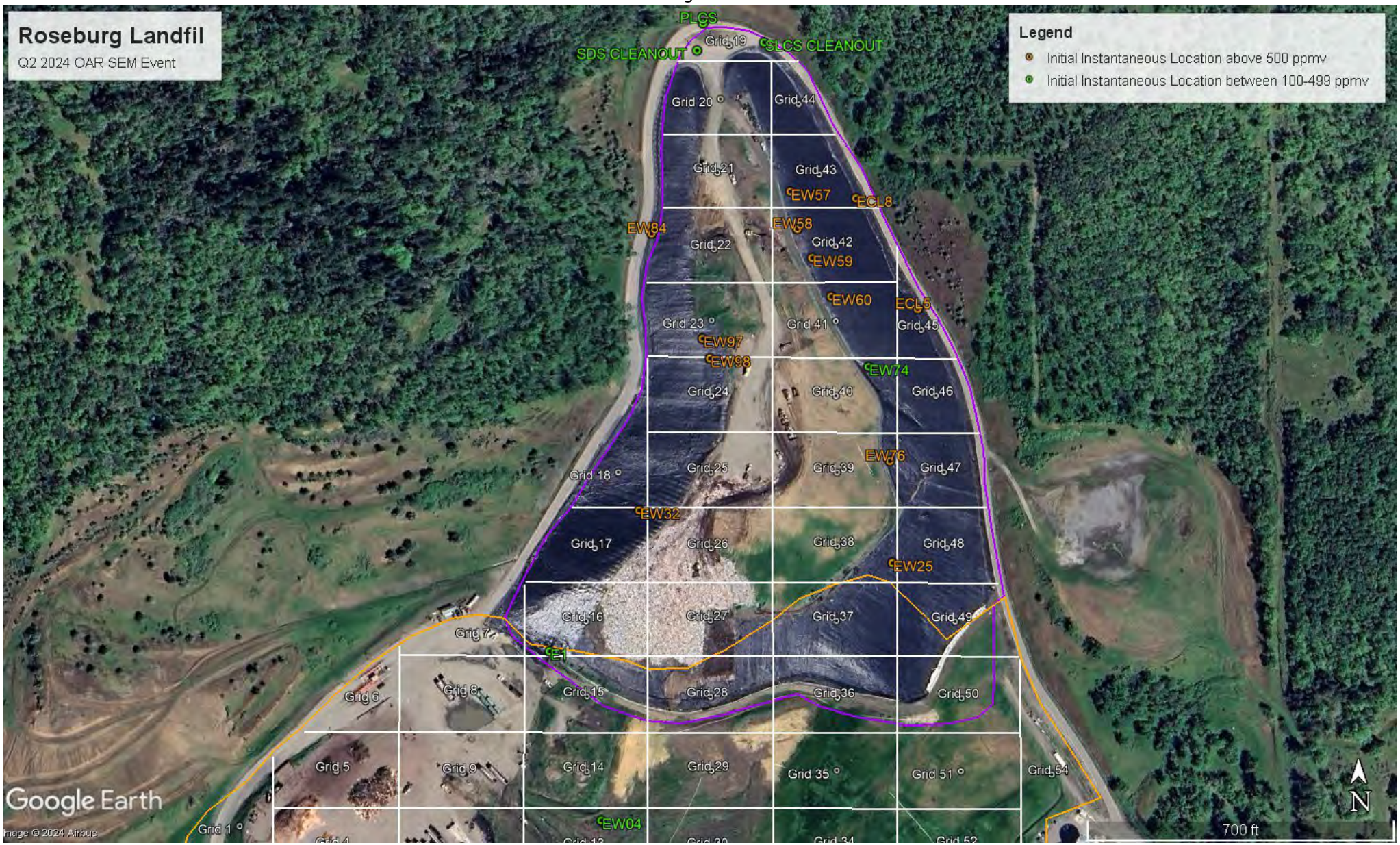
Attachment 2

Surface Pathway


Roseburg Landfil
Q2 2024 OAR SEM Event
Legend
Active/Exempt Area
Grid Number
Monitoring Pathway
Grid 19
Grid 20
Grid 44
Grid 21
Grid 43
Grid 22
Grid 42
Grid 23
Grid 41
Grid 45
Grid 24
Grid 40
Grid 46
Grid 18
Grid 25
Grid 39
Grid 47
Grid 17
Grid 26
Grid 38
Grid 48
Grid 16
Grid 27
Grid 37
Grid 49
Grid 7
Grid 6
Grid 8
Grid 15
Grid 28
Grid 36
Grid 50
Grid 5
Grid 9
Grid 14
Grid 29
Grid 35
Grid 51
Grid 54
Grid 1
Grid 4
Grid 10
Grid 13
Grid 30
Grid 34
Grid 52
Grid 2
Grid 3
Grid 11
Grid 12
Grid 31
Grid 33
Grid 53
Grid 32
Google Earth
Image © 2024 Airbus
900 ft
N

Attachment 3

Instantaneous and Component Emissions Monitoring Results


Roseburg Landfil
Q2 2024 OAR SEM Event
Legend
Initial Instantaneous Location above 500 ppmv
Initial Instantaneous Location between 100-499 ppmv
PLCS
SDS CLEANOUT
SLCS CLEANOUT
EW84
EW57
ECL8
EW58
EW59
EW60
ECL5
EW97
EW98
EW74
EW76
EW32
EW25
E1
EW04
Grid 1
Grid 5
Grid 6
Grid 7
Grid 8
Grid 9
Grid 14
Grid 15
Grid 16
Grid 17
Grid 18
Grid 20
Grid 21
Grid 22
Grid 23
Grid 24
Grid 25
Grid 26
Grid 27
Grid 28
Grid 29
Grid 35
Grid 36
Grid 37
Grid 38
Grid 39
Grid 40
Grid 41
Grid 42
Grid 43
Grid 44
Grid 45
Grid 46
Grid 47
Grid 48
Grid 49
Grid 50
Grid 51
Grid 54
Google Earth
Image © 2024 Airbus
700 ft
N

Instantaneous Data Report for April 8, 9, 16, and May 8, 2024

Location (Surface)	Initial Monitoring Results (ppmv) April 8, 2024	Initial Monitoring Results (ppmv) April 9, 2024	First 10-Day Recheck Monitoring Results (ppmv) April 16, 2024	1-Month Confirmation Monitoring Results (ppmv) May 8, 2024	Latitude	Longitude
EW98	6054	N/A	154	71	43.18934798	-123.382636
EW32	3100	N/A	47	210	43.18840502	-123.383238
EW97	2182	N/A	2	82	43.18947103	-123.382699
EW25	2132	N/A	4	72	43.18807896	-123.381081
EW84	1237	N/A	2	227	43.19012398	-123.383133
EW60	N/A	8522	47	32	43.18973204	-123.381603
ECL5	N/A	3359	26	12	43.18965501	-123.380865
ECL8	N/A	1256	2	126	43.19034199	-123.381391
EW59	N/A	1236	96	76	43.18997202	-123.381765
EW57	N/A	1217	9	5	43.19038399	-123.381951
EW76	N/A	896	31	122	43.18871104	-123.381102
EW58	N/A	507	16	136	43.19015097	-123.381892
E1	394	N/A	N/A	N/A	43.18753003	-123.384002
PLCS	216	N/A	N/A	N/A	43.19137104	-123.382656
SLCS CLEANOUT	180	N/A	N/A	N/A	43.19137397	-123.38261

Location (Surface)	Initial Monitoring Results (ppmv) April 8, 2024	Initial Monitoring Results (ppmv) April 9, 2024	First 10-Day Recheck Monitoring Results (ppmv) April 16, 2024	1-Month Confirmation Monitoring Results (ppmv) May 8, 2024	Latitude	Longitude
SDS CLEANOUT	163	N/A	N/A	N/A	43.191379	-123.38263
EW04	118	N/A	N/A	N/A	43.18648003	-123.383562
EW74	N/A	209	N/A	N/A	43.18929601	-123.381284

Pressurized Pipe and Component Results

Route	Date	Concentration (ppmv)
FLARE STATION	April 9, 2024	5.00

No other exceedances of the 500 ppmv threshold were observed during the second quarter of 2024 monitoring. The highest observed reading was 8,522.0 ppmv.

Attachment 4

Integrated Monitoring Results

Point Name	Record Date	FID Concentration (ppm)	Comments
Grid 1	--	--	Exempt
Grid 2	4/8/2024	3.03	
Grid 3	4/8/2024	2.77	
Grid 4	4/8/2024	3.30	
Grid 5	--	--	Exempt
Grid 6	--	--	Exempt
Grid 7	--	--	Exempt
Grid 8	--	--	Exempt
Grid 9	--	--	Exempt
Grid 10	4/8/2024	3.03	
Grid 11	4/8/2024	2.91	
Grid 12	4/8/2024	1.02	
Grid 13	4/8/2024	2.92	
Grid 14	--	--	Exempt
Grid 15	--	--	Exempt
Grid 16	4/8/2024	0.77	
Grid 17	4/8/2024	1.35	
Grid 18	4/8/2024	0.30	
Grid 19	4/8/2024	3.82	
Grid 20	4/8/2024	3.75	
Grid 21	4/8/2024	6.41	
Grid 22	4/8/2024	2.87	
Grid 23	4/8/2024	1.73	
Grid 24	4/8/2024	1.01	
Grid 25	4/8/2024	1.55	
Grid 26	--	--	Exempt
Grid 27	--	--	Exempt
Grid 28	4/8/2024	1.05	
Grid 29	4/8/2024	0.70	
Grid 30	4/8/2024	0.62	
Grid 31	4/8/2024	0.77	
Grid 32	4/8/2024	0.63	
Grid 33	4/8/2024	0.28	
Grid 34	4/8/2024	0.46	
Grid 35	4/8/2024	0.64	
Grid 36	4/8/2024	0.00	
Grid 37	4/8/2024	3.52	
Grid 38	4/8/2024	4.50	
Grid 39	4/9/2024	5.21	
Grid 40	4/9/2024	8.46	
Grid 41	4/9/2024	15.32	
Grid 42	4/9/2024	4.47	
Grid 43	4/9/2024	2.52	
Grid 44	4/9/2024	3.40	

Point Name	Record Date	FID Concentration (ppm)	Comments
Grid 45	4/9/2024	11.08	
Grid 46	4/9/2024	3.24	
Grid 47	4/9/2024	1.62	
Grid 48	4/8/2024	0.64	
Grid 49	4/8/2024	0.36	
Grid 50	4/8/2024	0.00	
Grid 51	4/8/2024	0.00	
Grid 52	4/8/2024	0.68	
Grid 53	4/8/2024	0.12	
Grid 54	4/8/2024	0.11	

Attachment 5

Calibration Logs

CARBON EMISSION MONITORING
CALIBRATION AND PERTINENT DATA

Date: 4/8/2024 Site Name: Coffin Butte Landfill

WEATHER OBSERVATIONS SCS Employee Riley Baksic

Wind Speed: 8 MPH Wind Direction: NW Barometric Pressure: 30.25

Air Temperature: 49 deg F General Weather Conditions: Sunny

CALIBRATION INFORMATION

Pre-monitoring Calibration Precision Check

Response Time trial #1 *5 seconds*

Response Time trial #2 *5 seconds*

Response Time Trial #3 6 seconds

Instrument ID: TVA-202016031210 Cal Gas Concentration: 500 ppm

Trial	Zero Air Reading	Cal Gas Reading	|(Cal Gas Conc. - Cal Gas Reading)|
1	0	501	1
2	0	499	1
3	0	500	0

Average Difference: 0.00

Calibration Precision = Average Difference / Cal Gas Concentration X 100%
= 0 / 500 X 100%
= 0.0% %

Post-monitoring Calibration Check

Zero Air Reading: 0 ppm Cal Gas Reading: 500 ppm

BACKGROUND CONCENTRATION CHECKS

Up Wind of landfill area on NW side. Reading: 0.4 ppm

Downwind SE side of site Reading: 1.7 ppm

NOTES:

CARBON EMISSION MONITORING
CALIBRATION AND PERTINENT DATA

Date: 4/9/2024 Site Name: Roseburg Landfill

WEATHER OBSERVATIONS SCS Employee Riley Baksic

Wind Speed: 3 MPH Wind Direction: NW Barometric Pressure: 30.31

Air Temperature: 53 deg F General Weather Conditions: Overcast

CALIBRATION INFORMATION

Pre-monitoring Calibration Precision Check

Response Time trial #1 *5 seconds*

Response Time trial #2 *5 seconds*

Response Time Trial #3 6 seconds

Instrument ID: TVA-202016031210 Cal Gas Concentration: 500 ppm

Trial	Zero Air Reading	Cal Gas Reading	|(Cal Gas Conc. - Cal Gas Reading)|
1	0	499	1
2	0	500	0
3	0	501	1

Average Difference: 0.00

Calibration Precision = Average Difference / Cal Gas Concentration X 100%
= 0 / 500 X 100%
= 0.0% %

Post-monitoring Calibration Check

Zero Air Reading: 0 ppm Cal Gas Reading: 500 ppm

BACKGROUND CONCENTRATION CHECKS

Up Wind of landfill area on NW side. Reading: 0.9 ppm

Downwind SE side of site Reading: 2.4 ppm

NOTES:

CARBON EMISSION MONITORING
CALIBRATION AND PERTINENT DATA

Date: 4/16/2024 Site Name: Roseburg Landfill

WEATHER OBSERVATIONS SCS Employee Riley Baksic

Wind Speed: 9 MPH Wind Direction: NE Barometric Pressure: 30.42

Air Temperature: 55 deg F General Weather Conditions: Sunny

CALIBRATION INFORMATION

Pre-monitoring Calibration Precision Check

Response Time trial #1 *5 seconds*

Response Time trial #2 *5 seconds*

Response Time Trial #3 6 seconds

Instrument ID: TVA-202016031210 Cal Gas Concentration: 500 ppm

Trial	Zero Air Reading	Cal Gas Reading	|(Cal Gas Conc. - Cal Gas Reading)|
1	0	501	1
2	0	499	1
3	0	500	0

Average Difference: 0.00

Calibration Precision = Average Difference / Cal Gas Concentration X 100%
= 0 / 500 X 100%
= 0.0% %

Post-monitoring Calibration Check

Zero Air Reading: 0 ppm Cal Gas Reading: 500 ppm

BACKGROUND CONCENTRATION CHECKS

Up Wind of landfill area on NE side. Reading: 0.3 ppm

Downwind SW side of site Reading: 1.7 ppm

NOTES:

CARBON EMISSION MONITORING
CALIBRATION AND PERTINENT DATA

Date: 5/8/2024 Site Name: Roseburg Landfill

WEATHER OBSERVATIONS SCS Employee Riley Baksic

Wind Speed: 5 MPH Wind Direction: N Barometric Pressure: 30.23

Air Temperature: 51 deg F General Weather Conditions: Sunny

CALIBRATION INFORMATION

Pre-monitoring Calibration Precision Check

Response Time trial #1 *5 seconds*

Response Time trial #2 *5 seconds*

Response Time Trial #3 6 seconds

Instrument ID: TVA-202016031210 Cal Gas Concentration: 500 ppm

Trial	Zero Air Reading	Cal Gas Reading	|(Cal Gas Conc. - Cal Gas Reading)|
1	0	500	0
2	0	501	1
3	0	499	1

Average Difference: 0.00

Calibration Precision = Average Difference / Cal Gas Concentration X 100%
= 0 / 500 X 100%
= 0.0% %

Post-monitoring Calibration Check

Zero Air Reading: 0 ppm Cal Gas Reading: 500 ppm

BACKGROUND CONCENTRATION CHECKS

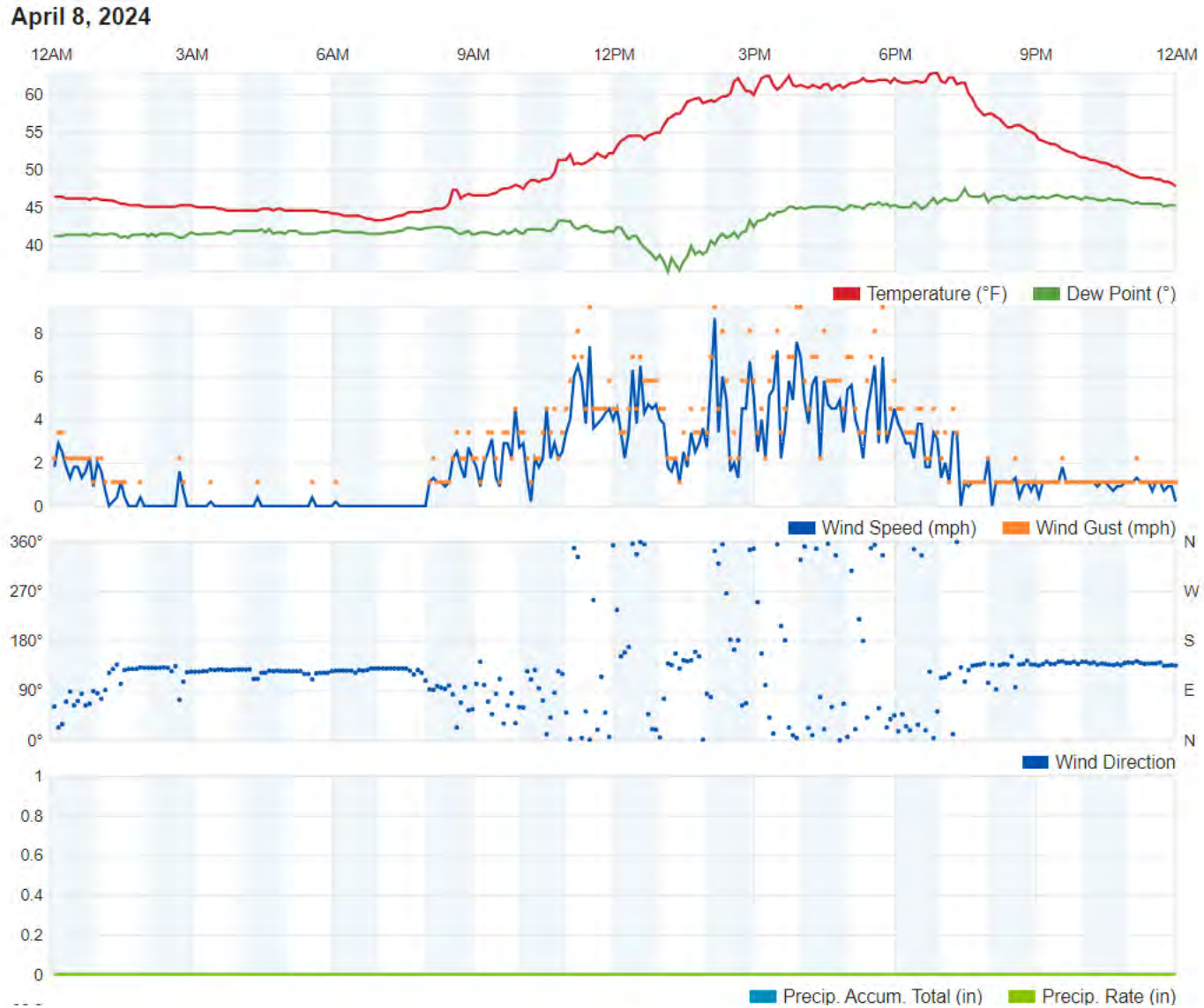
Up Wind of landfill area on N side. Reading: 0.9 ppm

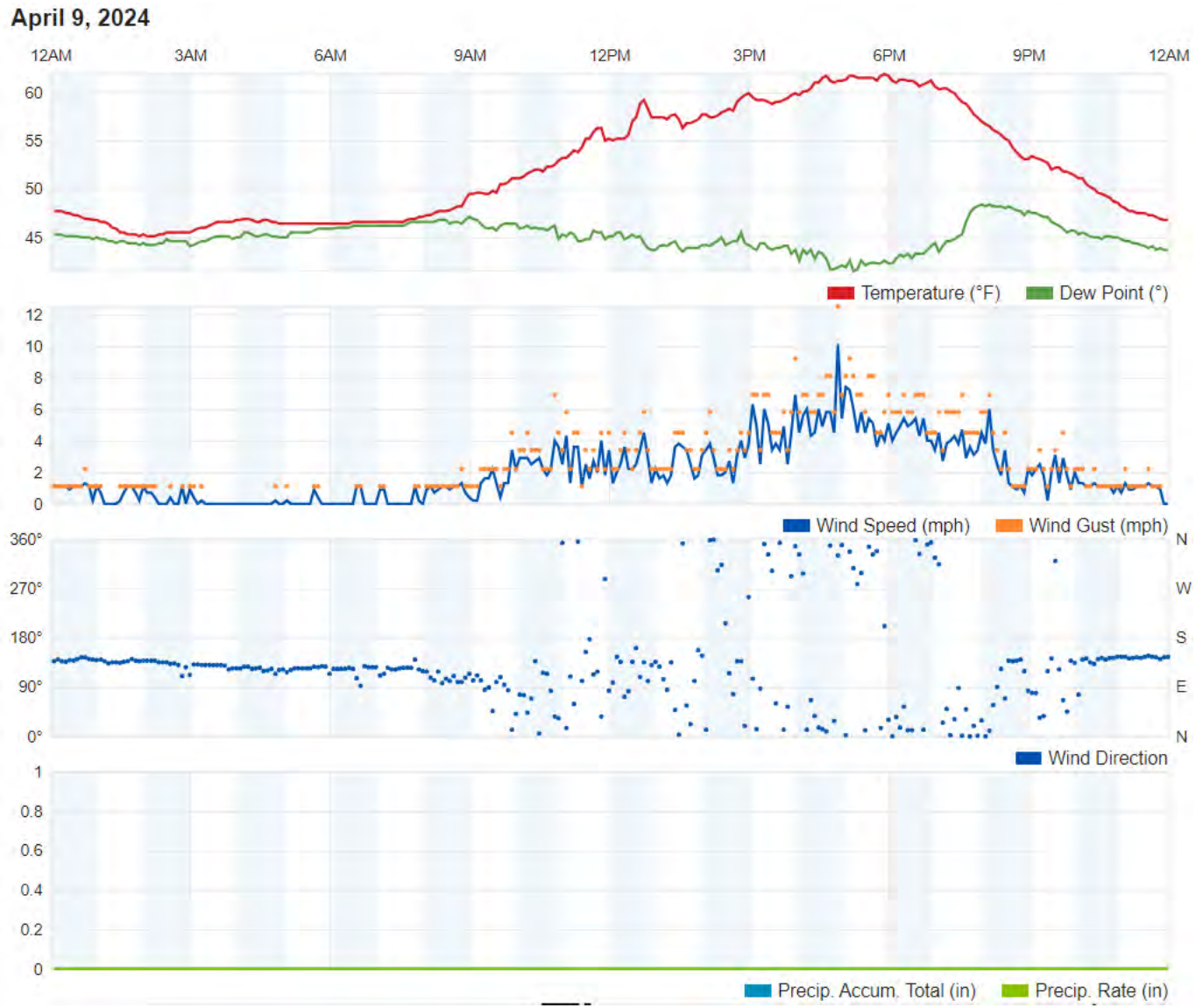
Downwind S side of site Reading: 1.6 ppm

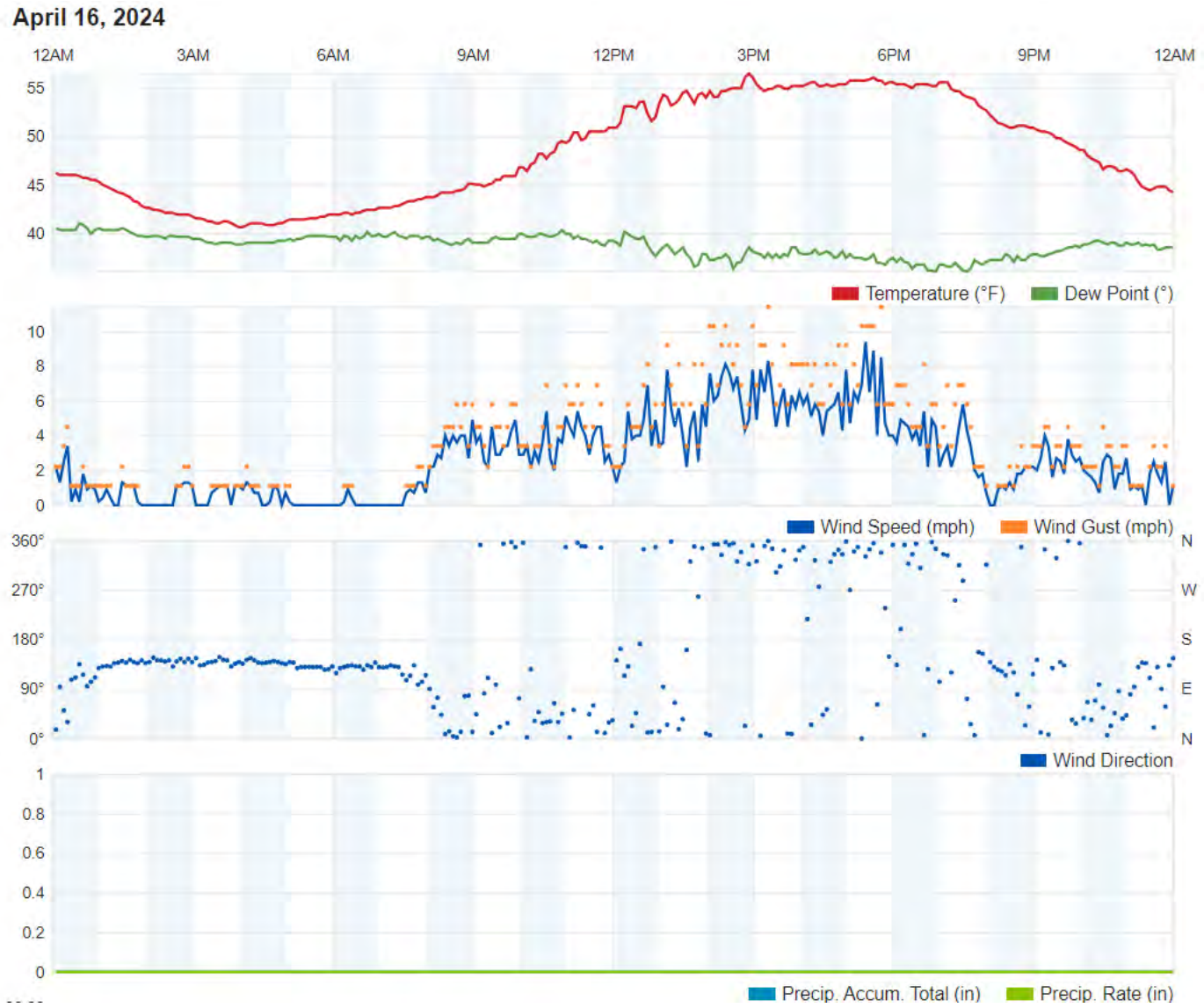
NOTES:

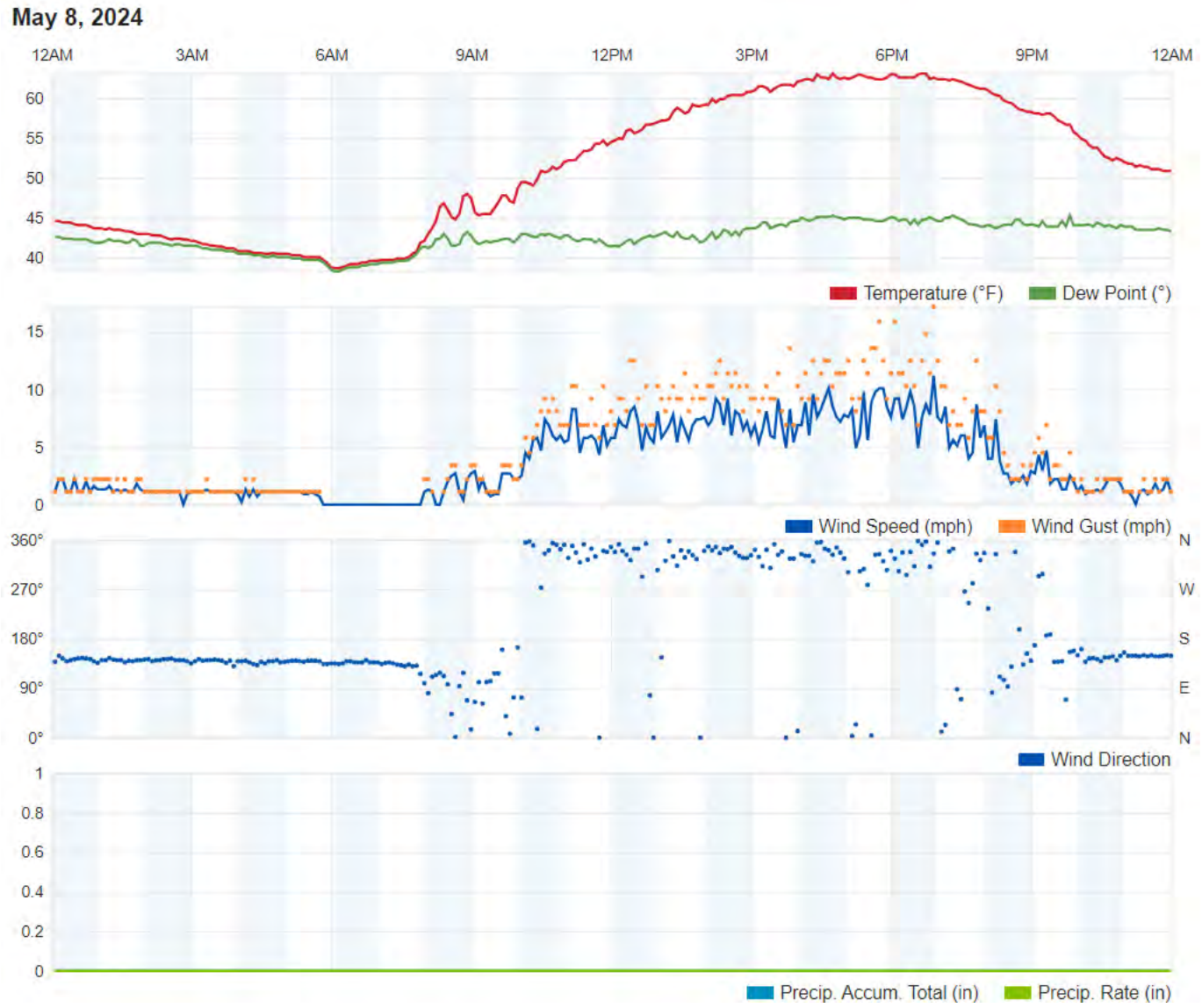
Attachment 6

Weather Data


April 8, 2024
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
60
55
50
45
40
Temperature (°F)
Dew Point (°)
8
6
4
2
0
Wind Speed (mph)
Wind Gust (mph)
360°
270°
180°
90°
0°
N
W
S
E
N
Wind Direction
1
0.8
0.6
0.4
0.2
0
Precip. Accum. Total (in)
Precip. Rate (in)


April 9, 2024
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
60
55
50
45
Temperature (°F)
Dew Point (°)
12
10
8
6
4
2
0
Wind Speed (mph)
Wind Gust (mph)
360°
270°
180°
90°
0°
N
W
S
E
N
Wind Direction
1
0.8
0.6
0.4
0.2
0
Precip. Accum. Total (in)
Precip. Rate (in)


April 16, 2024
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
55
50
45
40
Temperature (°F)
Dew Point (°)
10
8
6
4
2
0
Wind Speed (mph)
Wind Gust (mph)
360°
270°
180°
90°
0°
N
W
S
E
N
Wind Direction
1
0.8
0.6
0.4
0.2
0
Precip. Accum. Total (in)
Precip. Rate (in)


May 8, 2024
12AM
3AM
6AM
9AM
12PM
3PM
6PM
9PM
12AM
60
55
50
45
40
Temperature (°F)
Dew Point (°)
15
10
5
0
Wind Speed (mph)
Wind Gust (mph)
360°
270°
180°
90°
0°
N
W
S
E
N
Wind Direction
1
0.8
0.6
0.4
0.2
0
Precip. Accum. Total (in)
Precip. Rate (in)

APPENDIX G

Corrective Actions/System Expansion Documentation

TRANSIGHT CONSULTING, LLC
Transportation Engineering and Planning Services

Date:	May 23, 2025
To:	Petra Schuetz
From:	Joe Bessman, PE
Project Reference No.:	1539
Project Name:	Coffin Butte Landfill – Open Record

The purpose of this memorandum is to provide a formal response to public comments related to transportation that were received on the Coffin Butte Landfill conditional use application for expansion south of Coffin Butte Road as part of LU-24-027. Comments received from the public hearings are provided below followed by our response.

Comment 1: Traffic from the landfill has increased on Coffin Butte Road.

Response: Transight Consulting has been supporting Valley Landfills with transportation analysis of the Coffin Butte Road for the past five years, with various data collection efforts conducted by Benton County staff and third-party data collection firms throughout this period. In addition to the Coffin Butte Landfill, Coffin Butte Road served the adjacent Knife River Quarry, and connects to other rural uses to the west. Landfill demands constantly fluctuate (seasonally, daily, and even hourly), which is similar to travel demands along Highway 99W and to and from the surrounding rural uses.

The historical data collection conducted on Coffin Butte Road was not collected at landfill entrance, nor was data collection scheduled for the same specific time periods (or the same day of the week or month of the year), but rather to respond to specific Code requirements and issues raised. Throughout this period the data collection at Highway 99W/Coffin Butte Road reflects the most consistent count location throughout this period.

Traffic counts were collected at the Highway 99W/Coffin Butte Road intersection in March 2021, January 2022, September 2023, and April 2025. These traffic counts were specifically intended to capture the weekday evening commute period, which is the time period with the highest overall Total Entering Vehicles typically between the hours of 4:00 p.m. and 6:00 p.m. The January 2021, September 2023, and the April 2025 traffic counts included an extended time period from 2:00 to 6:00 p.m., with this data showing that even with the elevated landfill activity occurring earlier in the day, the peak hour at the highway intersection occurred within the 4:00 to 6:00 p.m. period, confirming that this does reflect the peak “design hour”.

While there are seasonal and day of week fluctuations, in review of the total entering traffic volumes (TEV) these unadjusted traffic counts show a relatively stable travel pattern, with the highest observed volumes in September 2023 and the lowest observed volumes in April 2025 (see Table 1). Increased activity occurred within the adjacent Knife River quarry to accelerate the removal of the material; this activity was captured in the September 2023 counts.

Table 1. Summary of Historical Traffic Counts, Total Entering Vehicles

Location	March 2021 Weekday Traffic Counts	January 2022 Weekday Traffic Counts	September 2023 Weekday Traffic Counts	April 2025 Weekday Traffic Counts
Highway 99W/ Coffin Butte Rd	836 Vehicles *4:35 to 5:35 PM*	820 Vehicles *4:35 to 5:35 PM*	894 Vehicles *4:35 to 5:35 PM*	805 Vehicles *4:00 to 5:00 PM*

Traffic volumes at the Highway 99W/Coffin Butte Road intersection show a fairly stable pattern throughout this time period. All of the traffic counts except the April 2025 data show a peak hour during the 4:35 to 5:35 p.m. period, with the April counts showing an earlier peak between 4:00 and 5:00 p.m. Further review was conducted specifically of eastbound and westbound traffic volumes on the west leg of the intersection from these same counts, with the travel patterns summarized in Table 2. This data consistently reviewed the 4:35 to 5:35 p.m. period to avoid time of day bias in this comparison, and reflects all the traffic arriving at the highway (including quarry trips, landfill trips, and other rural trips).

Table 2. Summary of Historical Traffic Counts on West Approach of Highway 99W/Coffin Butte Rd

Direction	March 2021 Weekday Traffic Counts	January 2022 Weekday Traffic Counts	September 2023 Weekday Traffic Counts	April 2025 Weekday Traffic Counts
Eastbound	38 Vehicles *(4:35 to 5:35 PM)*	19 Vehicles *(4:35 to 5:35 PM)*	49 Vehicles *(4:35 to 5:35 PM)*	33 Vehicles *(4:35 to 5:35 PM)*
Westbound	15 Vehicles *(4:35 to 5:35 PM)*	9 Vehicles *(4:35 to 5:35 PM)*	17 Vehicles *(4:35 to 5:35 PM)*	6 Vehicles *(4:35 to 5:35 PM)*
Bi-Directional Total	53 Vehicles	28 Vehicles	66 Vehicles	39 Vehicles

This data was prepared to reflect the peak traffic volumes on the system, which is the time period commonly referred to as the *System Peak Hour* or *Design Hour*. The April 2025 data collected at the landfill entrance shows that the peak landfill activity occurs earlier in the day, tapering into the evening commute period when the highway volume increases.

This data shows that the critical weekday p.m. peak hour volumes at OR 99W/Coffin Butte Road have been fairly stable over this five-year period, and volumes from Coffin Butte Road during the peak hour have also been relatively consistent. The measured traffic volumes remain within the normal seasonal fluctuation expected for this type of use and do not reflect an increasing trend.

Comment 2: Landfill trucks are heavier than other types of trucks and can accelerate pavement wear and maintenance on Coffin Butte Road.

Response: There are a variety of trucks that enter and exit the Coffin Butte landfill. Review of data captured at the landfill entrance between 7:00 a.m. and 9:00 p.m. show that trucks account for about two-thirds of all the Coffin Butte landfill trips. These truck types range from single-unit box trucks to semi-trucks, but the increased loading does increase pavement wear in comparison to the impact of passenger vehicles.

The modification of circulation and access will add truck trips in the section of Coffin Butte Road between the current landfill entrance and the new expansion entrance; this section of roadway will be

reconstructed to current Benton County standards for a *Collector Road* and a *Freight Route* as addressed within the application. The design of this roadway extension will address the additional truck travel along Coffin Butte Road and the maintenance impacts of these trips.

Comment 3: The removal of the tonnage cap could increase travel to Coffin Butte at a much higher rate than area population growth. The traffic study does not account for programmatic/landfill management changes that could drastically increase travel.

Response: Landfill tonnage is a common metric to associate with landfill trips, but there are multiple factors that influence trip rates at a landfill. Waste management often involves siting transfer stations within close proximity to the population served, so that residential vehicles and contractors can make shorter trips to these facilities. This waste is then hauled by larger transfer trucks to regional facilities like the Coffin Butte landfill. This process of consolidating refuse from multiple individual sources results in a lower number of trips per ton as the haul distance increases. Based on discussions with the Republic Services team, there are no plans to increase the Coffin Butte operations beyond current area population growth.

Within the literature review section of the submitted traffic study we reviewed other landfill applications prepared at other sites across the US. One of these studies was conducted at the Twin Creeks Landfill, and this report was prepared to address a tonnage increase from 750,000 per year to a maximum of 1,400,000 tons. This study found that nearly doubling the tonnage resulted in only +6 weekday p.m. peak hour truck trips, which was due to the dispersion of trips throughout the day, reduced waste transport later into the evening period, and the use of larger trucks to support the longer-distance waste transfer.

The traffic study prepared for Coffin Butte recognizes that landfill trips can vary seasonally, by day of the week, and in response to population growth. While changes due to the tonnage cap were not directly assessed or considered within the February 2024 Transportation Impact Analysis, the traffic study considered the relocation of truck trips between the scales and the new landfill entrance and increased the existing traffic volumes by 50% (+57 additional peak hour trips). This change in travel is well beyond the projected population growth identified for Linn-Benton County that identifies annual growth of about 1% annually, or State of Oregon projections showing a population change of about 1.7% annually. Applying these growth rates would only result in a 10% to 20% increase in traffic volumes throughout the design and construction of the expansion site and its seven-year lifespan.

While a specific tonnage limit was not specifically considered or assessed within the Coffin Butte traffic study, the submitted analysis demonstrates that there is ample capacity on the system to support a higher tonnage limit, particularly if the additional materials were to arrive from other waste transfer stations using larger transfer trucks.

Comment 4: The activity on Coffin Butte Road will be so intense as to effectively "close" the road for public use.

Response: Coffin Butte Road is a low-volume Benton County designated *Collector* Road and *Freight Route.* The traffic volumes have been reviewed over the past five years to establish the current travel levels of the landfill, and to show estimates of activity with the proposed expansion site.

The proposed modifications to the landfill access with the expansion site will not change the current traffic volumes between Highway 99W and the existing landfill entrance, which reflects the highest-volume portion of this corridor (all trucks and passenger vehicles destined to the landfill will continue to use this portion of the road, as well as public trips from rural areas to the west). Within this area, traffic counts

from April 2025 show a peak bi-directional volume east of the landfill entrance between 10:25 a.m. and 11:25 a.m. of about 160 total vehicles on this roadway segment (from the landfill and other public trips). This level of travel is well below the capacity of the facility, and while Benton County does not have specific volume thresholds for its rural Collectors, this value (approximately 1,600 vehicles per day) is about 60% of a typical rural Collector volume range (which is generally between 300 and 2,600 vehicles per day per the Federal Highway Administration's 2023 publication *Highway Functional Classification: Concepts, Criteria, and Procedures*).

NEXT STEPS

Thank you for the opportunity to clarify these transportation materials for the Coffin Butte Landfill, if you have any questions I can be reached at (503) 997-4473 or via email at joe@transightconsulting.com.

Wildlife Memorandum

for Coffin Butte Landfill Expansion Project

For: Benton County Planning Commission

By: Turnstone Environmental Consultants, Inc.

Date: June 2, 2025

INTRODUCTION

This memorandum is to address various Planning Commissioner questions and public comment raised in response to the evidence submitted by Applicant related to wildlife.

Concerns Regarding Roosevelt Elk

- Trail camera surveillance showed that elk use the expansion area as peripheral habitat, which is considered important but not essential habitat. Their primary habitat is to the west in open fields and coastal forest areas.
- Trail cameras found a large herd using the forested area in the expansion site for limited periods (2 to 11 days) and on only three occasions during a 12-month period.

Concerns Regarding Great Blue Herons and Bald Eagles

- Turnstone biologists observed the aftermath of the nest failure event with four juvenile bald eagles visiting each Great Blue Heron nest in the eastern rookery and cannot determine the cause of the nest failure, which would be speculation.
- Eagles and herons co-exist in areas next to open water, such as in the Columbia River Gorge, where there is a known eagle nest occurring within 200 yards of an active Great Blue Heron rookery.
- Two adult eagles and typically one or two young will occupy a nest; whereas, the landfill can attract a high density of eagles. While Bald Eagles and Great Blue Herons can nest in close proximity, the high density of eagles and large flocks of other predatory birds, may pose a different threat to the rookery. It may be possible that a large congregation of Bald Eagles could ascend on a Great Blue Heron rookery and cause a collapse.
- The new location of the eastern Great Blue Heron nest site is farther away from the Coffin Butte Landfill. The Applicant will manage the expansion, if approved, in accordance with the Oregon Forest Practices Act (FPA) and all other applicable regulations.

- The FPA requires landowners to avoid disturbance within 300 feet of an active nest or rookery during the nesting season from February 15 to July 31. Forest operations are restricted within 0.25-mile of active nest trees during the critical nesting period. The new nesting site is greater than 0.25 mile from the proposed tree removal areas.

- Turnstone's opinion remains that the expansion is not posing a serious interference to wildlife in the area.

Sincerely,

Stephanie James

Stephanie James

Environmental Scientist, M.S.

Turnstone Environmental Consultants, Inc.

Offices in Corvallis and Portland, Oregon

Phone 503-283-5338 x103
Email stephanie@turnstoneenvironmental.com
Web turnstoneenvironmental.com

SCS ENGINEERS Environmental Consultants & Contractors

June 5, 2025
File No. 27223197

MEMORANDUM

TO: Republic Services

FROM: James Walsh, P.E., BCEE, SCS Engineers

SUBJECT: Rebuttal to Public Comments Received May 2025
To Benton County Planning & Zoning Commission
On Landfill Fire Potential at Coffin Butte Landfill

From review of public comments provided, both in oral testimony and on the written record, in hearings for the Conditional Use Permit (CUP) on Coffin Butte Landfill, I summarize below 5 significant comments on landfill fire issues that I observed. Those comments and my responses to them are listed below.

1. Adair Fire Department

Comment: There were concerns voiced by an Adair Fire representative that property tax revenue to the Department has not kept up with Fire District growth and Department responsibilities. At the same time, there have been recent reductions in Adair Fire staffing. This may result in difficulties by the Department in meeting fire response needs in the future at Coffin Butte Landfill.

Response: Coffin Butte staff just met with Adair Fire in March 2025. The meeting went well with each party pledging to work together going forward, as well as they have in the past. In the meeting, the parties discussed a few ways both can engage and serve one another even better in the future. Meeting notes by both sides committed each party to continue the good working relationship of the past. There were no concerns expressed at that time about any possible service or support reduction from Adair Fire. Coffin Butte appreciates the past support Adair Fire has provided,and are hopeful it can continue in the future at the same level. With that said, it should be pointed out that most fires at the landfill have been handled properly and in full by landfill staff, and it is believed that will continue to be the case going forward.

2. FEMA Report

Comment: Adair Fire Department reported that they have reviewed a FEMA authored report on Landfill Fires suggesting that such fires can be large, can be fueled by landfill methane emissions, and may strain local fire services.

Response: We are well familiar with the FEMA document cited. FEMA often creates large debris piles from disaster cleanups. Waste in those can be left uncovered for months. Understandably, FEMA has had issues with fires in those large uncovered debris piles. However, FEMA has no operating experience with a modern MSW landfill like Coffin Butte Landfill or its fire potential or reality. Like any modern MSW landfill, Coffin Butte Landfill covers its waste each night and never has large areas of uncovered waste exposed for months at a time. Coffin Butte has far less fire potential than that reported by FEMA. Further, FEMA is simply mis-informed about methane emissions causing or exacerbating landfill fires. Landfill fires have nothing to do with methane emissions, not at Coffin Butte, and not at any modern MSW landfill. None of the past fires at Coffin Butte were created or exacerbated by methane.

3. Reporting Fires at Coffin Butte Landfill

Comment: It was suggested that Coffin Butte compile a running log of landfill fire incidents. And develop Incident Reports for each landfill fire. And that the Landfill's Operations Plan commits it to report each landfill fire event to OR DEQ.

Response: In response to community comments related to being apprised of fire events, Coffin Butte will maintain a log of fire incidents at the Landfill and a Coffin Butte representative will provide a verbal report on fire events at each Benton County Disposal Site Advisory Committee meeting. Further, Coffin Butte will ensure it is reporting each fire event to OR DEQ.

4. Magnitude of Landfill Fire Risks

Comment: One public commenter cited the SCS report as identifying 5 fires at Coffin Butte Landfill from 1999 to 2025 which they suggested was inconsistent with records from Adair Fire that report 28 calls for fire at the Landfill between 2013 and 2025. It was further stated that the SCS report identified 3 types of landfill fires that represent a material risk. There are many additional fire risks beyond those 3. The commenter concluded that the SCS report drastically under-represented the number, types, and magnitude of landfill fire risks.

Response: As the report makes clear, the 5 fires reported were those material and memorable to landfill staff, and representative of each of the 2 kinds of landfill fire that the landfill has experienced to date: working face fires and grass fires. It wasn't intended to identify any and all fires. Further, the landfill is confident there are only 3 types of landfill fires that could pose a material risk at Coffin Butte Landfill. Any others beyond those 3 have never occurred at the landfill, and we do not have a reasonable basis to believe there ever will be. The report fairly represents the number, types, and magnitude of landfill fire risks. Fires at the landfill have been safely and correctly managed to date, and will be so in the future, ensuring no significant impact on the community or environment.

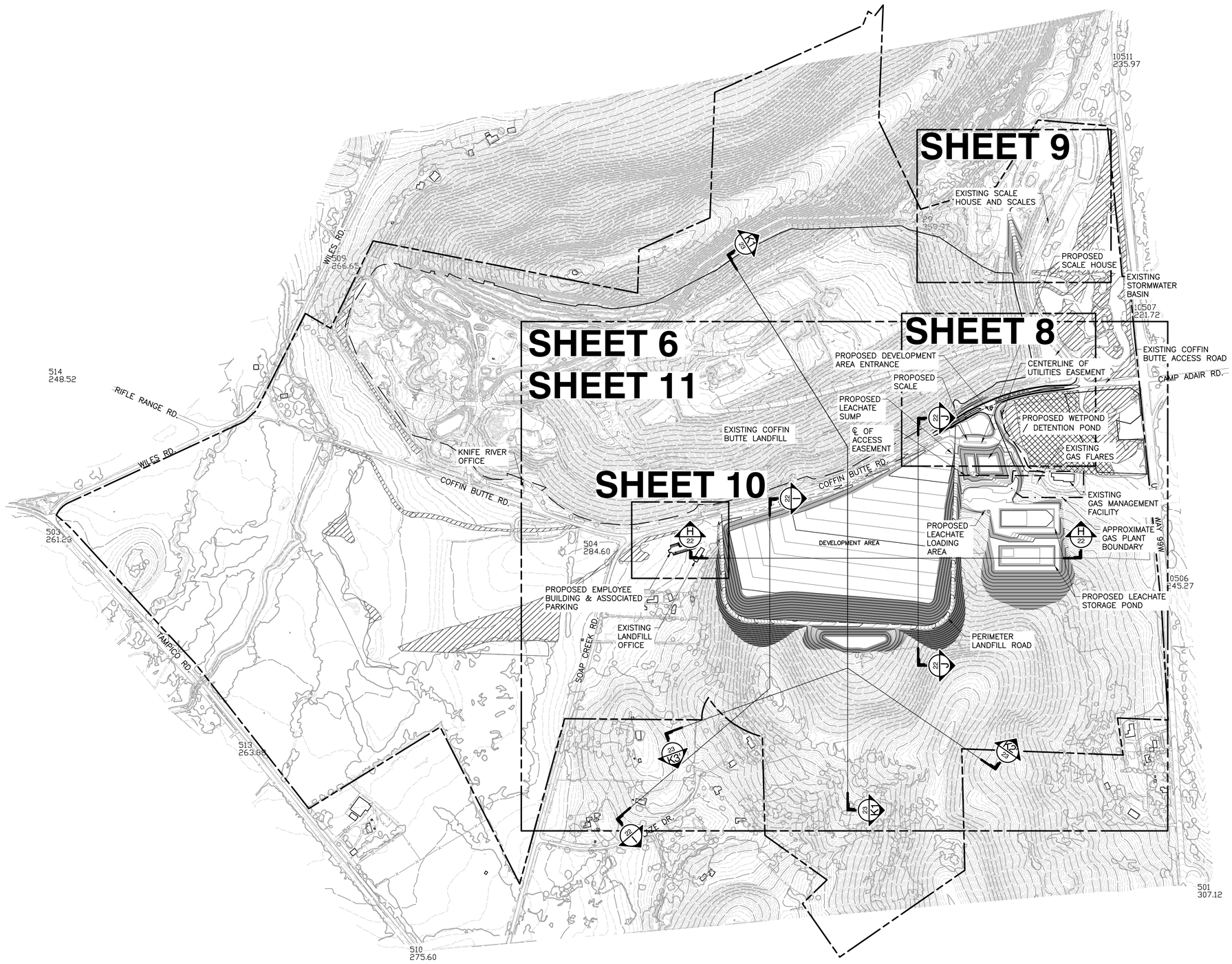
The landfill abides by the state of the practice for landfill fire management like at any other modern MSW landfill. Many will recall the 1999 landfill fire that was significant. That was when the site was owned and operated by the prior operator, not Republic Services. The only way that could have occurred is if many acres of waste were left uncovered and exposed for weeks on end. Republic

covers all waste at the confined daily working face at the end of each working day, with very few exceptions which are quickly addressed. There is no reasonable basis to believe that a fire of that size would reoccur with Republic Services.

5. On-Site Water Truck

Comment: It was reported that the 4,000 gallon water truck on site is defective, does not work, and would offer no value in extinguishing landfill fire.

Response: That statement is completely false. Landfill staff report that the subject water truck has been in continuous service in past years and is fully available at all times to help extinguish fires. In fact, that truck has been employed many times over the years to help extinguish both grass fires and working face fires.



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- ZONING BOUNDARY
- WETLAND MITIGATION BOUNDARY
- 300 — EXISTING 10–FT CONTOUR
- EXISTING 2–FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 250 — PROPOSED 10–FT CONTOUR

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).

NORTH

SCALE IN FEET
0 400 800

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

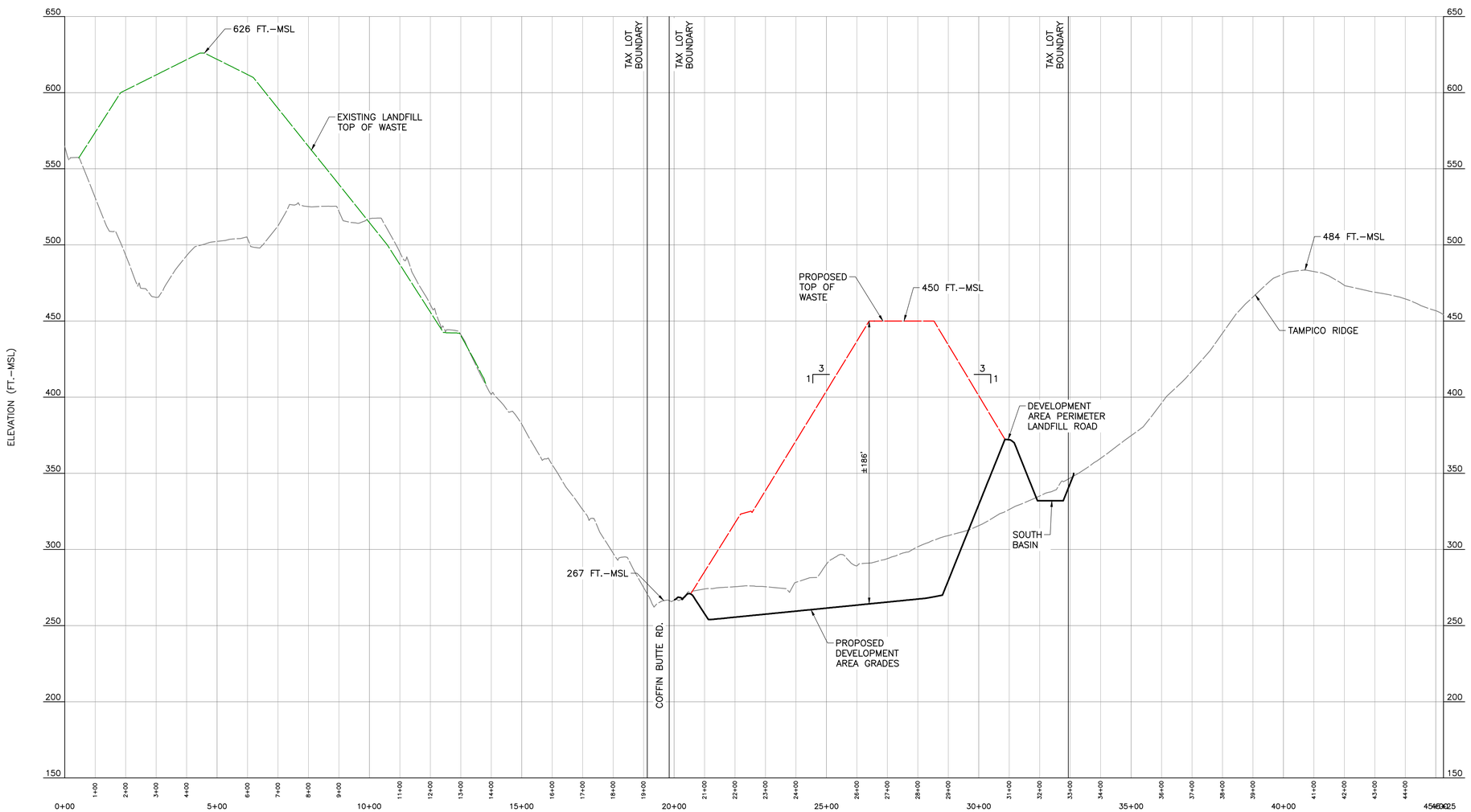
VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

OVERALL DEVELOPMENT PLAN

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.:
5

P:\322-001\322-1421-CAD\Dwg\SW01\322142-SW01-5-Overall Development Plan.dwg[5] LS(5/22/2025 - plan) - LP: 5/22/2025 1:54 PM



CROSS SECTION K1 - K1

SCALE H:1"=200'; V:1"=40'

LEGEND

- EXISTING GROUND ON OCTOBER 07, 2021
- PROPOSED TOP OF WASTE GRADES
- PROPOSED DEVELOPMENT AREA GRADES
- GROUNDWATER ELEVATION CONTOUR (FT–MSL)

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

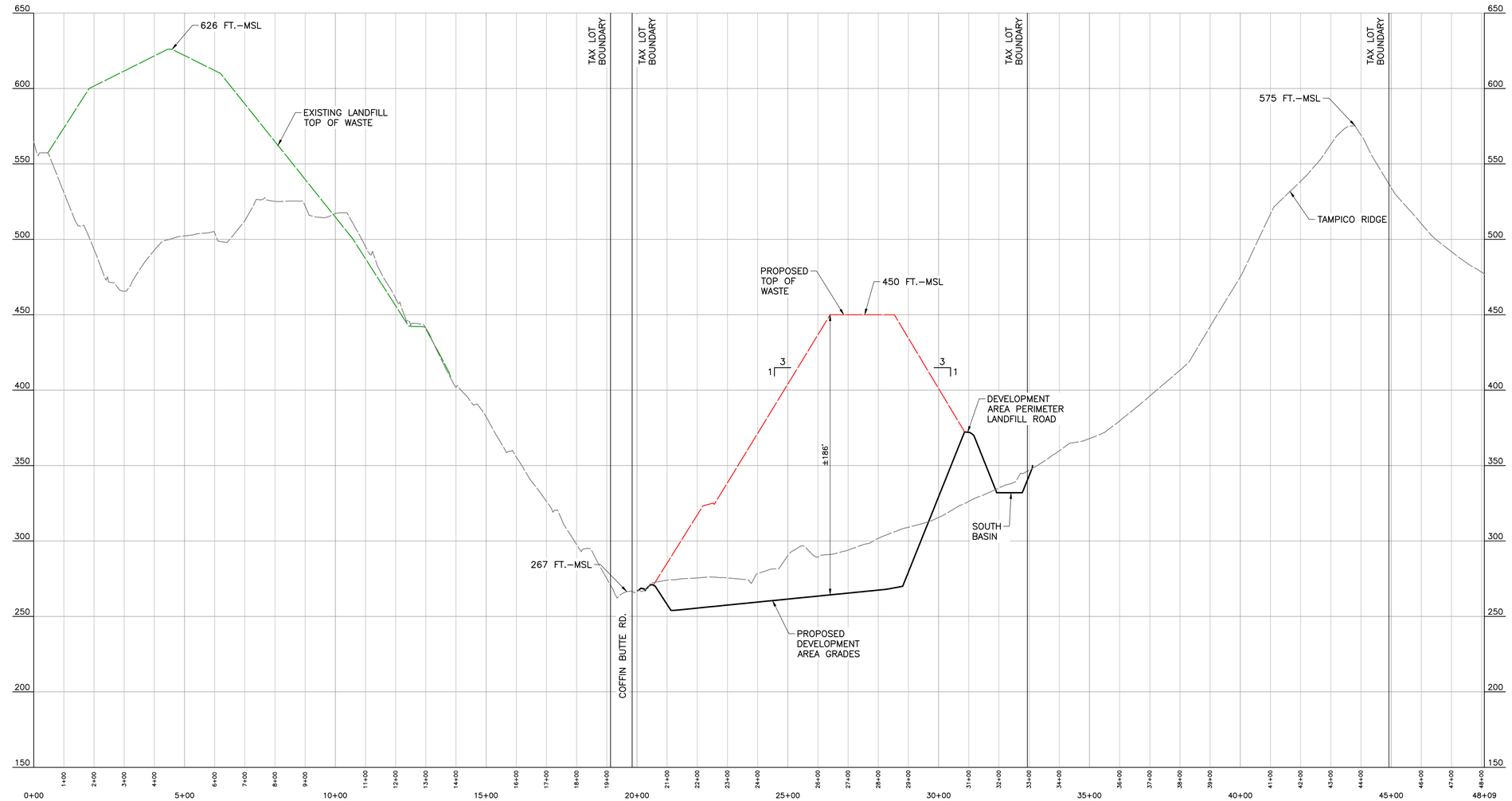
CROSS-SECTION K1-K1

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.: **A**

P:\320-200\322-142\-CADD\Dwg\SHEET\Exhibit\322142-SHEET-Cross Section Exhibits.dwg(A) LS(5/22/2025 - jsteed) - LP: 5/22/2025 3:02 PM

Exhibit E45



CROSS SECTION K2 - K2

SCALE H:1"=200'; V:1"=40'

LEGEND

- EXISTING GROUND ON OCTOBER 07, 2021
- PROPOSED TOP OF WASTE GRADES
- PROPOSED DEVELOPMENT AREA GRADES
- GROUNDWATER ELEVATION CONTOUR (FT–MSL)

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1		

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

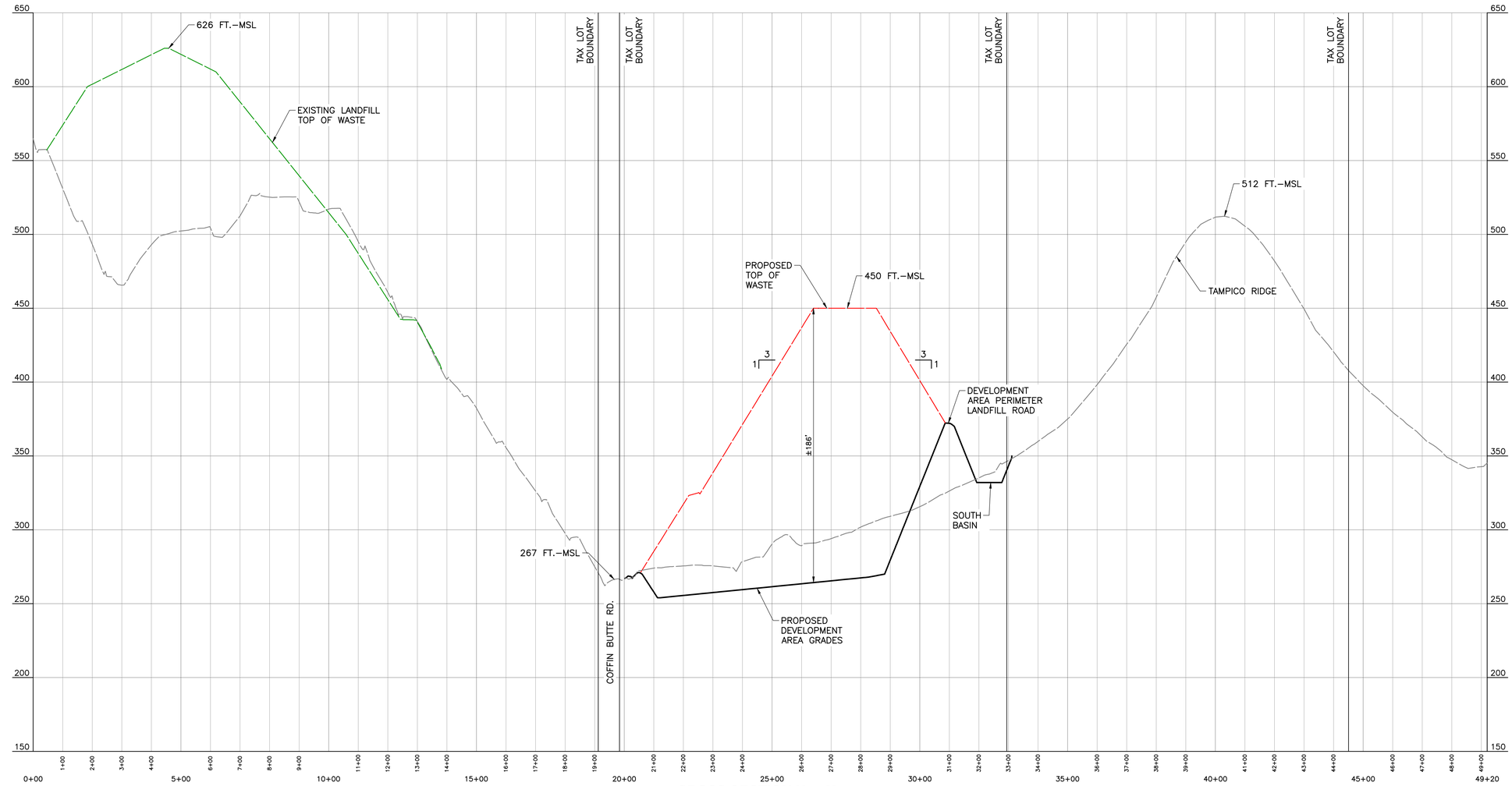
CROSS-SECTION K2-K2

DATE:	JANUARY 2025
DWG SCALE:	AS SHOWN
PROJECT NO:	322-142
DRAWN BY:	JS
CHECKED BY:	JAS
APPROVED BY:	JAS

DRAWING NO.:

B

P:\320-000\322-142\-CADD\Dwg\SWD1\Exhibit\322142-SWD1-Cross Section Exhibits.dwg[B] LS:(5/22/2025 - John) - LP: 5/22/2025 3:03 PM



CROSS SECTION K3 - K3

SCALE H:1"=200'; V:1"=40'

LEGEND

- EXISTING GROUND ON OCTOBER 07, 2021
- PROPOSED TOP OF WASTE GRADES
- PROPOSED DEVELOPMENT AREA GRADES
- GROUNDWATER ELEVATION CONTOUR (FT–MSL)

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT
APPLICATION
CORVALLIS, OR 97330

CROSS-SECTION K3-K3

DATE:	JANUARY 2025
DRAWN BY:	JS
DWG SCALE:	AS SHOWN
CHECKED BY:	JAS
PROJECT NO:	322-142
APPROVED BY:	JAS

DRAWING NO.: C

Exhibit E46

Civil & Environmental Consultants, Inc.

CONSTRUCTION SEQUENCE
June 2025

Civil & Environmental Consultants is providing this general overview of how construction will occur in the expansion area once the Conditional Use Permit is approved. Construction will generally conform to the following sequence, but changes may occur due to variables inherent in most construction projects. This construction sequence is being submitted in response to feedback received during the Condition Use Permit hearing process, prior to finalization of any Conditions of Approval. The construction timeline will adhere to all applicable Conditions of Approval.

- Landscape screening will be installed pursuant to the applicable Condition of Approval.
- The Coffin Butte Road left turn lane construction will be completed as the first part of the construction of the expansion area. A detailed design will be completed and submitted to Benton County for their review and approval prior to any construction commencing.
- The new leachate storage ponds will be constructed first, initially with the landfill staff excavating the soil material and hauling it to the existing landfill for use as daily cover. Blasting will be required during excavation of the leachate storage ponds and blasting will occur between the hours of 12:00 PM and 5:00 PM. However, once subgrade for the leachate storage ponds is achieved, blasting will not be required for the leachate storage ponds.
- Some of the material from the leachate storage pond excavation might be stockpiled on the existing landfill to be used as daily cover, intermediate cover or for road or tipper deck construction.
- Once construction of the leachate storage ponds achieves the required subgrade elevation, the liner installation company will mobilize to the site and install the required liner system and floating cover system.
- All the existing leachate piping that was routing leachate to the existing leachate ponds that is located in the expansion area footprint will be removed. New piping for the leachate will be installed that connects the leachate sumps in the existing landfill to the new leachate ponds.
- Once the new leachate ponds are approved by the Oregon Department of Environmental Quality (ODEQ) then leachate from the existing landfill will be pumped to these new ponds.
- Once the new leachate ponds are active, the existing leachate ponds will be closed in accordance with the closure requirements of the ODEQ.
- The building located within the footprint of the expansion area will be removed.
- The area will be logged, and timber will be removed by a company that specializes in timber removal.
- At this point the landfill staff will start removing soil material from the expansion area and using it as daily cover.

- Currently, the existing landfill has 14.2 million cubic yards of airspace remaining, at 15% for daily cover, the landfill staff will remove approximately 2.2 million cubic yards of material from the expansion area.
- At the appropriate time based on sequencing, Coffin Butte Landfill will hire a Contractor to complete the remaining excavation, which is estimated to be approximately 946,000 cubic yards. Additional blasting will be performed during the excavation of the expansion cell. Again, blasting will be performed between the hours of 12:00 PM and 5:00 PM.
- The Contractor will remove this material, and it will either be used for final cover material or stockpiled on the landfill for use as daily and/or intermediate cover for the expansion area.
- Once the subgrade elevations have been achieved, the liner system installation company will be mobilized to the site to install the liner system.
- The liner system is estimated to be installed in 3 phases over a period of 3 years.
- Once the liner system has been installed and approved by ODEQ, waste placement will commence.

06/05/2025

EXPIRES: **06/30/2026**

Civil & Environmental Consultants, Inc.

INFORMATION ON DRY CLIMATE LANDFILLS
June 2025

Civil & Environmental Consultants is providing this summary on dry climate landfills. It has been CEC's experience working with many dry climate landfills, like the ones located in eastern Oregon, that produce the same amount of landfill gas provided they are taking similar tonnage amounts for disposal. For example, if a landfill located in a dry climate takes 1.1M tons, like Coffin Butte, they would produce almost the same amount of landfill gas. The difference being, is that Coffin Butte Landfill, located in wetter climate, will produce the landfill gas faster because of the rainfall, then a landfill in a drier climate.

Furthermore, again based on CEC's experience, dry climate landfills will accept free liquids as part of the US EPA Research, Development and Demonstration (RDD) Permit, which falls under 40 CFR Section 270.65. There is also a guidance manual that is EPA/530-SW-86-008, published in July 1986. This RDD permit allows the landfills in drier climates to accept free liquids and place the liquids into the working face. This allows the waste to be compacted better and allows for faster waste degradation allowing for the increased landfill gas generation.

Once the landfill has been accepted into the RDD program, the amount of liquid waste accepted can be significant. The acceptance of liquid waste also creates more leachate, which has to be stored in evaporation ponds. Most dry climate landfills do not recirculate leachate, again based on CEC's experience, because recirculating is not a disposal method for leachate. The waste will become saturated and then there are issues with slope stability. The leachate is typically stored in evaporation ponds where the liquid is evaporated but a solid residue is left behind, which is typically removed from the pond and disposed of in the landfill.

06/03/2025

EXPIRES: **06/30/2026**

Geo-Logic ASSOCIATES

Memorandum

To: Jeff Condit **Date:** June 12, 2025

From: John M. Hower, Geo-Logic Associates, Inc.
Eric Tuppan, Tuppan Consultants, LLC.

Subject: Response to comments on CUP Application for the expansion of the Coffin Butte Landfill

The following are responses to public comments received following submittal of the Conditional Use Permit (CUP) application for the Coffin Butte Landfill.

Response to Comments concerning the effect of blasting on adjacent properties

Commenters noted that blasting used to break up and loosen rock for excavation can potentially interfere with uses on adjacent properties due to noise and the potential for seismic disturbance (rattling of windows), and interruption of groundwater flow.

Seismic Disturbances

Blasting has been used sparingly at the CBL, and only when the rock is too hard for removal by traditional earth moving equipment like excavators. At VLI, a blasting engineer develops a focused program to account for the area and quantity of material to be excavated and the geologic conditions, including rock fracture spacing and orientations to ensure that community disruptions are minimized. An appropriate monitoring program using seismographs is also implemented. VLI notes that in 2024 during excavation of Cell 5E, only two blasting events or shots occurred. Knife River, working in the quarry area that was developed as Cell 6, detonated 55 shots between early 2023 and the end of 2024.

Research by the U.S. Bureau of Mines (Duvall and Fogelson, 1962) and cited by the Oregon Department of Transportation website found that fracturing rock around a typical blast hole is limited to a distance of approximately 20-to-40-hole diameters away from the drill holes in which the explosives are packed. Thus, this is a standard of practice employed by blast engineers for this type of mass excavation. As an example, during excavation of the Cell 5 area,

Geo-Logic ASSOCIATES

4.5-inch diameter holes were drilled to depths of approximately 48 feet on 10-foot centers to loosen the rock. This resulted in a rock break distance of between 7.5 feet and 15 feet from each hole, using the rationale above. These findings suggest that the disturbance of rock resulting from blasting would likely be on the same order as disturbance of rock using conventional earth moving equipment.

Even with the short distance of rock fragmentation from the blasting hole, as a precaution, the contractor deployed seismographs to monitor ground vibration caused by the blasting at several locations along Military and Wiles roads on the north side of Coffin Butte near existing homes, at distances of approximately 1,100 to 2,300 feet from the excavation. The seismic wave velocities at those distances were all far below the criteria used for assessing ground vibration associated with building damage.

During the development of the future expansion area, VLI and/or its subcontractor will continue to will provide nearby residents with notification of future blasting events, and a seismic monitoring plan will be implemented for future blasting required for the development area.

Wilbur I. Duvall and Fogelson, D E. "Review of criteria for estimating damage to residences from blasting vibrations.", United States Department of the Interior, Bureau of Mines Report of Investigations 5968, Jan. 1962.

State of Oregon Department of Transportation pamphlet – Rock Blasting and the Community (https://www.oregon.gov/odot/geoenvironmental)

Interruption of groundwater flow associated with the proposed development.

VLI recognizes residents' concerns over the future water supply. As shown in annual groundwater monitoring reports and in Figure 1 (below), we note that the proposed development is located where groundwater flow from Coffin Butte and groundwater flow from Tampico Ridge converge. As a result, the local community south, southwest, and southeast of the proposed development is located upgradient of the proposed development. Groundwater monitoring during development of Cells 1 through 5 has not resulted in a significant change in the groundwater equipotential surface upgradient of these areas of the site as shown in the hydrographs and equipotential surface contour maps that accompany the annual water quality monitoring reports. Recognizing that the geologic conditions beneath the proposed expansion area and Tampico Ridge are similar to those under the existing landfill, modeling results support a conclusion that the proposed expansion is unlikely to result in change in the water resource that is different than the change that occurs seasonally during wet and dry seasons.

Geo-Logic ASSOCIATES

The ways in which a landfill development could interrupt groundwater flow include blasting (rock removal) and changes to recharge zones. This section evaluates those interruptions.

To better estimate the potential impact to residents, VLI prepared an analytical solution to characterize the change in water levels associated with the landfill development through blasting, rock removal, and placement of the composite liner system. All of the proposed development activities are located in areas downgradient of the local community, and as result, those activities should not affect recharge to wells or springs.

The potential changes in water levels at the Berkland and Holdorf wells resulting from the proposed landfill operation were evaluated. The two Berkland wells are closest to the proposed development area. The Holdorf well is farther to the south.

The analysis concluded possible decreases similar to the changes in water levels associated with seasonal precipitation patterns observed in site monitoring wells.

The analytical calculation included an area of several thousand feet beyond the southern edge of the proposed development area in order to evaluate conditions beyond the location of residential water supply wells that were modeled. These evaluations suggest that the change in head beyond about 3000 feet from the proposed development area would be far smaller, and would likely have no effect on well or spring water supply.

VLI recognizes that our neighbors rely on well water, and that springs are part of the appealing natural landscape. We will work closely with the community to monitor and address changes in local water supply wells and springs that may be affected by our operations. A methodological, stepwise approach to monitoring and evaluation will be conducted as follows.

- As part of the proposed expansion project, a network of four monitoring wells will be constructed along the southern side of the development. Water levels in these four wells will be regularly monitored as part of the CBL routine monitoring program. These wells will effectively act as "sentinel" wells to provide an added level of monitoring.
- Should these four new wells show four successive decreases demonstrating a 10 percent decrease in the potentiometric surface, or a dramatic change across two events (not associated with local climactic conditions or residential water use), VLI will request the ability to evaluate yield and water levels at residential wells. Furthermore, as part of this, VLI may install additional sentinel wells to the south of the four new monitoring wells.

- Additionally, if those sentinel wells show a decrease that is affecting neighbors, and that is unrelated to local climate conditions or changes in residential water consumption, VLI will reach out to those neighbors to evaluate and implement mutually-agreeable solutions at VLI's expense. VLI underscores that its evaluation and analysis does not support that there will be any material impact to neighboring residential well.
- VLI will remain open to discussion with interested residents about their wells and water levels.

Response to Comments concerning the presence of arsenic in groundwater

VLI has been monitoring groundwater chemistry at the CBL for more than 30 years in accordance with the requirements outlined by the State of Oregon Department of Environmental Quality (ODEQ). VLI acknowledges that since arsenic was first detected at well MW-9S, elevated arsenic concentrations have been detected in wells that monitor the east side of the facility; namely, wells MW-26, MW-27, and MW-9S; however, no monitoring results indicate that these arsenic concentrations are attributed to a leachate discharge. This section will:

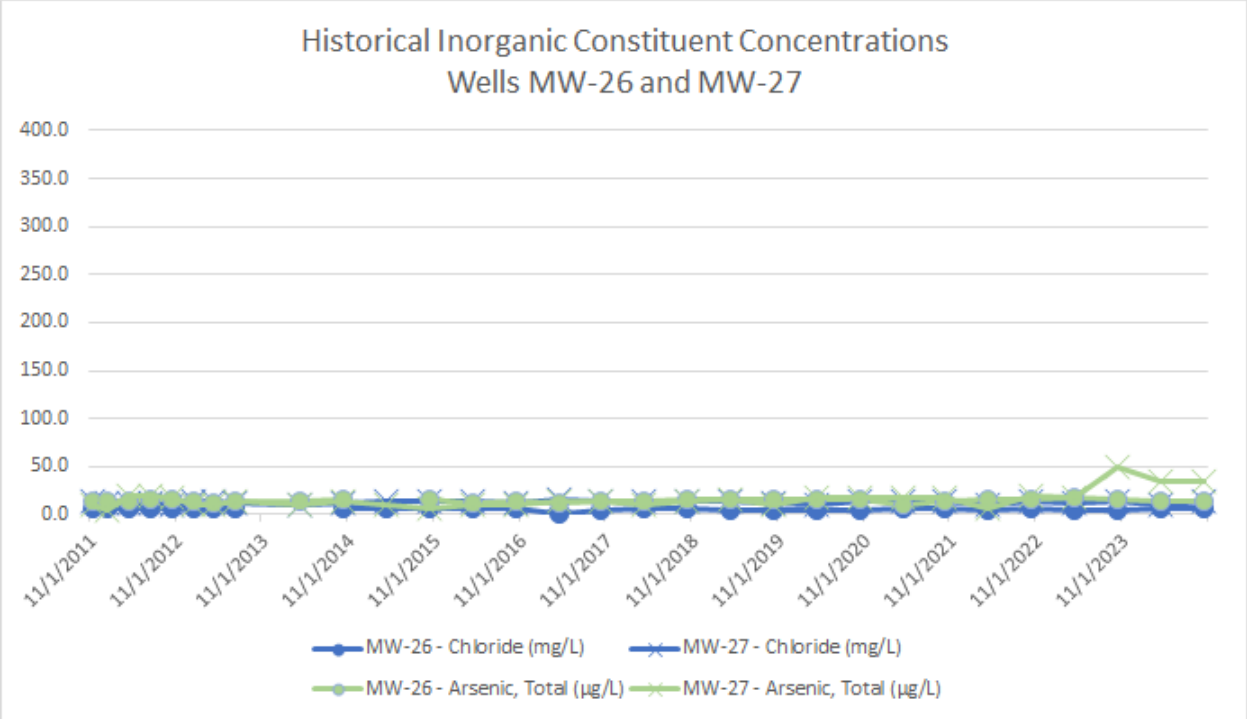
- describe the ways leachate impacts to groundwater can be determined, and present historical groundwater chemistry results for the subject wells,
- present public information regarding the basin-wide geochemistry with respect to arsenic and its natural occurrence in the area,
- describe the impacts of low dissolved oxygen content associated with local the natural environmental conditions along the eastern portion of the site, and its effect on arsenic concentrations in this area of the site
- propose actions should a release to groundwater be identified and verified.

Determination of Leachate Impacts to Groundwater

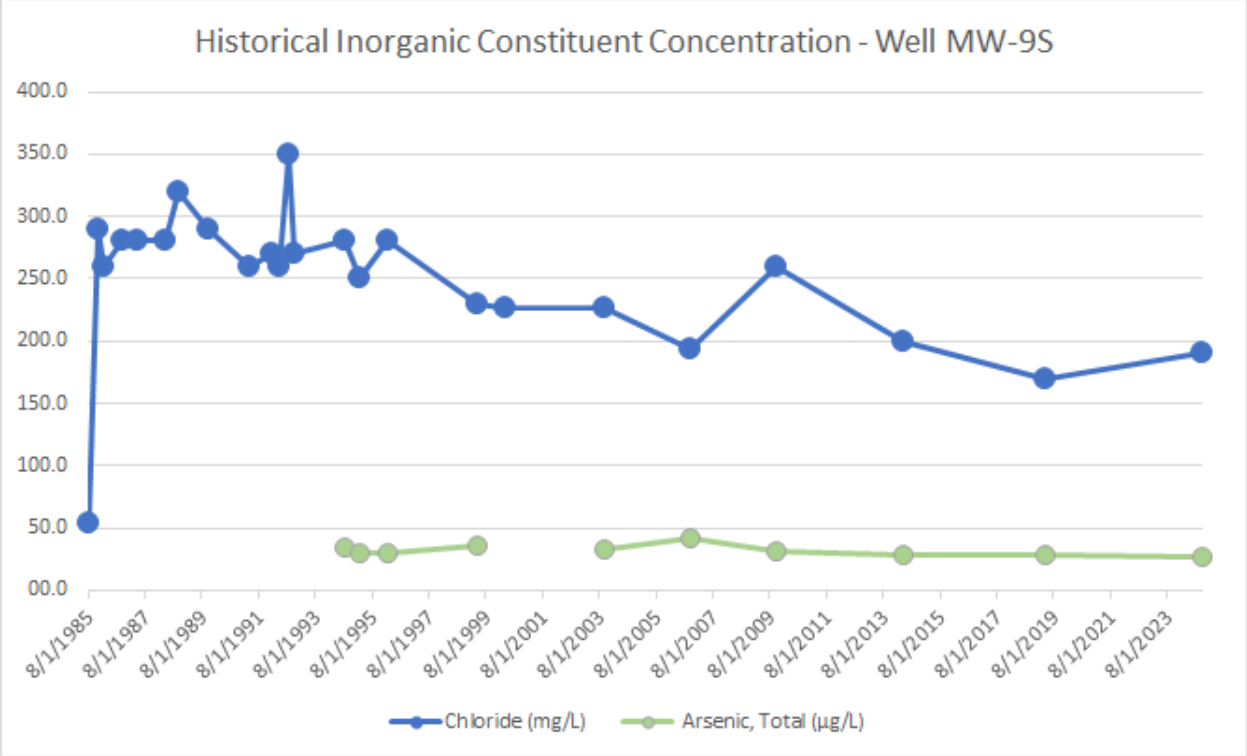
Typical for a MSW landfill, the monitoring program at CBL monitors both leachate and groundwater quality. The leachate at CBL is monitored annually at primary and secondary leachate sampling locations. Historical data show that leachate at the CBL is composed of elevated concentrations of inorganic constituents (for example: total dissolved solids, chloride, sodium) and some metals including arsenic as well as volatile organic compounds. Chloride in

particular is a useful tool for determining leachate influence on groundwater; whereas arsenic is not. Chloride is a conservative indicator of a release because the ion will move at the same rate as groundwater and will not attenuate due to chemical reactions and interactions. A release from a landfill is determined by observing changes in a suite of geochemical parameter concentrations in detection monitoring wells. This monitoring is conducted in accordance with the ODEQ-issued permit and data submitted to that agency.

Evaluation of groundwater data trends for key inorganic indicator parameters is a reliable method used to determine if groundwater has been affected by leachate. Considering that concentrations of inorganic constituents in leachate are significantly higher than in groundwater, if a leachate discharge were to occur, concentrations of many inorganic monitoring parameters - particularly chloride - would increase over time. Time-series charts depicting chloride and arsenic concentrations measured over time in samples from wells MW-9S, MW-26, and MW-27 are provided below. These charts illustrate that concentrations of these monitoring parameters have been relatively static over time. The absence of increasing concentrations supports the conclusion that groundwater at these wells is not affected by a leachate release.



Geo-Logic ASSOCIATES



In addition to inorganic constituents, the leachate at CBL contains measurable concentrations of chlorinated aliphatic compounds (including, tetrachloroethene, cis-1,2-dichloroethene, methylene chloride, and several others) and chlorinated aromatic compounds (benzene, 1,4-dichlorobenzene, chlorobenzene, toluene, xylenes, and ethylbenzene). These VOCs have been repeatedly detected in leachate samples collected over the last 30 years. Conversely, no VOC has been detected and verified in groundwater samples collected from wells MW-26, MW-27, or MW-9S. Taken together, the stable inorganic constituent concentrations and the absence of VOCs in samples from these wells indicate that the arsenic concentrations in this area of the site are naturally occurring. Fluctuations in arsenic concentrations are discussed below.

Regional Occurrence of Arsenic in Groundwater

The occurrence of arsenic in the region is documented in a technical publication by the U.S. Geological Survey (Hinkle and Polette, 1999), which identified naturally occurring arsenic minerals occurring in volcanic rock including the same types of geologic materials underlying the CBL. That publication focused on areas in the Willamette Basin using publicly available data from water wells in Lane and Linn Counties and in the Tualatin Basin where arsenic has been found in groundwater. That document cautions, however, that *"… it cannot be assumed that these areas are the only areas in the (Willamette) basin that contain ground water with high concentrations of arsenic. Little or no data exist for many parts of the basin."* The important

takeaway from that document is that arsenic is present in the Willamette Basin, and that it can be present in areas outside the data set that the authors used.

The USGS study also evaluated temporal changes in arsenic concentrations over the course of the year. The study found that at some wells, arsenic concentrations changed by up to 50 percent of the original sample concentration from one sampling event to the other. The changes in arsenic concentration were independent of seasonal influences, and the study concluded without a working hypothesis to explain those variations. Arsenic concentrations in samples from wells MW-26, MW-27, and MW-9S also exhibit variations between sampling events and appear to be related to the level of dissolved oxygen in groundwater at the time of sampling, as described below.

Effect of Dissolved Oxygen on Arsenic Concentrations

The mechanism that releases the naturally-occurring arsenic from the native iron oxides locally at Coffin Butte is contact with groundwater that has a low dissolved oxygen content. This low dissolved oxygen is related to the former depositional environment on the eastern side of the landfill, which was a marsh or wetland with organic rich clays. These conditions are clearly noted in the boring logs for well MW-27, and were geologically mapped in the vicinity of wells MW-26 and MW-27 during excavation of Cell 4. When low dissolved oxygen groundwater comes in contact with soils, it dissolves the iron oxides and releases both the iron oxide and associated arsenic into the groundwater where it is measured and as seen in monitoring wells MW-26 and MW-27. As groundwater migrates beyond areas of low dissolved oxygen, the iron oxide and arsenic precipitate back to the soil, reducing the concentrations in groundwater. Natural variability over time within the same well can result in fluctuations in arsenic concentrations such as at MW-27 and as presented in the 1999 USGS study. Understanding the geologic conditions at the site in relation to the arsenic concentrations, ODEQ has found this rationale sound in approving the detection monitoring program for the east side of the landfill.

Response Actions to Community Concerns

As demonstrated above, more than 30 years of groundwater monitoring results support the conclusion that the arsenic concentrations measured in samples collected from wells MW-9S, MW-26, and MW-27 are associated with a naturally-occurring condition that exists on the eastern side of the landfill property. Furthermore, none of the data collected from these wells show indications of leachate impact over the last 30 years. Solid Waste Permit 306 requires VLI to continue to monitor water quality throughout the active life and post-closure period of the landfill, and take appropriate remedial measures in the event that a release to groundwater occurs. VLI is committed to complying with our site-specific, State of Oregon, and federal

landfill operations and monitoring requirements. ODEQ has accepted VLI's explanation for the presence of arsenic in groundwater near the eastern property boundary, and through this understanding, the agency has not mandated further evaluation, implementation of a formal assessment monitoring program, or corrective actions.

VLI acknowledges the community's concern regarding local arsenic concentrations and potential water quality changes associated with the proposed development. As a measure to help foster better understanding of the issue, and respond should the issues arise, VLI proposes a methodical, stepwise approach, including:

- The installation of a network of four groundwater monitoring wells around the perimeter of the proposed facility. The new monitoring wells would be installed prior to placement of waste in the new cell in order to obtain background water quality data as it relates to the new cell.
- In addition, VLI, with property-owner approval, proposes to sample domestic water wells immediately south of the landfill (i.e., along Blaze Drive and Ploughshares Road) for arsenic and chloride once a year to track levels moving forward. This sampling program will begin before landfill construction to establish a baseline for arsenic and chloride concentrations in those wells.
- If changes in concentrations above baseline levels are measured and can be attributed to landfill operations, VLI will work with property owners to remedy the condition.

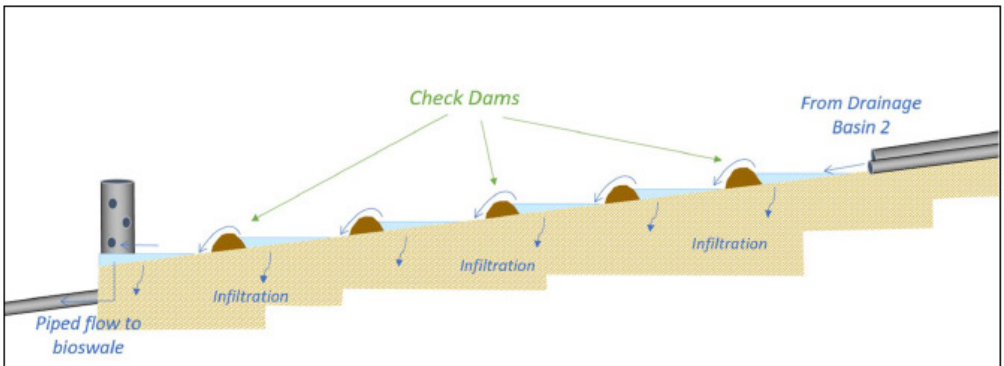
Response to Comments concerning stormwater and surface water management in the current development area.

Surface water and stormwater at the CBL is divided into three drainage areas:

- Area 1, which drains the Knife River quarry, and is permitted under the Oregon 1200-A permit through Knife River
- Area 2, which incorporates the western area of the CBL and discharges at Outfall 001, and is permitted under the Oregon 1200-Z permit
- Area 3, which incorporates the eastern area of the CBL and discharges at Outfall 002), and falls under the same permit at Area 2.

Drainage Area 1 is operated under a separate permit, and is not included in the CUP application. Drainage Area 2 and 3 each discharge to a different outfall (Outfalls 001 and 002 respectively). Drainage Area 2, located on the west side of the Site, is a 43-acre area that drains to the west towards Soap Creek, which is more than 500 feet from the Basin 2 outfall point. The stormwater infrastructure in this area of the site consists of pipes and a large end-of-pipe sedimentation basin (Pond 3) followed by a large bioswale. In 2021, Pond 3 was modified with six impermeable check dams, or berms, to increase the hydraulic retention time of the basin, thereby enhancing gravitational settling of particulate solids, and increasing mass reduction by infiltration. The berms bisect the basin across its longitudinal axis, extending across the width of the basin between the two side embankments. Gravel-filled trenches were placed in front of the first two berms to promote infiltration. Each berm has a weir that water flows over when the depth behind the berm rises above the weir crest and discharges to the next lower step pool. The inverts of the weir crests are approximately 4 inches lower than the top of the berms. The last step-pool discharges to a large area at the downstream end of the basin where water ponds and additional infiltration occurs before discharging through an outlet structure. A schematic of this system is shown below.

The addition of check dams has spread out the flow across the large surface area of the pond, promoting larger, shallow ponding areas. The check dams result in a step-pool like structure which has greatly increased the retention time and infiltration of runoff.



Schematic of Drainage Area 2 Infrastructure. Source, Geosyntec Consultants.

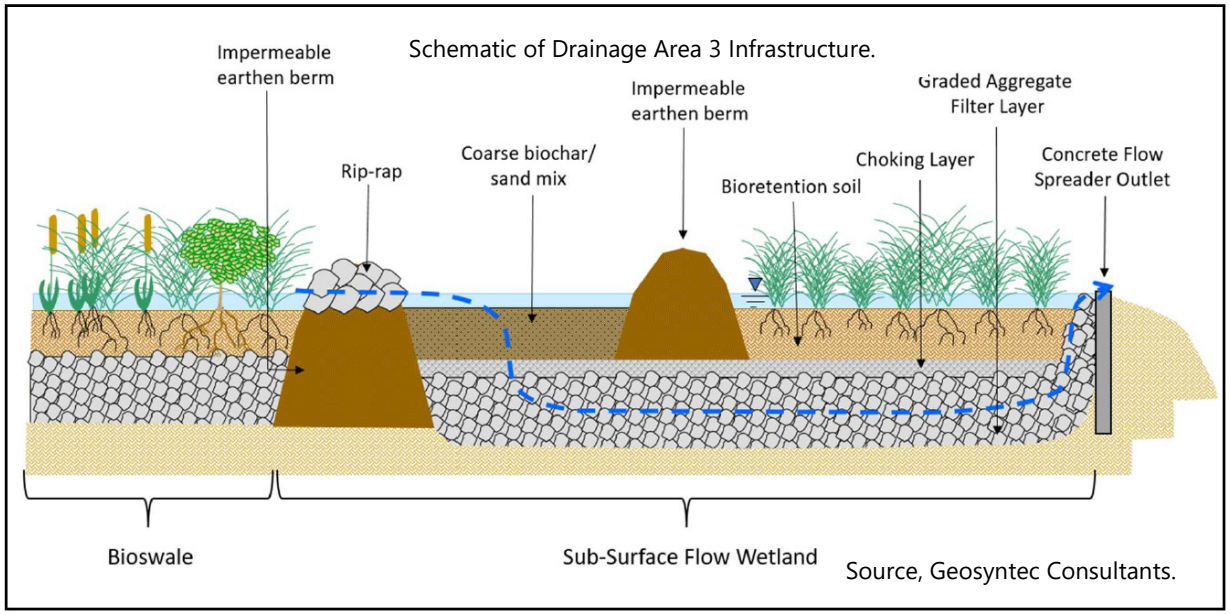
Drainage Area 3 consists of the active landfill and primary Facility operations located on the east side of the Site, including the proposed expansion area facilities. Most of the area is or will be covered with landfill wastes, and most of the landfill, and each cell of the landfill in this drainage area is equipped with a composite liner system, rendering the area impervious. Other areas of impervious surfaces include truck scales, loading bays, building roofs, and Coffin Butte Road. Overall, Drainage Area 3 contains about 26.6 acres of impervious surface and is therefore

approximately 21.5 percent (%) impervious. Stormwater runoff from the active landfill north of Coffin Butte Road is generated both from active cells and covered, inactive cells. The area south of Coffin Butte Road includes the area surrounding the existing leachate treatment facility, leachate holding ponds, and landfill gas power generation facility. Stormwater from Drainage Area 3 is routed through a series of existing treatment controls (i.e., BMPs) prior to discharging to Toketie Marsh over a flow spreader weir, where it is sampled. Toketie Marsh discharges to an unnamed tributary of Soap Creek. Soap Creek discharges to the Luckiamute River, and then to the Willamette River.

Existing end-of-pipe BMPs in Drainage Area 3 include two large sedimentation basins, located to the northeast and southeast of the active landfill area, a large bioswale that receives water from both sedimentation ponds, and a subsurface wetland (installed in 2021) that receives effluent from the bioswale. The more northern sedimentation basin (Pond 2) is approximately 32,000 square feet and receives runoff from the areas north of the active landfill through a 30-inch storm pipe. The more southern sedimentation basin (Pond 1) is approximately 26,000 square feet and receives runoff from the active and inactive landfill cells, which generally drain to the east, through a 36-inch storm pipe. Both ponds drain towards the centerline of the landfill area where they combine into a 48-inch storm pipe that drains to the large bioswale, which takes up approximately 45,000 square feet.

In 2021, a portion of the existing east bioswale was converted to a sub-surface flow wetland (SSFW). A conceptual overview of the constructed SSFW is depicted below and includes an impermeable berm bisecting the swale at its northern end that forces water down through a sand/biochar media filter and into a subsurface gravel layer. After passing through the treatment media, water flows horizontally through the gravel layer beneath the impervious berm and re-emerges on the surface on the downstream side. Bioretention media planted with native wetland plants was placed above the gravel layer on the downstream side of the berm. Treated surface water flows over a flow spreader weir at the northern end of the subsurface wetland, where it is sampled, prior to being discharged to Toketie Marsh.

Geo-Logic ASSOCIATES



Schematic of Drainage Area 3 Infrastructure.

Source, Geosyntec Consultants.

Outside of the operations areas, precipitation that falls on the northeastern slopes of Tampico Ridge drains north to a ditch along the south side of Coffin Butte Road, which conveys the intercepted stormwater eastward toward Highway 99. Stormwater then flows through a culvert beneath Coffin Butte Road, continuing northward in the drainage ditch along the west side of Highway 99 to a culvert that conveys water from a wetland and this ditch to a creek on the east side of Highway 99.

Response to Comments concerning Stormwater and Surface Water Management in the Proposed Development Area

Stormwater from the proposed landfill development area will ultimately be directed toward the east and use existing stormwater controls described in the discussion of stormwater controls for the existing landfill (see preceding response). As presented in the CUP application supporting documentation, the proposed stormwater design captures stormwater using graded swales and conveys the water to catch basins. The catch basins direct stormwater flows to a combined detention and wet pond facility located to the east of the landfill footprint. The purpose of this facility is to slow down the flow rate to allow sediment to settle out of the flow stream before water is discharged. The outflow of onsite stormwater from the wet pond will be conveyed through a graded swale to a 12-inch culvert crossing to the north side of Coffin Butte Road and

ultimately discharge to the existing detention facility and bioswale that include a sub-surface flow wetland where stormwater will undergo additional treatment before discharge off site.

The combined detention and wet pond were designed for the project site according to the current City of Corvallis Stormwater Design Standards. Surface water will be monitored in accordance with the current ODEQ-issued NPDES Stormwater permit, which requires stormwater monitoring on the east side (for the current landfill) as well as monitoring stormwater west of the proposed development area. Stormwater that discharges to the west originates on the existing landfill north of Coffin Butte Road, generally on the western part of the landfill. After treatment, discharge from the western part of the landfill flows into Soap Creek.

As the project design progresses, VLI will develop comprehensive designs for drainage structures. These designs will be supported by hydraulic calculations to demonstrate that each component of the stormwater management system for the proposed development area is sized to accommodate the design storm event for the facility. This procedure is typical of development projects of all types and will be conducted in accordance with the appropriate engineering standards and pertinent regulations. The final drainage system design will be reviewed and approved by ODEQ prior to finalizing the bid documents for construction.

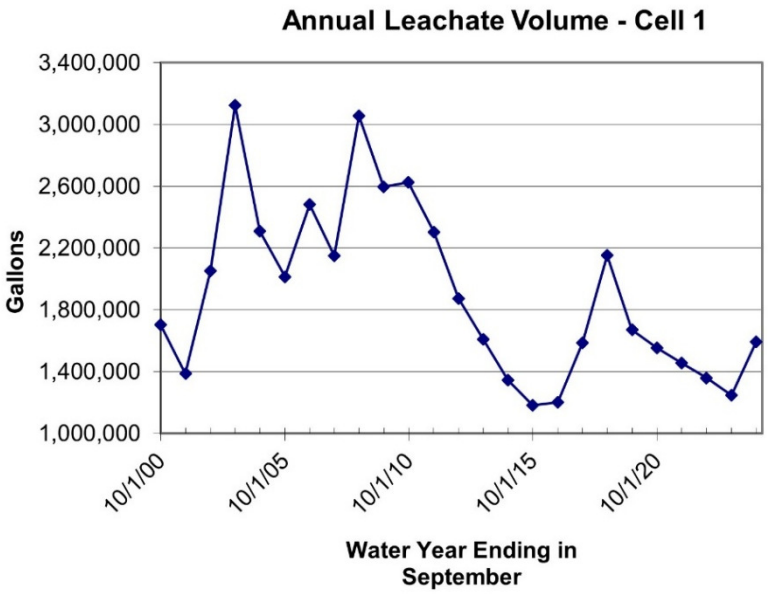
Response to comments concerning current stormwater runoff flowing into Knife River Quarry

A comment reported an observation that stormwater runoff from the existing landfill entered the Knife River quarry pond. Current topography, grading and engineered drainage controls prevent stormwater runoff from the existing landfill from flowing into the Knife River quarry pond. The current stormwater protection plan for the landfill identifies stormwater flow basins based on topography. Site drainage and grading direct stormwater runoff away from the quarry operations. VLI notes that stormwater in the western part of the landfill, primarily the closed parts of Cell 1 and closed Cell 1A, flows within what is referred to as Drainage Area 2 and discharges to Outfall 001. Although this drainage area shares a common boundary (based on topography) with the Knife River drainage area; existing grades and engineered controls are designed to prevent stormwater runoff from landfill areas comingling with runoff from the quarry area, as shown in Figure 2.

Geo-Logic ASSOCIATES

Response to Comments concerning the volume of leachate produced in Cells 1 and 1A.

VLI monitors leachate production rates for each cell on a daily basis. The volume of leachate generated in each cell is transmitted to a pipeline equipped with a calibrated flow meter, and the meter is read and recorded daily, allowing operations staff to observe changes in leachate production. Annual leachate production volumes from Cell 1 between 2000 and 2024 are presented in the graph below and are based on the "water year" beginning on the first of October of one year and extending through the end of September of the following year. For the 2025 water year to date, the Cell 1 leachate production is 880,390 gallons, which should project to a water year total of approximately 1.2 million gallons. As shown on the graph, leachate generation volumes have generally decreased over time, though transient increases in generation occur following periods of higher-than-normal precipitation. During the last five years, the annual leachate production from Cell 1 has been less than 1.7 million gallons.



With placement of flexible membrane final cover systems, which act to prevent infiltration and, thus, leachate generation, over Cell 1A and most of Cell 1, leachate generation rates will continue to decline.

Geo-Logic ASSOCIATES

Response to Comments concerning concentrations of metals and PFAS in leachate

As required by Solid Waste Permit 306, annual leachate samples are analyzed for 15 metals and reported in the Annual Environmental Monitoring Report (AEMR). Data published by the USEPA in 2002 (Kjeldsen, et. al, 2002 – Present and Long-Term Composition of MSW Landfill Leachate: A Review), show that concentrations of metals in leachate samples collected at the CBL are comparable to the leachate chemistries at other municipal solid waste landfills. As shown below, the arsenic concentrations in leachate at the CBL are near the bottom of the range of arsenic values reported by the USEPA. VLI notes that, because they are targeted to drinking water quality, USEPA primary drinking water standard Maximum Contaminant Levels (MCLs) referenced in various comments are not applicable to leachate.

Comparison of EPA Cited Ranges for Metals Concentrations in Leachate with Average Leachate Values at Coffin Butte Landfill

Constituent	EPA cited ranges		Coffin Butte Leachate
	Minimum Value	Maximum Value	Average Value
Arsenic	100	1,000	111
Cadmium	1	400	2.61
Calcium	10,000	7,200,000	129,000
Chromium	20	1,500	160
Cobalt	5	1,500	50
Copper	5	10,000	15.8
Magnesium	30,000	15,000,000	145,000
Lead	1	5,000	5.5
Iron	3,000	55,000,000	6,040
Manganese	30	1,400,000	984
Mercury	0.1	160	0.70
Nickel	15	13,000	161
Zinc	30	1,000,000	419

All values are reported in micrograms per liter (µg/L)

Source: Peter Kjeldsen, Morton A. Barlaz, Alix P. Rooker, Anders Baun, Anna Ledin, and Thomas H. Chistensen, 2002, "Present and Long-Term Composition of MSW Landfill Leachate: A Review" *in* Critical Reviews in Environmental Science and Technology, V32(4), p297-336.

Per- and Polyfluoroalkyl substances (PFAS) are emerging contaminants recently recognized by the USEPA to be present in environmental media as a result of industrial discharges, use in commercially-available household products, and in fire-fighting foams. In fact, the use of PFAS is widespread, and these chemicals are present in products such as lip balms, lotions, makeup, sunscreen, food packaging, fire retardant, clothing, and cookware. Through their use in many household products, these chemicals have been found in samples of municipal solid waste

leachate at many landfills. Landfills are a receiver of many wastes containing PFAS and sequester these chemicals in a highly-engineered, closely monitored setting.

As an emerging contaminant, neither the current solid waste permit nor federal 40CFR258 regulations require testing for PFAS. However, leachate samples were collected in 2022 and 2024 at the request of the City of Corvallis. These samples were analyzed for PFAS in order to gain an understanding of their presence and concentrations in landfill leachate that was transported to its wastewater treatment facility. Twenty-seven PFAS compounds were detected during these two monitoring events at concentrations ranging from 7 to 36,000 nanograms per liter (ng/L or parts per trillion). For comparison, in 2022, the USEPA (Chen, et. al, 2022) published the results of a study of PFAS concentrations in landfill leachate. This study analyzed 26 PFAS compounds and found total concentrations of PFAS as high as 58,260 ng/L in leachate samples. In addition, between 2018 and 2020, the State of California Water Resources Control Board conducted a pilot study to evaluate PFAS concentrations in leachate at active municipal solid waste landfill throughout the State. Review of data from 12 California landfills that are equipped with leachate collection and removal systems shows cumulative PFAS results as high as 103,000 ng/L. Results from USEPA and the State of California suggest that the leachate PFAS data from the CBL is similar to PFAS concentrations in leachate at other municipal solid waste landfills.

As federal and state agencies gain an understanding of the presence of PFAS in the environment, permit requirements may change as far as routine monitoring or pilot testing. VLI will continue to comply with current and future permit requirements for this site.

Chen, Y., H. Zhang, Y. Liu, J. Bowden, T. Tolaymat, T. Townsend, and H. Solo-Gabriele. Concentrations of perfluoroalkyl and polyfluoroalkyl substances before and after full-scale landfill leachate treatment. WASTE MANAGEMENT. Elsevier Science Ltd, New York, NY, USA, 153: 110-120, (2022)

Response to Comments concerning leachate seeps

Past landfill operations experienced leachate seeps emanating from active faces of the landfill. Current operations utilize ethylene propylene diene monomer (EPDM) as an alternative interim cover material and linear low-density polyethylene (LLDPE) final cover systems as portions of the landfill reach design capacity. Combined with improved grading and drainage practices, the use of EPDM interim cover material and LLDPE final cover systems significantly limits the amount of precipitation that infiltrates landfill wastes. In addition, more robust leachate collection and

recovery as well as landfill gas collection systems that remove significant volumes of water vapor from the landfill that would otherwise promote leachate formation, and these environmental controls significantly reduce the likelihood of leachate accumulation and the formation of seeps. As a matter of practice, site operations personnel inspect the landfill during and immediately after significant or prolonged storm events to make sure that environmental controls are functioning correctly and to repair any storm-related damage as quickly as possible.

Response to Comments concerning the absence of clay below the liner system.

Cells 1A and 1 were first used for waste disposal in 1975. Both cells were developed prior to the adoption of regulations and practices requiring construction of landfill liner systems, and historical records indicate that minimal excavation was conducted in these areas of the site prior to initiating waste disposal operations. Historical records indicate that Cell 1A was developed on exposed bedrock. The southern portion of the Cell 1 area was originally underlain by native alluvium, and that material was removed prior to waste placement and used to construct an approximately two-foot-thick clay liner over portions of the Cell 1 subgrade and an engineered fill toe berm. In addition, Cell 1 is equipped with a leachate collection system. Leachate is extracted from Cell 1, and is managed in accordance with the terms of the current solid waste permit. Portions of Cell 1 and all of Cell 1A have been formally closed in accordance with Oregon Administrative Rules, Chapter 340, Division 94 (OAR 340) and Federal Subtitle D regulations found in the Code of Federal Regulation, Part 258 (40CFR258).

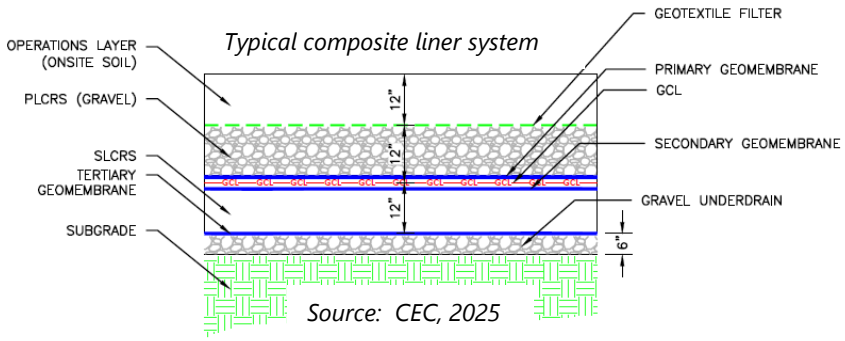
Acknowledging the absence of modern landfill liner systems that were available at the time these cells were constructed, VLI installed the leachate collection system and numerous groundwater monitoring wells downgradient of these cells. As a result, the leachate collection and monitoring system now meets or exceeds current regulatory standards. These efforts are to remove leachate for proper disposal, and to allow evaluation and appropriate response should changes in groundwater chemistry be detected in this area of the landfill.

Proposed Expansion Area Liner System

With respect to the project proposed in the CUP application, the composite liner system proposed for the landfill expansion is designed to meet or exceed OAR 340 and 40CFR258 design standards for municipal solid waste landfill liner systems. The composite liner system design planned for the expansion area extends below the entire landfill footprint. The excavation will result in slope areas and a floor area. Slope areas will descend from a high point

of approximately 370 feet above mean sea level near the southwestern portion of the development area to an elevation of approximately 250 feet above mean sea level near the northeastern portion of the development area. Slope areas will be developed at a gradient of 2 (horizontal) to 1 vertical, and the floor area of the development will be graded to drain to the northeast at a gradient of 2 percent. The multiple-layer composite system contains the following key components, from bottom to top:

- An underdrain layer of sand or gravel (or other possible geosynthetic component) that keeps the groundwater from impinging on the liner.
- A tertiary geomembrane, referred to as a flexible membrane liner (FML), of high-density polyethylene (HDPE) that separates the groundwater from lower layers of the liner system.
- A second layer of sand or gravel (or other possible geosynthetic component) that provides for detection and secondary containment of possible leaks. This layer is monitored for volume and water quality as part of the detection monitoring program.
- Two more FML layers (primary and secondary geomembranes separated by a geosynthetic clay liner) to provide containment of leachate and fluids produced within the landfill. •



- A 12-inch-thick leachate collection and removal system (LCRS) designed to collect and remove leachate generated in the landfill and convey the liquid to a pond for treatment; this prevents the accumulation of leachate along the base of the landfill and removes the downward hydraulic pressure that could drive leachate from this layer into the underlying secondary layer and to groundwater.
- A 12-inch-thick operations layer comprising on-site soils that reduces the likelihood of waste materials damaging the composite liner system components

As currently proposed, the composite liner system design far exceeds the OAR 340 and 40CFR258 standards. The final design and installation will be approved by the DEQ and construction will be closely monitored, tested and certified by a professional engineer, consistent with a DEQ-approved quality assurance and quality control plan.

Geo-Logic ASSOCIATES

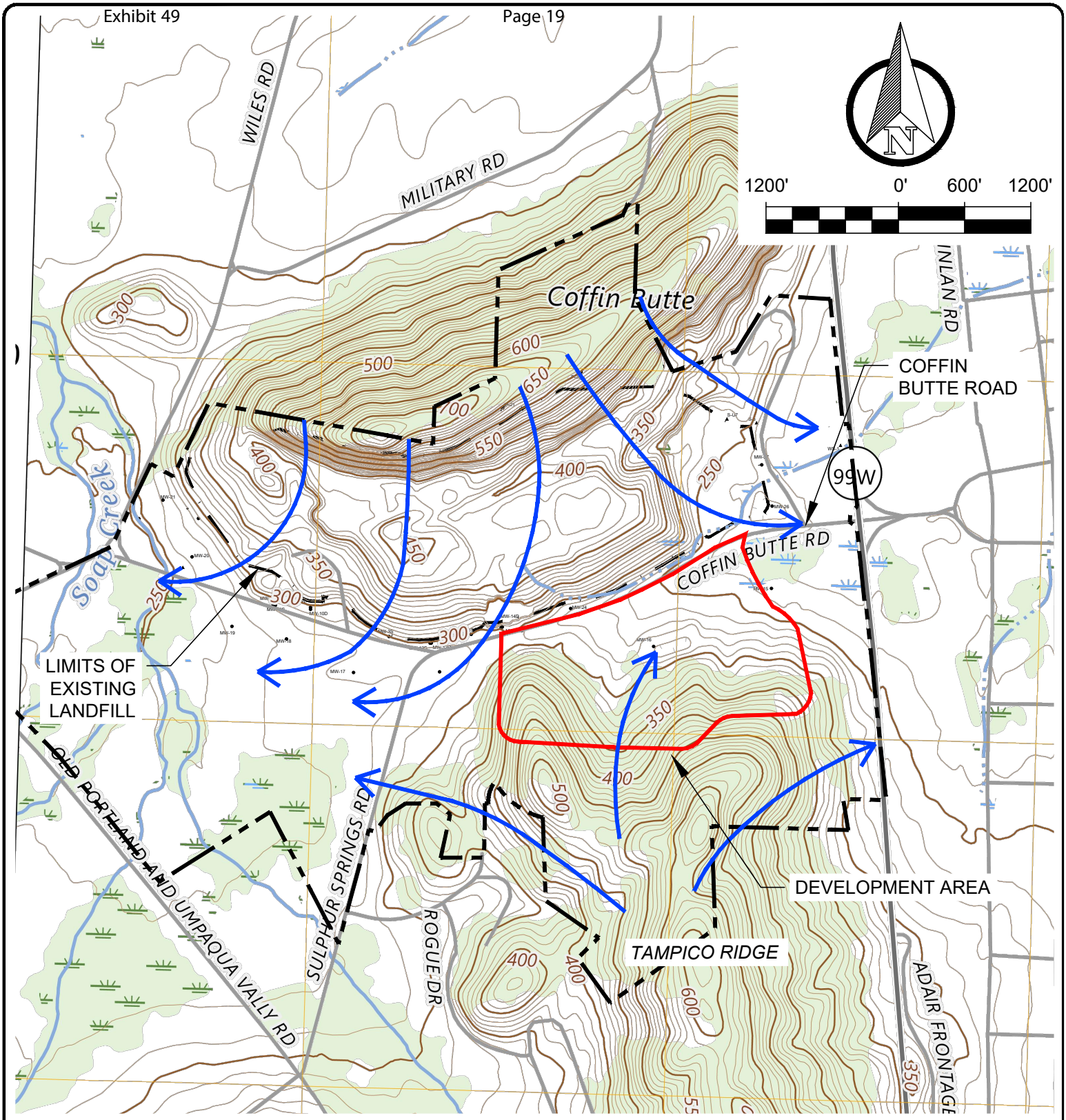
Respectfully submitted,

John M. Hower, PG, CEG (California)
Geo-logic Associates, Inc.

Eric Tuppan, RG
Tuppan Consultants LLC

REGISTERED PROFESSIONAL OREGON ERIC J. TUPPAN G1473 GEOLOGIST

Exp 12/1/2025



LEGEND

- DEVELOPMENT AREA
- PROPERTY BOUNDARY
- GROUNDWATER FLOW DIRECTION

NOTES

1. MAP OVERLAY FROM USGS 2024 LEWISBURG QUADRANGLE OREGON 7.5- MINUTE SERIES NAD83 WGS84.

This figure has not been published but rather has been prepared by Geo-Logic Associates, Inc. for use by the client named in the title block, solely in respect of the construction, operation, and maintenance of the facility named in the title block. Geo-Logic Associates, Inc. shall not be liable for the use of this figure on any other facility or for any other purpose.

COFFIN BUTTE LANDFILL

RESPONSE TO COMMENTS - CUP APPLICATION

BENTON COUNTY, OREGON

GROUNDWATER FLOW CONDITIONS

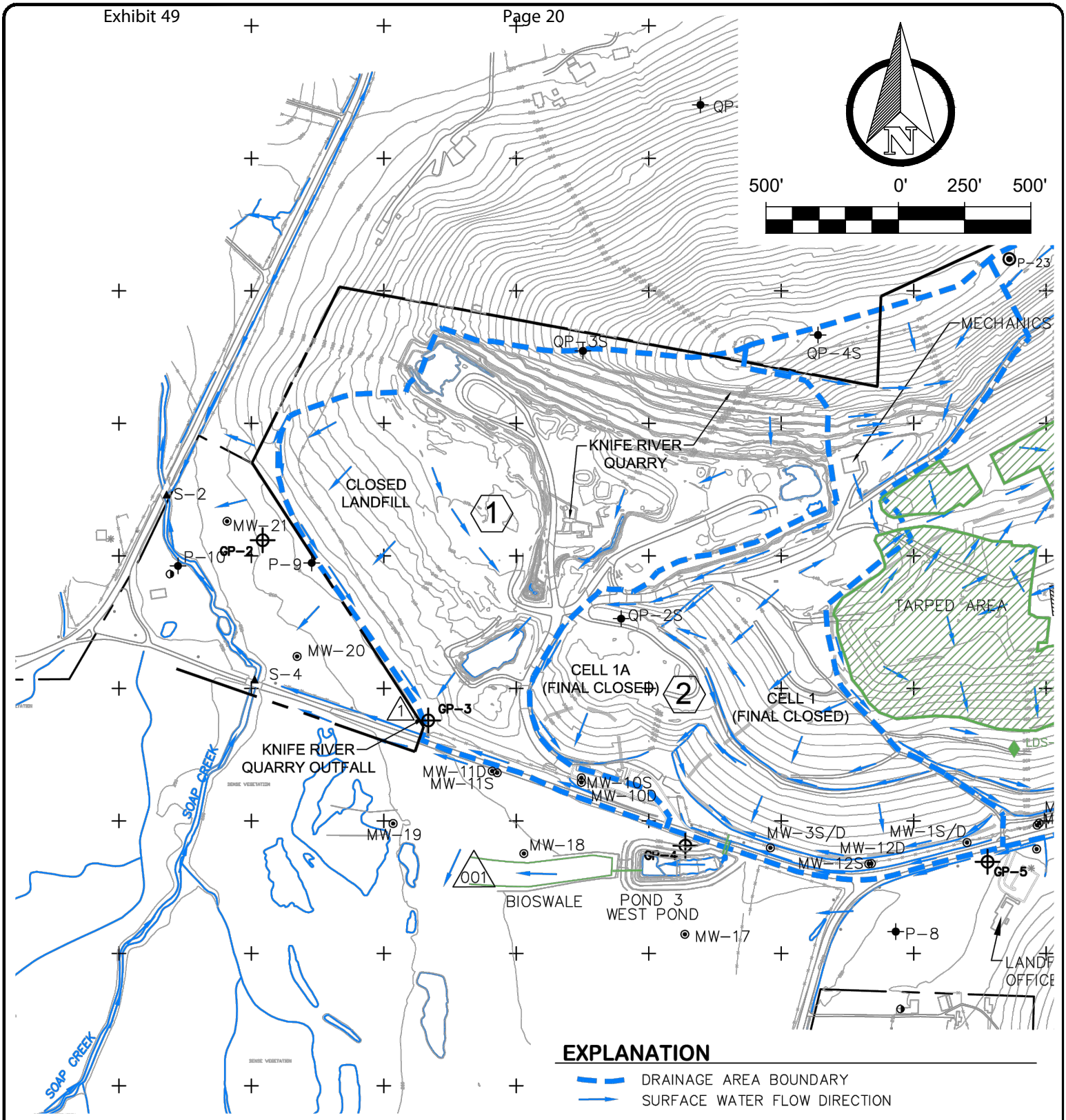
FIGURE NO. 1

PROJECT NO. AU24.1090.00

DATE OF ISSUE:	06/11/2025	DRAWN BY:	SMD	APPROVED BY:	JH

Geo-Logic ASSOCIATES
P.O. BOX 288
NEWPORT, CA 97365
(541) 848-8859
www.geo-logic.com

N:\COFFIN BUTTE\AU24.1090 - ENVIRONMENTAL MONITORING\5_CAD\2024 ENVIRONMENTAL MONITORING REPORT\FIG 1_GROUNDWATER FLOW CONDITIONS.DWG June 11, 2025 - 7:33 PM BY: GLA-USER



EXPLANATION

- DRAINAGE AREA BOUNDARY
- SURFACE WATER FLOW DIRECTION

COFFIN BUTTE LANDFILL

RESPONSE TO COMMENTS - CUP APPLICATION

BENTON COUNTY, OREGON

DRAINAGE MAP

FIGURE NO. 2

PROJECT NO. AU24.1090.00

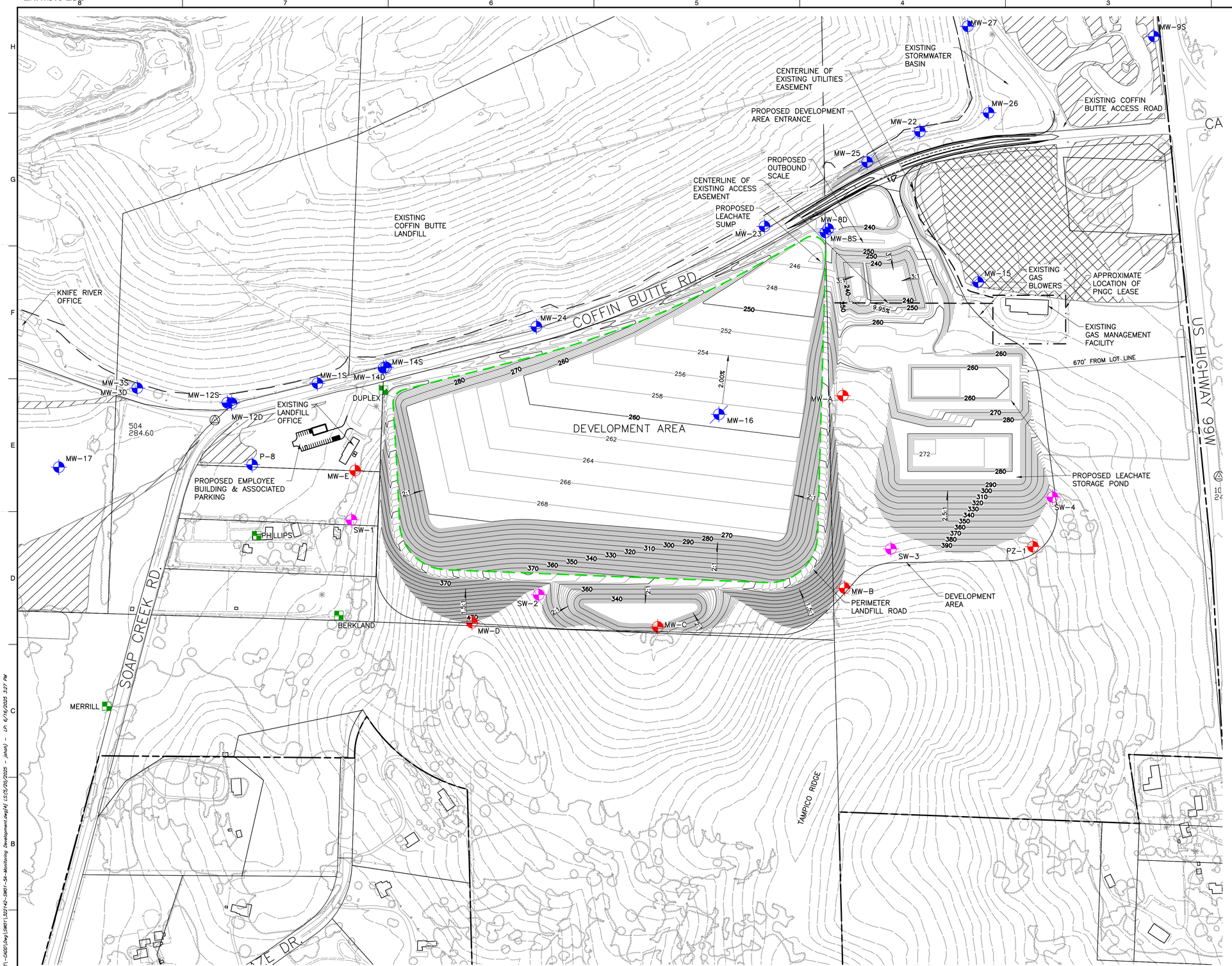
DATE OF ISSUE:	06/11/2025	DRAWN BY:	SMD	APPROVED BY:	JH

Geo-Logic ASSOCIATES
P.O. BOX 288
NEWPORT, CA 97365
(541) 848-8859
www.geo-logic.com

This figure has not been published but rather has been prepared by Geo-Logic Associates, Inc. for use by the client named in the title block, solely in respect of the construction, operation, and maintenance of the facility named in the title block. Geo-Logic Associates, Inc. shall not be liable for the use of this figure on any other facility or for any other purpose.

N:\COFFIN BUTTE\AU24.1090 - ENVIRONMENTAL MONITORING\5_CAD\2024 ENVIRONMENTAL MONITORING REPORT\FIG 4_DRAINAGE MAP.DWG June 11, 2025 - 7:48 PM BY: GLA-USER

Exhibit E50



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL BOUNDARY
- TAX LOT BOUNDARY
- 300 EXISTING 10-FT CONTOUR
- EXISTING 2-FT CONTOUR
- EXISTING PALUSTRINE FORESTED WETLAND
- EXISTING PALUSTRINE EMERGENT WETLAND
- 10 ISOPACH 10-FT CUT CONTOUR
- 0 ISOPACH ZERO CUT/ FILL CONTOUR
- 10 ISOPACH 10-FT FILL CONTOUR
- PROPOSED LANDFILL FOOTPRINT
- EXISTING GROUNDWATER MONITORING WELLS/PIEZOMETER
- DECOMMISSIONED MONITORING WELLS
- EXISTING WATER SUPPLY WELLS
- PROPOSED WELLS/PIEZOMETER
- SW – SENTRY WELLS

NOTES

1. TAX LOT BOUNDARIES FROM BENTON COUNTY ZONING MAP PANEL 41047C0975G, DATED 01/19/2000 (TAX LOT BOUNDARIES MAY DIFFER FROM ZONING DATED 2021).
2. DEVELOPMENT AREA PERIMETER DESIGNED ONLY FOR PICKUP TRUCKS OR SMALLER VEHICLES.
3. SENTRY WELLS LOCATIONS ARE APPROXIMATE.

REFERENCE

AERIAL PHOTOGRAPH, TOPOGRAPHIC INFORMATION FROM AERIAL SURVEY AND GRID BY COOPER AERIAL SURVEYS COMPANY; DATE OF PHOTOGRAPHY: OCTOBER 07, 2021.

SUBMITTAL RECORD

NO	DATE	DESCRIPTION

2356 Gold Meadow Way
Suite 120
Gold River, CA 95670
Ph: 916.503.0050
www.cecinc.com

Civil & Environmental Consultants, Inc.

VALLEY LANDFILLS, INC.
COFFIN BUTTE LANDFILL
CONDITIONAL USE PERMIT APPLICATION
CORVALLIS, OR 97330

GROUNDWATER MONITORING NETWORK

DATE:	JANUARY 2025	DRAWN BY:	JS
DWG SCALE:	AS SHOWN	CHECKED BY:	JAS
PROJECT NO:			322-142
APPROVED BY:			JAS

DRAWING NO.: 4

P:\320-000\322-142\-CADD\Dwg\SW01\322142-SW01-SA-Monitoring Development.dwg[4] LS:(5/20/2025 - jshah) - LP: 6/16/2025 3:27 PM

SCS ENGINEERS Environmental Consultants & Contractors

June 20, 2025
File No. 04225008.00

MEMORANDUM

TO: Jeffrey G. Condit– Miller Nash LLP

FROM: Jeff Leadford, P.E. – SCS Engineers

SUBJECT: Coffin Butte Landfill 2024 Expansion Application Odor Dispersion Modeling Study Supplemental Information

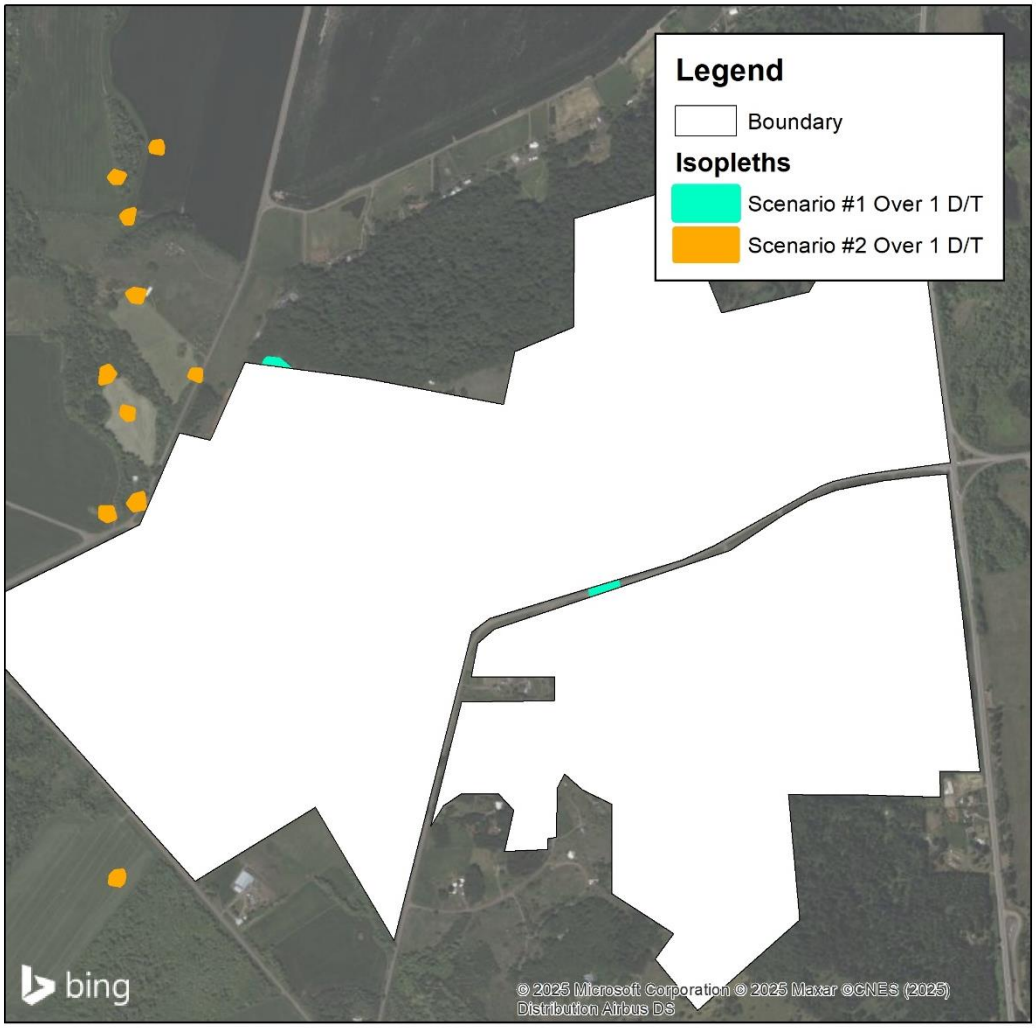
This memo provides a brief supplement to the June 6, 2025 update to the Coffin Butte Landfill 2024 Expansion Application Odor Dispersion Modeling Study ("June 2025 Model").

For purposes of the June 2025 Model, each modeling scenario was shown in units of micrograms per meter cubed (ug/m3) at peak, off-site, 1-hour pollutant concentrations. Each pollutant impact was then compared to its odor threshold via it's D/T (i.e., maximum impact divided by odor threshold). A D/T ratio of one indicates that roughly half of people can detect an odor at a given location for a given hour. A D/T of 7 is expected to result in a odor "nuisance" in most states, though this number is variable and not quantified in Oregon.

Figure 1 provides a further illustration of odor dispersion modeling in the June 2025 Model as requested by Maul Foster and Alongi upon their review of the study. In Figure 1 below, the green shows the extent of odor detection of hydrogen sulfide outside the property boundary. As shown in the Table 6 of the June 2025 Model, this pollutant had the highest dilution to threshold ratio (D/T) and thus was most likely to be detected offsite. The yellow shows the extent of odor detection of dimethyl sulfide, which has the highest D/T per Table 7 in the June 2025 Model.

MEMORANDUM
June 20, 2025

Figure 1: Odor Modeling Over 1 D/T



As explained in the June 2025 Model, namely Sections 4.0 and 5.3, a variety of factors influence odors relative to the D/T measurements in the model. There are a few factors that make odor modeling somewhat subjective for odors on a given day. As explained in the June 2025 Model's uncertainty analysis (Section 5.3), the air modeling program has limitations at low wind speeds and is not able to model thermal inversions which could be present around Coffin Butte. These conditions could increase or decrease odor levels. In addition, certain landfill activities may temporarily increase odor. Such activities are addressed in detail in Jeff Condit's April 29, 2025 letter to the Planning Commission.

Setting a specific odor detection threshold is also highly variable as each person detects odors subjectively.

If you have any questions, please contact Jeff Leadford at jleadford@scsengineers.com or 720-272-0172.

Sincerely,

Jeff Leadford, PE
Senior Project Professional
SCS ENGINEERS

THE GREENBUSCH GROUP, INC.

Memorandum

DATE: *June 18, 2025*

TO: *Jeff Shepherd, P.E. – Civil & Environmental Consultants, Inc.*

FROM: *Adam C. Jenkins, PE, INCE Bd. Cert., CTS-D*
Justin Morgan, INCE

RE: *Republic Services Coffin Butte Landfill – VNEQS Comment Responses*

This memorandum provides responses to comments provided by the Valley Neighbors for Environmental Quality and Safety (VNEQS) on June 10, 2025. Individual comments raised by VNEQS in the detailed comments section pertaining to noise (beginning on page 7) are addressed below.

Community Addresses Flaws in the Applicant's Consultant's Study

FLAW #1 IN CONSULTANT'S STUDY – REMOVAL OF VOLUME CAP – NOISE ANALYSIS NOT ADJUSTED FOR NOISE IMPACTS INCREASING IN TANDEM WITH WASTE VOLUME INCREASES Applicant's consultant's submittal does not take into account removal of the intake cap, which will have the effect of increasing noise impacts 1:1 in tandem with waste volume increases (69%/100%/100%+)[7]. Applicant's own drawings show an increase over current volumes of 69%, but Applicant has shown capacity to double volumes in the past (as from 2017 to 2019). With no constraint in the intake cap, any analysis of potential future impacts should not perform noise analysis using current noise volume, but at least 169% of current noise volume (using Applicant's own volume estimates for years 5&6 of the proposal), or 200% of current noise volume if Applicant exceeds estimates and conforms to historical increases.

The noise study is based on information about future traffic volumes accessing the expansion area and is not based on current traffic volumes. The comment references note 7, which lists the future and current allowable fill volumes and divides the two volumes to establish the 69% increase. Additional fill capacity does not mean more noise; it simply means the site would have additional capacity.

FLAW #2 IN CONSULTANT'S STUDY – NO CONSIDERATION OF SITE PREPARATION IMPACTS Applicant's consultant's submittal does not take into account site preparation noise (unknown impacts), applicant has not provided a timeline or plan, but removal of enough material (mostly basalt) to equal the volume of THREE EMPIRE STATE BUILDINGS (3,500,000 CUYD) will not be accomplished quietly or swiftly.

The Benton County Code does not provide regulations for construction noise and construction noise is exempt from Oregon Administrative Rules sound limits under OAR 340-035-0035(5)(g).

Potential Code Citations – Potential Findings for Denial, Noise, Part I

53.215 (1) NOISE SERIOUSLY INTERFERE – INCREASED WASTE DISPOSAL VOLUME = INCREASED NOISE Applicant's consultant's analysis considers only current noise impacts, not future noise impacts that would result from

increased activity resulting from increased volumes of waste accepted. Noise could increase 69%/100%/100%+ over current noise recorded (not including site preparation, see below).

The noise study is based on future traffic volumes accessing the expansion area and is not based on current volumes. Additional fill capacity does not correlate to more noise; it simply means the site would have additional capacity.

53.215 (1) NOISE SERIOUSLY INTERFERE -- SITE PREPARATION = INCREASED NOISE Applicant's consultant's analysis considers CURRENT NOISE IMPACTS, NOT FUTURE NOISE IMPACTS THAT WILL RESULT FROM EXTENSIVE SITE PREPARATION "before and after" operating hours, i.e. all the time. This noise will be extremely disruptive, consisting of blasting – YEARS of blasting, scraping, beeping, loading dump trucks, unloading dump trucks, truck travel, etc.

The Benton County Code does not provide regulations for construction noise and construction noise is exempt from Oregon Administrative Rules sound limits under OAR 340-035-0035(5)(g). Noises caused by "beeping" which is assumed to refer to backup alarms or other safety devices are exempt from OAR sound limits under OAR 340-035-0030(3)(b).

Community Addresses DEQ Regulations

DEQ REGULATIONS ARE NOT LAND USE CRITERIA DEQ Regulations protect PUBLIC HEALTH; Land Use protections protect one land use from potentially incompatible uses; such protections do not necessitate a health component. A one-time 49-decibel noise would have an entirely different impact on an "adjacent" (however defined) property than a 49-decibel noise that continued 24/7. Either would be allowed by DEQ; the latter situation, however, might properly result in land use application denial. In LU 21-047, The Planning Commission addressed this squarely, and succinctly summarized the disconnect as follows: "…There is no ability for the Planning Commission to review the situation after DEQ's approval to ensure that DEQ's standards were adequate to prevent the proposed use from seriously interfering with uses on adjacent property."

DEQ noise regulations were developed based on criteria developed by the Environmental Protection Agency in Information on Public Health and Welfare Criteria for Noise (July 1973) and Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (March 1974) as an outcome of the Noise Control Act of 1972. These documents thoroughly assess noise and its effects on humans, not only health effects but also other affects such as speech and sleep interference. The substantial increase threshold of 10 dB adopted by DEQ is also consistent with EPA guidance in EPA EIS Guidelines for Region X (April 1973). In our experience, the DEQ noise regulations are one of the most comprehensive regulatory framework for assessing potential noise effects from noise sources such as the Coffin Butte expansion. The proposed project, including additional mitigation measures proposed since the Noise Study was published, will be far below DEQ noise standards and not present any adverse effects on the surrounding properties.

DEQ REGULATIONS ARE NOT CURRENTLY ENFORCED AND COMMUNITY BELIEVES THEY ARE CURRENTLY EXCEE[C]DED DEQ regulations are not enforced; and Benton County does not have a noise ordinance to enforce. An unenforced regulation relies on voluntary compliance, and there has been considerable public testimony to the effect that the Applicant frequently does not comply with unenforced regulations (i.e. EPA emissions, OSHA, DEQ, etc.)

The Applicant has proposed additional noise control and monitoring measures to assess compliance with DEQ noise limits on a regular basis, which could be added as a condition of approval, enforceable by Benton County.

Potential Code Citations – Potential Findings for Denial, Noise, Part II

53.215 (1) NOISE ALL THE TIME The Applicant proposes to engage in landfill operations from 5 am to 5 pm and to engage in site preparation "after and before" operating hours. "After and before" is equivalent to "all the time". The Applicant's proposal, by subjecting adjacent properties to the constant noise – at approximately double current volumes -- of an operation which Benton County Public Works testified was already the "most intensive" industrial operation in Benton County would constitute significant adverse impact.

It is our understanding that any operations conducted outside the 5am to 5pm hours would not generate any notable levels of noise.

53.215 (1) APPLICANT CURRENTLY OUT OF COMPLIANCE WITH DEQ NOISE REGULATIONS The Applicant has been promising neighbors for years that it will replace the existing backup alarms that awaken them before dawn, but to date has yet to do so. Backup alarms produce a noise that ranges from 87 to 102 dB (twice the DEQ regulatory limit for night-time noises), and by OSHA standards must be audible above the surrounding ambient noise level (which is why they are so loud). Applicant currently starts landfill operations at 5:00 a.m., TWO HOURS BEFORE DEQ ALLOWS, awakening residents in surrounding homes at that time with the loud beeping of backup alarms (see testimony, Grant Carlin). Consequently, it is probable that landfill operations are already out of compliance with DEQ noise regulations mandating noises no louder than 50 dB at night from 10 p.m. to 7 a.m. It is reasonable to assume that if the Applicant is currently out of compliance with regulations, non-compliance will continue if this application is not denied.

Although noise from backup alarms is exempt from OAR sound limits, backup alarms will be replaced with ambient sensing broadband backup alarms. Ambient sensing broadband backup alarms are typically quieter than standard alarms, adjust their volume based on the surrounding noise environment, and replace tonal alarm noises ("beeping") with broadband noise. During times when the surrounding sound levels are low, the alarms are quiet and if sound levels in the area increase the alarm also increases to maintain audibility and comply with safety standards. Ambient sensing broadband backup alarms are typically 5 to 10 dB above the ambient noise level, ensuring reliable audibility while limiting overall sound levels.

The statement that "backup alarms produce a noise that ranges from 87 to 102 dB (twice the DEQ regulatory limit for night-time noises)" does not include a distance for these sound levels and it is therefore not appropriate to compare these to OAR sound limits that are established at noise-sensitive receptors. Given the distance from existing operations, backup alarms, which are exempt from OAR sound limits, would not result in sound levels of 87 to 102 dB at nearby properties.

The statement that the "applicant currently starts landfill operations at 5:00 a.m., TWO HOURS BEFORE DEQ ALLOWS" is incorrect. The OAR does not prohibit the site from operating before 7 a.m., but the OAR does reduce the allowable sound levels during nighttime hours, which was accounted for in the noise analysis.

Sincerely,

Adam C. Jenkins, PE, INCE Bd. Cert., CTS-D
Vice President – Acoustical

SCS ENGINEERS Environmental Consultants & Contractors

June 20, 2025
File No. 04225008.00

MEMORANDUM

TO: Jeffrey G. Condit– Miller Nash LLP

FROM: Jeff Leadford, P.E. – SCS Engineers

SUBJECT: Valley Neighbors for Environmental Quality and Safety Testimony Response at the Coffin Butte Landfill

The Coffin Butte Landfill (Coffin Butte, or Landfill) is currently in the application process of a proposed expansion. On June 10, 2025 the Valley Neighbors for Environmental Quality and Safety (VNEQS) submitted testimony and documents in opposition to the proposed expansion effort (Testimony). This memo serves as the SCS Engineers (SCS) response to this Testimony's odor-specific issues raised, including critiques of SCS's "Coffin Butte Landfill 2024 Expansion Application Odor Dispersion Modeling Study (Modeling Study). The odor portion of the Testimony starts on Page 10 of the submittal with a summary starting on Page 3. SCS is providing the following responses to flaws mentioned in the Testimony:

The VNEQS states that "the odor consultant's assertion that 1% of odor complaints are "likely" caused by the landfill" [Testimony Page 5] and "Applicant's consultants then conclude that only 1% "likely" originate from the landfill" [Testimony Page 10]. These statements are misleading as they both take the odor complaint analysis results out of context by failing to mention the results were based upon correlation to wind conditions measured on-site. If complaints did not include location and/or time stamps, then they could not be properly corelated to the Landfill as the potential odor source.

Flaw #1 translates cubic yards to tons and mentions these are roughly comparable, but gives no reference to that comparison. Landfill municipal solid waste (MSW) does compress over time, but this will end up with less volume as well. Coffin Butte's Waste in Place report for 2023 noted only 21,537,961 tons in the landfill by the end of 2023. A standard ratio of 0.6 tons per cubic yard is used in the industry, which is significantly less than what the Testimony implies.

Flaw #2 mentions that the closure year is incorrect. Years of capacity in both the current landfill area and expansion area are estimates. Year 2052 was determined (as mentioned in Section 3.2 of the Modeling Study) assuming 2023 waste acceptance rates continued moving forward until the full capacity of 41,110,068 tons was reached.

Flaw #3 cites inconsistencies in landfill gas collection efficiency. There are various estimations of collection efficiency at landfills, and all are quite variable. The EPA has determined a conservative default efficiency of 75% which is referenced on Page 10 of the Modeling Study. VNEQS is using

Carbon Mapper to estimate collection efficiency in this Flaw citation, but gives no data to backup its claim. A brief aerial map of methane at the Landfill from Carbon Mapper does not seem to give an accurate representation of annual landfill gas fugitive emissions. These total fugitive emissions then would need to be compared to the total amount of gas collected to estimate collection efficiency.

Flaw #4 correctly notes that increased surface area will allow more area for fugitive gas to escape. This will be combated with additional gas collection wells in the new expansion area, as required under Federal and State air regulations. However, regardless of where waste is deposited it will be emitting the same amount of gas over time.

Flaw #5 mentions that the 84 odor complaints were "cherry picked" from the hundreds of odor complaints filled out by residents. As mentioned in Section 2.7 of the Modeling Study, Coffin Butte maintains a log of odor complaints received from the public and the Oregon Department of Environmental Quality (DEQ). All odor complaints in this log from 2022 through 2024 were assessed and none were left out. If additional complaints were recorded and not submitted to the Landfill's log, SCS is willing to perform a more expansive analysis if the complaint data can be supplied.

If you have any questions, please contact Jeff Leadford at jleadford@scsengineers.com or 720-272-0172.

Sincerely,

Jeff Leadford, PE
Senior Project Professional
SCS ENGINEERS

TRANSIGHT CONSULTING, LLC
Transportation Engineering and Planning Services

Date:	June 17, 2025
To:	Petra Schuetz
From:	Joe Bessman, PE
Project Reference No.:	1539
Project Name:	Coffin Butte Landfill – VNEQS Response

The purpose of this memorandum is to provide a formal response to comments within the June 10, 2025 memorandum from the Valley Neighbors for Environmental Quality and Safety (VNEQS) related to transportation. These comments were received on the Coffin Butte Landfill conditional use application for expansion south of Coffin Butte Road as part of LU-24-027. Transportation comments within the letter are summarized below and are followed by our response.

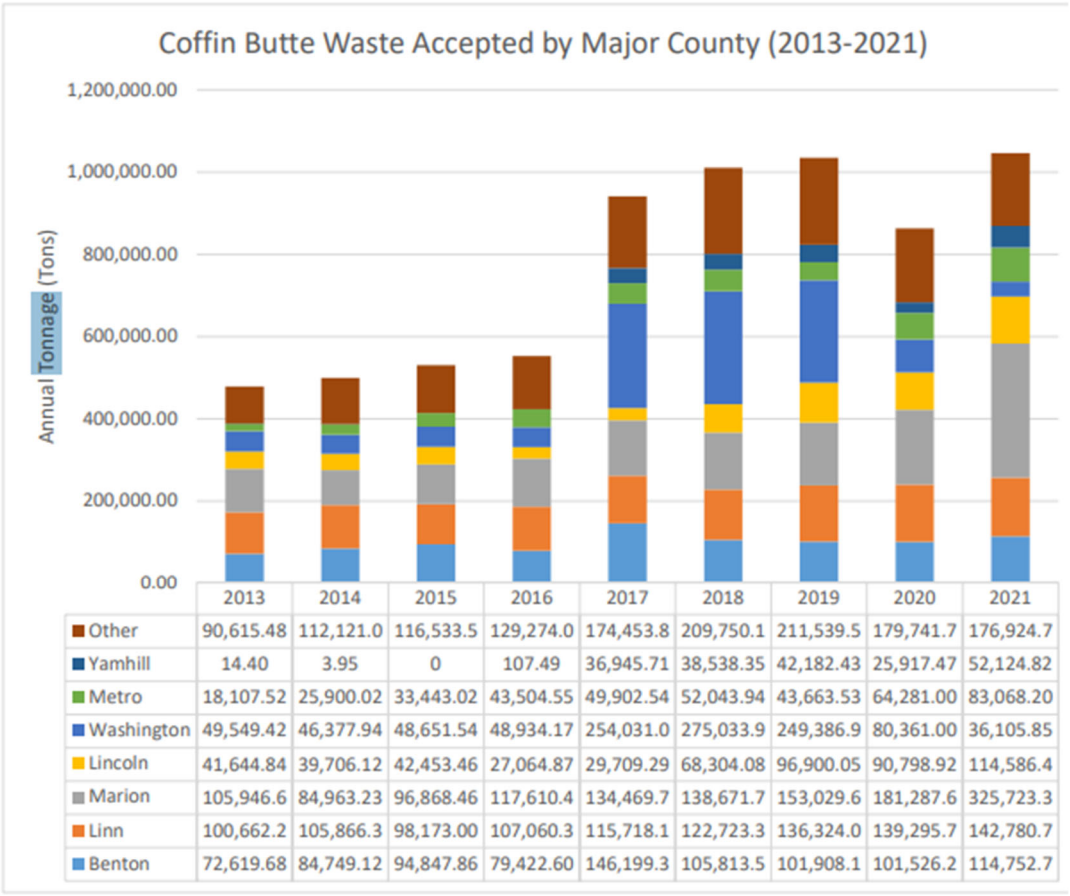
Comment 1: The applicant generally assumes that the level of future impacts will be identical to current impacts, when the actual impacts could be double. The annual limit of 1.1 million cubic yards could increase to 1.5 million in years 1-4, and to 1.86 million in years 5-6.

Response: The landfill quantities cited are entirely speculative; within the footnotes of the opposition comments on page 5 it appears that the opponents are mixing changes in total landfill area (acres) with traffic, but these metrics do not correlate. As stated, the transportation study assumed that landfill tonnage would generally follow area population growth, which is projected for the Linn-Benton Counties to remain at about 1 percent annual growth (or less), as documented within the original Transportation Impact Analysis as cited within adopted long-range plans. The traffic study acknowledges that waste levels can vary on an annual basis due to external factors, so in lieu of assessing growth through the approximately seven-year lifespan of the expansion site, accounting for minor trips to the current site, or movement of transfer vehicles between sites, we provided an analysis showing the operational impact of a 50% increase in current (measured and observed) landfill traffic volumes that was reassigned to the system based on the proposed configuration of the scales.

Correlating a 50% trip increase to a tonnage change does not provide a direct conversion for this site; the presence of transfer stations that “intercept” landfill trips results in fewer trips with larger trucks (heavier loads and higher per-vehicle tonnage) from longer distances. Some transfer stations also include solid waste compactors, which can increase tonnage within an equivalent volume. Accordingly, as the site is already a regional landfill that provides trash services for adjacent counties, any increase in tonnage would necessarily occur from longer-distance transport. A 50 percent increase in site trips (which would predominantly consist of larger transfer trucks rather than personal vehicles, dump trailers, or even garbage trucks) equates to more than double the current tonnage and would still provide a very conservative analysis. There are no current plans by Republic Services to increase its operations at the site, but operational fluctuations have occurred historically, and the site is designed to accommodate these levels.

The Benton County Talks Trash ("BCTT Report") Solid Wate Process Workgroup Report, dated April 2023[1], provides historical data historical tonnage information broken out by contributing source. Figure 1 illustrates this trend for the Coffin Butte Landfill. This graphic and accompanying text describe the tonnage increase between 2016 and 2017 as primarily attributable to increased refuse from Washington County in an effort to extend the lifespan of the Riverbend regional landfill. This tonnage was dispersed to other landfills in 2020, resulting in the Coffin Butte tonnage reduction, with this reduction possibly also attributed to the pandemic. The 2021 tonnage increased due to area fires (note that fire and flood intake are exempt from the tonnage cap). Other factors noted by the subcommittee that could influence annual waste tonnage included recession/economic factors, societal changes in waste generation, disposal alternatives, global health issues, environmental legislation changes, and natural disasters.

Chart 3: Intake by Source, 2013 - 2021



	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other	90,615.48	112,121.0	116,533.5	129,274.0	174,453.8	209,750.1	211,539.5	179,741.7	176,924.7
Yamhill	14.40	3.95	0	107.49	36,945.71	38,538.35	42,182.43	25,917.47	52,124.82
Metro	18,107.52	25,900.02	33,443.02	43,504.55	49,902.54	52,043.94	43,663.53	64,281.00	83,068.20
Washington	49,549.42	46,377.94	48,651.54	48,934.17	254,031.0	275,033.9	249,386.9	80,361.00	36,105.85
Lincoln	41,644.84	39,706.12	42,453.46	27,064.87	29,709.29	68,304.08	96,900.05	90,798.92	114,586.4
Marion	105,946.6	84,963.23	96,868.46	117,610.4	134,469.7	138,671.7	153,029.6	181,287.6	325,723.3
Linn	100,662.2	105,866.3	98,173.00	107,060.3	115,718.1	122,723.3	136,324.0	139,295.7	142,780.7
Benton	72,619.68	84,749.12	94,847.86	79,422.60	146,199.3	105,813.5	101,908.1	101,526.2	114,752.7

Figure 1. Total tonnage by location (includes daily top cover)

[1]chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://cd.bentoncountyor.gov/wp-content/uploads/2023/12/bctt_final_report_4-11-2023.pdf

The BCTT report also provided information on landfill lifespan. Consistent with the traffic study, this forecast was also premised on a "steady annual tonnage intake of between 1 million and 1.1 million tons for the duration of the landfill's projected remaining site life." (BCTT, pp 618). Accordingly, as the transportation analysis was premised on current conditions plus 50% traffic increases into the landfill (approximately equivalent to doubling the current waste tonnage using transfer stations). This scenario is more conservative than the status-quo assumptions for the Coffin Butte landfill within the BCTT report. Accordingly, no changes to the report are needed to address this comment.

Comment 2: The traffic analysis does not account for the expansion of the landfill to the former quarry site.

Response: The traffic analysis was not prepared to assess use of the former Knife River Quarry site as a landfill; the traffic study was prepared to specifically address the impact of landfill expansion to the south side of Coffin Butte Road as required to support this application. However, the lateral shift in landfill operations has no impact on public streets and is managed entirely within the Republic Services site, so the existing conditions analysis within the report would accurately describe this scenario (and conservatively also includes the Knife River operations that were occurring when the traffic counts were collected). Accordingly, no changes to the report are needed to address this comment.

Comment 3: The old landfill will not disappear; cumulative impacts should be incorporated.

Response: Limited-service trips may occur in the future to service, maintain, and monitor the current landfill site. These values could fluctuate over time and are expected to decrease but will be limited and will not change the findings or results of the analysis. No changes to the analysis were provided in response to this comment as the impacts are likely less than five peak hour trips, and more realistically between zero and two. Accordingly, no changes to the report are needed to address this comment.

Comment 4: The removal of 3.5 million cubic yards to create the new landfill is different than a typical application, with the construction work ongoing for years. This has not been accounted for.

Response: The traffic counts within the traffic study capture the adjacent Knife River rock quarry operations that were being accelerated to support use of adjacent landfill cells. While a specific construction timeline and schedule for construction of the new expansion site are not known at this time, it is expected that creating an adjacent landfill area will provide a similar level of effort as will be the case at the proposed site. As the traffic counts within the traffic study captured this activity (and even increased it by 50%), this on-going construction activity has been accounted for. No changes were provided in response to this comment.

Comment 5: Transporting all the materials from the new landfill site across Coffin Butte Road will require ~270,000 one-way trips in a standard dump truck.

Response: The specific method of hauling material has not been finalized, but it will most likely occur using larger construction vehicles (scrapers or large dump trucks) within a Benton-County approved traffic-control plan. Some of the materials can be used for landfill liners, other material will likely be hauled off-site for fill on other projects. The specific quantities that will remain on-site or hauled to adjacent lands or further off-site are not yet known.

Comment 6: No standard ITE trip generation data is available for landfills, opponents disagree with "non-approved" trip generation approach.

Response: The ITE Trip Generation manual is a useful reference for a broad range of land uses but has limited applicability outside of urban and suburban uses. As most county transportation engineering staff can attest, rural uses tend to be highly variable on a seasonal basis, and travel patterns also vary with the surrounding population served, number of on-site [seasonal and permanent] employees, or material quantities processed. This is the case not just with landfills, but also with quarries, timberyards/operations, farming, and agricultural operations, which have a high variability even between sites within a localized area.

The ITE Trip Generation Manual and its accompanying reference manuals are not silent on how to treat uses that are not directly included, and there are numerous traffic studies of other landfill sites across the US that also provide useful information on landfill operations (as summarized in the traffic report). The ITE Trip Generation Manual directly recommends that engineers collect and obtain local data even for uses that are included in the manual. There is no better comparative site than the existing Coffin Butte landfill, and the data collection at the site over the course of several years, including the recent April 2025 data collection at the Coffin Butte landfill entrance spanning from 7:00 a.m. to 9:00 p.m. provides strong evidence of its current and prior operations and travel characteristics.

Opponent arguments appear to disagree with growth rates applied to the current rates rather than the existing operations of the site, stating that as a regional landfill ("import landfill") trips should correlate to "import area". As previously discussed, and addressed, as waste is transferred from further locations and transfer stations the fleet mix changes, with a lower total volume of higher-capacity trucks transferring an increasing proportion of the tonnage. This substantially reduces the number of trips per ton compared to the use of personal vehicles, dump trailers, or even commercial garbage trucks. This matches the findings of the Twin Creeks Landfill Expansion Report prepared by HDR in 2016 that was referenced within the Traffic Impact Analysis.

Comment 7: The traffic study does not account for cross-traffic on Coffin Butte Road for site preparation activities.

Response: As is common in all traffic studies, the report was prepared to assess operational conditions when the landfill construction is complete. Construction conditions will be less intense on the site than its operation as a landfill, as evidenced by the existing traffic counts at the former Knife River site entrance that demonstrate an accelerated level of activity required to prepare a landfill site. The duration of this "construction period" will be similar to the "existing conditions" included in the report, which are well within Benton County standards. For clarity, this will include the following:

- No change in current travel and access to the Coffin Butte scales
- Similar construction activity as the prior Knife River operations

The traffic study accounts for these characteristics, so no changes are needed to the report.

Comment 8: The traffic study does not account for cross traffic on Coffin Butte Road resulting from traffic design and site preparation. The traffic levels effectively privatize the road and will impede emergency use.

Response: This argument again posits that the site does not account for the preparation of the landfill expansion area, its concurrent use as a landfill, and its suitability to allow emergency ingress/egress while landfill activity doubles.

- Doubling the landfill tonnage at Coffin Butte is not anticipated or planned. The traffic study shows that conservatively increasing the current number of vehicles entering and exiting the landfill by 50% (approximately equivalent to doubling the tonnage) can readily comply with Benton County standards.
- Maintaining use of the existing scales provides an extensive (over quarter-mile) queuing area for vehicles so that back-ups along Coffin Butte Road are avoided. This not only maintains the road clear of blockages for public trips, cyclists, fire and emergency use, but this also simplifies the traffic plan for private users that will not have to modify their haul route.
- The proposal includes reconstruction of Coffin Butte Road within the impacted area, bringing this segment into compliance with Benton County's standards for the roadways freight and collector designations. The voluntary condition to install a new westbound left-turn lane with extensive storage area into the landfill expansion site also prevents queues and back-ups at this new access point.

As provided in the application materials, the levels of traffic on Coffin Butte Road remain well within *Rural Collector* levels, and the elevated volume of trucks associated with a regional landfill (and adjacent quarry site) remain consistent with the *Freight Route* designation of this road. Through travel will continue to occur nearly unimpeded, similar to its current conditions with the new turn lanes.

In terms of the additional "what if" scenarios cited (such as wildfires, earthquakes, etc.) it is noted that these are not included within Benton County's transportation analysis criteria and are addressed in other portions of the application. It should be noted that the transportation improvements presented, and the lack of traffic control for through movements, will continue to enable emergency service providers and the public unrestricted and unimpeded use of Coffin Butte Road. There is no evidence that indicates conditions will in any way impede public or emergency travel along Coffin Butte Road.

Comment 9: Traffic will seriously interfere with uses on adjacent property by impeding traffic flow.

Response: There is no evidence indicating that through traffic will experience any additional delays. With the maintenance of the existing scales that provide extensive on-site queue storage, and the proposed addition of a westbound left-turn lane into the new landfill area, through traffic will continue to flow unimpeded. There is no evidence that indicates conditions will in any way impede public or emergency travel along Coffin Butte Road.

Comment 10: Degradation of Level of Service is an undue burden.

Response: Traffic operations show that conditions will remain well within Benton County standards, which is the only applicable criteria. The opposition's argument that side-street (north-south) delay for vehicles exiting the scales or landfill and turning left or right from a stop sign will provide a public burden is baseless. The minor increase from LOS "A" to LOS "B" only impacts landfill customers/employees. There is no control delay for through motorists on Coffin Butte Road (Level of Service "A"), and no evidence of impacts let along an "undue burden."

Comment 11: Degradation of roadway structural section due to truck traffic creates an "undue burden".

Response: Both Highway 99W and Coffin Butte Road are designated as higher-order streets and as freight routes. The required improvements to Coffin Butte Road will be constructed to an increased standard in recognition of the increased bearing needs of the pavement's structural section. The widening for bicycle lanes also places these heavy vehicles further from the road edge which improves lateral support, reduces

edge stresses and deflections, and avoids pavement edge drop-off. The mitigation provided with this project extends beyond the lifespan of the landfill expansion site.

Comment 12: An undue burden will occur due to road congestion and EMS response to traffic accidents due to increased semi-truck traffic.

Response: There is no evidence that would indicate reconstruction of Coffin Butte Road to Benton County standards, including the voluntary addition of a new westbound left-turn lane and widening for bicycle lanes (shoulders) would increase safety risks. The proposed access point to the new landfill expansion site provides extensive sight lines that comply with AASHTO recommendations. No safety deficiencies were noted in the report or with the preliminary turn lane layout. The presence of trucks on designated freight routes is neither an undue public burden or a public safety issue.

SUMMARY AND CONCLUSIONS

I appreciate the opportunity to provide this supplemental information to help address comments and concerns raised by neighbors and surrounding community members. In addition to these responses, I would further note that ODOT and Benton County transportation engineering staff have also reviewed the transportation materials and agree with the study approach (as provided within the scoping materials), the provided findings, and recommended mitigation measures to address the transportation system impacts. Benton County's findings are provided in the staff report, and ODOT comments have been obtained and also submitted into the record.

As previously stated, the transportation plan has been substantially modified from the prior application to incorporate the public and agency comments and feedback received. The application now avoids impacts to Tampico Road, provides mitigation for its impacts to Coffin Butte Road, retains the unimpeded through function of Coffin Butte Road as a *Collector* and *Freight Route*, and maintains the weigh scales at a location with extensive queuing capacity (over ¼ mile).

If you have any questions I can be reached at joe@transightconsulting.com or at (503) 997-4473.

Geo-Logic ASSOCIATES

Memorandum

To: Jeff Condit **Date:** June 19, 2025

From: John M. Hower, Geo-Logic Associates, Inc.
Eric J. Tuppan, Tuppan Consultants LLC

Subject: Response to comments from Valley Neighbors for Environmental Quality and Safety in response to CUP Application for the expansion of the Coffin Butte Landfill

The following are responses to VNEQS comments received following submittal of the Conditional Use Permit (CUP) application for the Coffin Butte Landfill.

Page 17 - Response to Comments concerning the effect of Development on Dewatering

Valley Landfills, Inc (VLI) previously responded to comments concerned with the effect of the development on the water table and the potential to dewater private water supply wells south of the development. Please refer to page 2 of the June 11, 2025 Memorandum to Jeff Condit prepared by Geo-Logic Associates, Inc. and Tuppan Consultants LLC. VLI's evaluation of the impacts to local water supply wells considers the relative consistency of the groundwater flow conditions to support a conservative assumption that fractured bedrock behaves similarly to a porous media. Under this assumption, all fractures are interconnected, allowing the analytical solution to evaluate the most widespread effect of the proposed project. As stated in the referenced response, the analyses indicated that the change in water levels associated with the proposed development would be similar to changes in water levels associated with seasonal precipitation patterns. VLI will also implement a robust monitoring program and will work with the community to address project-related changes in groundwater availability should those occur. We also note that with adoption of the CUP, VLI will conduct a focused hydrogeologic investigation of the proposed development to confirm and quantify the hydrogeologic conditions in this area of the site.

VNEQS also expressed concern about the effects of the existing landfill operations on outbuilding foundations and a livestock pond northwest of the existing facility. It is unclear how

dewatering would affect concrete foundations, and so without more detail regarding the foundations mentioned in the comment, no appropriate response can be developed.

Page 19 - Response to Comments concerning the adequacy of the Composite Liner System

VLI previously responded to comments concerned with the proposed composite liner system. Please refer to pages 16 and 17 of the June 11, 2025 Memorandum to Jeff Condit prepared by Geo-Logic Associates, Inc. and Tuppan Consultants LLC. As stated in that response, the composite liner system for the proposed development exceeds the current State of Oregon and federal regulatory standards for composite liner system designs for municipal solid waste landfills, and will provide superior protection against groundwater contamination when compared to the prescriptive standard composite liner system design. The designs and construction projects for all previous composite liner systems have been approved by Oregon Department of Environmental Quality (ODEQ), and there has been no evidence of a release to groundwater from portions of the Coffin Butte Landfill equipped with composite liner systems.

Pages 19 through 23 - Response to Comments concerning Groundwater Contamination

Arsenic Concerns

The occurrence of arsenic in groundwater was addressed on pages 4 through 8 of the June 11, 2025 Memorandum to Jeff Condit prepared by Geo-Logic Associates, Inc. and Tuppan Consultants LLC. As demonstrated therein, the occurrence of arsenic in wells MW-9B, MW-26, and MW-27 are attributed to natural background conditions.

PFAS Concerns

The occurrence of PFAS in leachate was addressed on pages 14 and 15 of the June 11, 2025 Memorandum to Jeff Condit prepared by Geo-Logic Associates, Inc. and Tuppan Consultants LLC. VLI notes that current federal, state, and site-specific regulations for landfill environmental monitoring do not require groundwater samples to be analyzed for PFAS. VLI notes that last year, 48.1 percent of the CBL leachate (approximately 23.14 million gallons) was transported from the CBL to the City of Corvallis wastewater treatment facility, accounting for approximately 0.0058 percent of all liquids treated at the wastewater treatment plant last year based on the

City of Corvallis website. As a result, the contribution of PFAS from landfill leachate is expected to be very small.

VNEQS also expressed concern over lack of available PFAS treatment and the potential for PFAS to be discharged into the Willamette River from biosolids. VLI notes that US EPA has identified three commercially-available and widely-utilized treatment technologies that are effective at removing or reducing PFAS in water. These include: granular activated carbon filtration, reverse osmosis filtration, and ion exchange resins. (Source: FACT SHEET: Water Filters). The City of Corvallis uses carbon filtration at its Taylor Water Treatment Plant to remove organic compounds in water, including PFAS.

VLI also notes that the City of Corvallis actively monitors and treats the municipal water supply for PFAS. Importantly, the City has not detected PFAS in drinking water samples. According to the City of Corvallis 2025 Water Quality Report and the City's website, PFAS have not been detected in drinking water (emphasis added):

> *PFAS chemicals are so widely used, they seep into our air, soil, and our water systems. The good news is that PFAS have only been found in a few small public drinking systems in Oregon, and never in Corvallis. Though these chemicals may not originate in waterways (or in water or wastewater treatment facilities) many Oregon clean water utilities, including Corvallis, are taking action to protect public health by:* ***Testing for PFAS in wastewater and wastewater biosolids****; tracking current research on PFAS; working with policy makers to reduce PFAS in consumer products; and informing customers about the latest PFAS news.* ***PFAS and phthalates have not been detected in Corvallis drinking water.***
>
> (Source: https://www.corvallisoregon.gov/publicworks/page/what-are-pfas-and-phthalates)

Domestic Well Contamination Concern

VLI asserts that the statement provided in the "History of Domestic Well Contamination" subsection of VNEQS' comment is inaccurate. At the time that VLI was conducting a remedial investigation for the west side of the landfill in the mid-1990s, their consultants prepared a Preliminary Assessment (EMCON, 1996) for the ODEQ. That report found that no health-based drinking water standards were exceeded in groundwater samples from monitoring wells downgradient of the Closed Landfill or in the Helms well, located southwest of Soap Creek approximately 500 feet from the landfill boundary. Prior to issuance of that report and based upon a recommendation from their consultant, VLI had installed water treatment at the Helms

wellhead, in May 1994, and implemented quarterly monitoring of the domestic well to provide redundant protective measures of the drinking water supply. In addition to these measures, VLI had arranged to purchase the property from Mr. Helms as part of their policy to purchase properties near or adjacent to the landfill. Neither that purchase nor the decommissioning of the well was required by the ODEQ.

At the conclusion of the remedial investigation regulatory process that had been ongoing for the west side of the landfill, VLI submitted a Focused Remedial Investigation and Feasibility Study (Tuppan, 2003) that included recommendations to ensure the protectiveness of the remedy, including decommissioning two unused water supply wells (one of which was the Helms well and the other was an old water supply well for the landfill) and property purchases as buffer around the landfill (the Helms property).

Subsequently, the ODEQ's Staff Report (August 2004) and Record of Decision (October 2005) adopted the recommendation to decommission water wells within areas potentially downgradient of impacts since that measure removes potential exposure to contaminants in groundwater. One of the two wells included the Helms well. That well was decommissioned in September 2006. By that time, the Helms property had already been purchased by VLI.

Domestic Well Impact Concern

As stated on VLI's responses to comments concerning the impacts of blasting and the presence of arsenic at the CBL, VLI is committed to safeguarding the groundwater resources in the communities surrounding the landfill. On pages 4 and 8 of the June 11, 2025 Memorandum to Jeff Condit prepared by Geo-Logic Associates, Inc. and Tuppan Consultants LLC, VLI outlines a groundwater monitoring and response program to address changes in groundwater levels or chemistry that could affect the community.

Willamette Basin Contamination Concern

The CBL is equipped with a robust groundwater monitoring network designed to detect a release from the landfill at the edge of the waste management units, long before potential contamination would leave the landfill property and migrate into the Willamette Basin. This early detection monitoring ability provides space within the landfill property to effectively treat a release before contamination could leave the landfill property and affect the Willamette Basin. The proposed development will add to the existing groundwater monitoring network, and will increase the capability of detecting a release from the landfill.

Geo-Logic ASSOCIATES

Respectfully submitted,

John M. Hower

John M. Hower, PG, CEG (California)
Geo-logic Associates, Inc.

Eric Tuppan, RG
Tuppan Consulting LLC

Exp 12/1/2025

SCS ENGINEERS Environmental Consultants & Contractors

June 20, 2025
File No. 27223197

MEMORANDUM

TO: Republic Services

FROM: James Walsh, P.E., BCEE, SCS Engineers

SUBJECT: Rebuttal to Public Comments Received June 2025
To Benton County Planning & Zoning Commission
On Landfill Fire Potential at Coffin Butte Landfill
From Valley Neighbors for Environmental Quality and Safety

This memorandum is to address various comments submitted by Valley Neighbors for Environmental Quality and Safety (VNEQS) on Coffin Butte Landfill, Pages 27-30, on landfill fire risk. In each case we will repeat the comment verbatim, followed by an SCS rebuttal.

#1: FACTUALLY INCORRECT STATEMENT BY CONSULTANT JAMES WALSH:
"The landfill accepts only MSW (Municipal Solid Waste)"
IN FACT, the facility also accepts "special waste," industrial waste, and C&D (Construction & Demolition) waste. C&D waste is known to be more likely to spontaneously combust.
SCS REBUTTAL: The statement we made above in italics was not meant to be misleading. The characterization of MSW often also includes special waste, industrial waste, and C&D. ODEQ characterizes Coffin Butte as a "municipal solid waste landfill" and that classification is allowed to receive special waste, industrial waste, and C&D. C&D waste in a modern MSW sanitary landfill like Coffin Butte is no more likely to combust than other wastes received. There is no evidence that any approved and accepted waste stream at Coffin Butte Landfill is ever likely to spontaneously combust.

#2. FACTUALLY INCORRECT STATEMENT BY CONSULTANT WALSH:
"The landfill does not accept hazardous waste."
IN FACT, there are no audits of waste, and no penalties for landfilling hazardous waste.
SCS REBUTTAL: The statement we made above in italics is factually correct. Controls on wastes received at Coffin Butte are robust. First, hazardous wastes are tightly regulated by federal and state law at the generator and transport levels. In addition, Republic Services has a rigorous company-wide Waste Acceptance Program that would exclude any hazardous wastes, as well as many other wastes not regulated that Republic views as potentially problematic to the landfill. There are federal and state penalties that apply to generators, transporters, and lastly landfills if any hazardous waste were to slip through to the landfill. Thus, it is very difficult for hazardous waste to reach the Coffin Butte Landfill. In addition, all waste transporters to Coffin Butte Landfill are pre-

registered and their wastes pre-approved by Republic. Lastly, site operators observe waste deposits upon placement at the working face, and any unacceptable wastes are spotted, isolated, and removed.

#3. FACTUALLY INCORRECT STATEMENT BY CONSULTANT WALSH:
"Robust waste approval checks are in place."
IN FACT, there is no oversight of any kind, and when alerted to the presence of hazardous waste in a load, the landfill operator permits disposal of hazardous waste (see Doug Pollock testimony). Any "robust" oversight of disposal would presumably preclude human corpses from being disposed of at the landfill (corpse of Kaylee Birdzell, 2022; remains of Kara Tayler, 2023)
SCS REBUTTAL: The statement we made above in italics is factually correct. Neither ODEQ nor the landfill operator allows regulated hazardous waste to be disposed at Coffin Butte, regardless of the circumstances. Robust waste approvals are in place. See the rebuttal on hazardous and other potentially problematic wastes above. There is additional detailed evidence from Republic in the record elsewhere to support this.

#4. FACTUALLY INCORRECT STATEMENT BY CONSULTANT WALSH:
"Waste disposal is limited to a 1/2 acre working face."
IN FACT, the landfill working face shown on GIS is typically 1.5-2.5 acres (see testimony, Mason Leavitt). More working face = higher fire risk
SCS REBUTTAL: The Applicant addressed this issue in its submission dated June 12, 2025.

#5. FACTUALLY INCORRECT STATEMENT BY CONSULTANT WALSH:
"Daily cover is applied at the close of each business day."
IN FACT, see testimony and photographs, Mark Yeager, and testimony, Roger Orton: daily cover is not consistently applied at the close of each business day. When applied, "alternate daily cover" is often poorly-applied tarps with large gaps that allow for combustion air infiltration.
SCS REBUTTAL: Daily cover is a policy of the landfill. The Applicant will address any occasional departures from this policy. Coffin Butte uses a combination of soil and tarps as daily cover. The use of tarps as an "alternate daily cover" at Coffin Butte has been approved by ODEQ. By definition, approved alternate daily cover is daily cover. There may be some small gaps between tarps. The goal for any daily cover is to cover as much of the daily waste deposits as possible to reduce exposure to atmosphere and oxygen. Tarps as daily cover at Coffin Butte achieve that goal, meeting the state of the practice for the regulated landfill industry, sufficiently reducing the risk of exposure to atmosphere and the risk of fires, to the same extent as soil daily cover.

#6. FACTUALLY INCORRECT STATEMENT BY CONSULTANT WALSH:
"There are three plausible fire scenarios (working face/grassed area/gas well fire."
IN FACT, there are many, many more plausible fire scenarios, including many that would endanger lives and property well beyond the area of the landfill itself:

- PLAUSIBLE SCENARIO 1: a dumped "hot load" (fire burning in the garbage truck, so to minimize truck damage the driver dumps the entire load by the side of the road...a recent

"hot load" dump caused the deadly Sandalwood fire in California that destroyed 70+ structures and resulted in two fatalities);
SCS REBUTTAL: This would be either a working face fire or a grass fire – two of the plausible scenarios already identified. If this were to occur on the landfill property, it would be quickly identified and extinguished.

• PLAUSIBLE SCENARIO 2: Lightning strike (see testimony, Virginia Scott);
SCS REBUTTAL: This would be likely be a grass fire, one of the plausible scenarios.

• PLAUSIBLE SCENARIO 3: Burning embers from a fire burning elsewhere rain down upon the landfill, igniting it. Fire experts tell area residents that this is THE MOST LIKELY scenario for a fire emergency: that a wildfire elsewhere lofts airborne embers into the area, starting fires there;
SCS REBUTTAL: This would likely be a grass fire, one of the plausible scenarios. The likelihood of this is low, and the risk and consequences would be no worse than on any other grassed area in the County. Moreover, the likelihood of timely detection and response is far higher at Coffin Butte Landfill than with other rural and unobserved grassed (or otherwise vegetated) areas.

• PLAUSIBLE SCENARIO 4: Exploding lithium batteries (see testimony, Virginia Scott, & OPB article, "*Exploding lithium batteries are causing fires in Oregon's landfills*");
SCS REBUTTAL: Batteries are excluded from working face disposal and have a designated separate collection area at the landfill. Batteries are not landfilled. If they did get through to the working face, and ignited, they would be manageable as a working face fire, which is already addressed.

• PLAUSIBLE SCENARIO 5: Electrical short ignites fire in garbage truck in the compressed natural gas fueling area (see "Corvallis Fire Instagram account");
SCS REBUTTAL: This has never happened and the likelihood it could is very low. If it did occur, such trucks are isolated on a hard surface, and physically separate from anything else that could ignite. And such a fire would be immediately identified and responded to by on-site staff, who would quickly extinguish the fire.

• PLAUSIBLE SCENARIO 6: "Subsurface Reaction" (the term of art used by the Applicant's fire consultant, Mr. James Walsh to describe spontaneous combustion deep in the landfill mass). In his 2015 expert testimony on the Bridgeton, Missouri fire (we will use the term "fire" rather than "SSR"), the Applicant's fire expert, Mr. Walsh, stated: "There is no known way to prevent the SSR from developing or to stop it." That SSR (or "fire") has now been burning in the Bridgeton landfill for 15 years. There are known risk factors, however, and one of them is having incinerator ash in the landfill; Coffin Butte has been accepting ash from the incinerator in Marion County for years. Another is accepting construction and demolition debris.

SCS REBUTTAL: THE SSR that was identified at Bridgeton Landfill is not a fire. A fire is shallow, aerobic, oxidation, and requires the presence of significant quantities of oxygen. An SSR is deep, anaerobic, lacking oxygen, and assuredly not a fire. An SSR is extremely rare. Plus, temperatures are recorded monthly at all extraction wells at Coffin Butte Landfill, allowing for detection of elevated temperatures in the waste – a way to detect a possible subsurface fire or SSR. All such recorded temperatures to date at Coffin Butte are under the limits prescribed by the MSW landfill NSPS regulations. There is and has been no evidence of an SSR (or underground waste fire) at Coffin Butte and there is no material risk of one developing. Conditions at Bridgeton are entirely different than those at Coffin Butte. Ash alone will not create an SSR.

POTENTIAL CODE CITATIONS – FIRE:

53.215 (1) FIRE SERIOUSLY INTERFERE WITH USES ON ADJACENT PROPERTY

There has been testimony (Erin Bradley & Joel Geier) regarding the threat fire on the landfill posed in 2024 to nearby properties

SCS REBUTTAL FOR THIS COMMENT AND ALL ALLEGED "POTENTIAL CODE VIOLATIONS" BELOW:

This is a list of highly speculative, highly unlikely scenarios. My prior reports, including my June 6, 2025 submission, do not support the outcomes suggested by VNEQS. As an expert in this field, I stand by the conclusion that operations at Coffin Butte, including the proposed expansion, do not present a significant fire risk.

53.215 (1) FIRE SERIOUSLY INTERFERE WITH CHARACTER OF THE AREA

A fire that destroyed structures and forests would result in a significant impact in the character of the area, as can be seen from before/after photographs taken in the aftermath of various Oregon fires in 2020

53.215 (2) FIRE UNDUE BURDEN ON PUBLIC IMPROVEMENTS

A fire that started at the landfill could damage public improvements, including power and water infrastructure.

53.215 (2) FIRE UNDUE BURDEN ON PUBLIC IMPROVEMENTS, EGRESS

If there is an artificial canyon made out of methane-generating garbage on either side of Coffin Butte Road, a fire that started elsewhere and spread to the landfill (via burning embers) could prevent Coffin Butte Road from being a safe egress route for Valley residents

53.215 (1) FIRE UNDUE BURDEN ADAIR FIRE: DANGEROUSLY STEEP SLOPES

The Applicant has told the EPA that the surface of the existing landfill is too steep, and dangerous for EPA personnel to walk over with hand-held air quality monitoring devices. But fire personnel will have to access these same surfaces. Steep and dangerous surfaces are a threat to the life and safety of firefighting personnel and an undue burden.

53.215 (1) FIRE UNDUE BURDEN ADAIR FIRE: ADDITIONAL 59 ACRES OF SURFACE ON WHICH FIRES MIGHT IGNITE

The increase in the landfill surface area is 145% of existing landfill footprint, without taking slopes into account (like the roof of a building, the surface area of the landfill is greater than its footprint). An increased surface area of 45% is a material amount and poses a threat to the life and safety of firefighting personnel and an undue burden.

53.215 (1) FIRE UNDUE BURDEN ADAIR FIRE: ADDITIONAL 10,000,000 CUYD OF METHANE-GENERATING WASTE IN PLACE

The proposal will increase waste in place by 140% over existing waste-in-place. More waste-in-place means more methane. Methane is currently being released as fugitive emissions from the landfill in explosive concentrations. An increased amount of 40% is a material amount of explosive methane and is a threat to the life and safety of firefighting personnel and an undue burden

53.215 (1) FIRE UNDUE BURDEN ADAIR FIRE: GEOMETRY OF THE PROPOSAL

The proposal will create an artificial canyon made of garbage on either side of Coffin Butte Road, each side of which will producing methane at explosive levels. The new topography will intensify fires moving uphill and increase wind speed if a fire ignites on either side of the artificial canyon. Fighting fires in an artificial canyon made of methane-producing garbage is a threat to the life and safety of firefighting personnel and an undue burden.

53.215 (1) FIRE UNDUE BURDEN CORVALLIS & BENTON COUNTY RFD's

Hot loads could be dumped by the side of any road in Benton County where there is garbage truck traffic to the landfill. Therefore, a fire like the deadly Sandalwood fire could ignite anywhere and could pose an undue burden to firefighting personnel.

53.215 (1) LANDFILL NOT CONSIDERED IN COMMUNITY WILDFIRE PROTECTION PLAN – UNDUE BURDEN ON BENTON COUNTY COMMUNITY DEVELOPMENT STAFF

Benton County staff did not incorporate the landfill in the CWPP. The reason given was inadequate experience and that it was "a task too large to undertake" by Benton County staff.[21]

[21] Email, Inga Williams to Nancy Whitcombe, 3/18/2022 "I don't see how I can include this in CWPP as I have no experience in the topic and it would be a task too large to undertake for what is in the final dra stages. It may be that it could be included as a task to be worked on in future year updates."

53.215 (1) FIRE UNDUE BURDEN – PROPERTIES IN THE LANDFILL AREA

Hot loads are most likely to be dumped on roadsides in the landfill area. In fact, in the early 2000's a "hot load" was dumped north of the landfill. Therefore, a fire like the deadly Sandalwood fire could ignite in that area and pose an undue burden of fire risk
to residents and their properties.

53.215 (1) FEMA DOCUMENT ON LANDFILL FIRES

The FEMA document "LANDFILL FIRES THEIR MAGNITUDE, CHARACTERISTICS, AND MITIGATION" states:

> *"Landfill fires are particularly challenging to the fire service. A large landfill fire normally requires numerous personnel and a significant period of time before it is contained. Both of these circumstances can strain a jurisdiction, particularly one dependent on volunteer staffing."*

So, per FEMA, a large landfill fire would particularly strain Adair RFD. This document continues, regarding Mr. Walsh's recommendation of water tanker mitigation:

> *"The use of water to suppress landfill fires is controversial. The application of large volumes of water may actually exacerbate a fire by contributing to the process of aerobic decomposition*."

It goes on in some detail about underground fires that can begin via spontaneous combustion. Applicant's consultant, Mr. James Walsh, failed to mention such fires as a 'plausible fire scenario' for Coffin Butte. However, regarding the Bridgeton landfill fire, Mr. Walsh opined that there was 'no known way' to prevent that type of landfill fire or to stop it. Per FEMA:

> *"Fires, particularly those underground, can undermine the integrity of the landfill, which could cause a collapse under the weight of landfill employees, firefighters, or equipment."*[22]

[22] FEMA, all quotes from "LANDFILL FIRES [etc]" pages 1, 15, 16

SCS REBUTTAL: We are well familiar with the FEMA document cited. FEMA often creates large debris piles from disaster cleanups. Waste in those can be left uncovered for months. Understandably, FEMA has had issues with fires in those large uncovered debris piles. However, FEMA has no operating experience with a modern MSW sanitary landfill like Coffin Butte Landfill, much less its fire potential or reality. Like any modern MSW landfill, Coffin Butte Landfill covers its waste each night, and never has large areas of uncovered waste exposed for months at a time. Coffin Butte has far less fire potential than that reported and experienced by FEMA. The fires that can and have occurred at Coffin Butte are much smaller than what FEMA has experienced with large completely uncovered debris piles.

We previously addressed support from Adair Fire in the SCS rebuttals of June 6, 2025. Coffin Butte and Adair Fire had a meeting in March 2025 to discuss and plan to work together when needed going forward. At that time, Adair Fire indicated they looked forward to continuing support to the landfill. The landfill appreciates that support, when needed. It should be noted that most fires are handled by on-site staff and Adair Fire's support is not needed. When Adair Fire has responded, their support, combined with the current on-site capabilities of Coffin Butte Landfill, has proved plenty sufficient to quickly extinguish the fire.

As to underground fires threatening the surface integrity of the landfill and endangering fire fighters, such large fires at depth simply do not occur at a modern sanitary landfill. Spontaneous combustion and fire spread can not occur at depth in such a landfill. Unlike debris piles, the underground waste in a modern MSW sanitary landfill is well compacted and very dense. It is infeasible to have sufficient oxygen to create or expand an underground landfill fire at Coffin Butte

Landfill. With that, the surface integrity of any modern MSW sanitary landfill like Coffin Butte is not threatened.

Lastly, we would agree the use of water to extinguish large landfill fires is not desirable. Water should be primary for grass fires only. We cited soil as primary for both working face fires and gas extraction well fires, as is standard practice among modern MSW sanitary landfills. The size of a fire at depth in Coffin Butte Landfill as is suggested here is simply not plausible for the above reasons.

Wildlife Memorandum

for Coffin Butte Landfill Expansion Project

For: Jeff Shepherd, P.E. – Civil & Environmental Consultants, Inc.

By: Stephanie James, M.S. – Turnstone Environmental Consultants, Inc.

Date: June 19, 2025

INTRODUCTION

This memorandum is to address questions and comments raised by the Valley Neighbors for Environmental Quality and Safety related to wildlife.

COMMUNITY ADDRESSES FLAWS IN THE APPLICANT'S CONSULTANT'S STUDY – WILDLIFE:

The Applicant's proposal relies on moving current landfill accessory uses that are accommodated on the 59-acre LS-zoned (*Landfill Site zoned*) parcel onto parcels zoned FC (*Forest Conservation*). The reason that the LS zone was created in 1983 was to prevent FC parcels from being used for landfill operations. Forest Conservation is for conserving forests, not destroying them, which is what the Applicant proposes to do. The language of the FC zone is that its purpose is to "…conserve forest lands…and protect the…wildlife resources in the zone." With regard to the impact of blasting away the mountainside, filling it with garbage, and displacing current landfill operations equipment onto non-LS-zoned parcels, the proposal would have the following impacts:

BLUE HERONS 1: EXPANDED DISTURBANCE FROM EXPANDED OPERATIONS WOULD PUT THE HERON COLONY AT RISK Blue Herons have been observed continuing to use trees on the Forest Conservation parcel as perches, while nesting immediately across the highway from the proposed new leachate ponds. Herons have been known to recolonize temporarily abandoned nesting trees, and might do so here if the source of disturbance goes away. But if human activity, large-scale removal of forestlands, earth-moving, and location of leachate ponds and haul roads cause continued disruption, including on the Forest Conservation parcel closer to the currently active nests, collapse of the colony and permanent abandonment could result.

Response: The Great Blue Heron protected site ("east rookery") has expanded to the area east of HWY-99W. The expanded operations in the Forest Conservation zone would be located in close proximity to the abandoned stick nests in the hybrid poplar stand but outside of the 300-foot buffer. The individual birds in this rookery are likely inured to the existing infrastructure which includes a gas management facility and HWY-99W, which now bisects the expanded protected site. The new facilities, including the proposed scale house, maintenance building, and leachate loadout area would be located south and west of the east rookery, adequately buffered by 300 feet of forest, and situated on the opposite side of the highway from the active nesting site. Recolonization of the exposed, monoculture hybrid poplar forest stand may not provide a benefit to the population as they appear have greater reproductive success in their new location.

BLUE HERONS 2: EXPOSING BLUE HERONS TO DISEASE An active landfill adjacent to their continuing rookery will increase the number and diverse bird species that can result in the spread of various avian diseases. The bird flu virus can survive up to two years in a landfill, so carcasses of infected birds disposed of in landfills can disseminate avian flu, endangering the surviving population of Blue Herons.

Response: The Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture recommends double-bagging and disposing of the carcass of a bird infected with the highly pathogenic avian influenza ("avian flu") in your regular trash. Expanding the landfill would not likely increase the number of infected carcasses that arrive at the landfill or increase the exposure of infected carcasses to the local Great Blue Heron or other local bird populations.

BALD EAGLES 1: DESTRUCTION OF HABITAT The applicant's wildlife consultant has observed bald eagles foraging and soaring on the 59-acre parcel. An active landfill on this parcel will provide scavenging opportunities that can induce them to ingest harmful garbage.

Response: The landfill expansion would not likely increase the exposure of bald eagles to infected harmful garbage, as the number of active cells would not increase.

BALD EAGLES 2: EXPOSING BALD EAGLES TO DISEASE An active landfill damages bald eagles by concentrating great numbers of invasive bird species such as starlings as well as providing infected bird carcasses (culled domestic birds) that can result in the spread of avian disease.

Response: As with potential increased risk to the Great Blue Heron, the landfill expansion would not likely increase the exposure of bald eagles to the avian flu. The amount of incoming infected bird carcasses is not likely to increase due to landfill expansion and the rate of exposure is not likely to increase due to landfill expansion.

OTHER WILDLIFE: DEER, ELK, BOBCAT, COUGAR, RACOON, STRIPED SKUNK Community members agree with the applicant's consultants; the parcels are important habitat. Per the purpose of the zone, this habitat should be conserved, not destroyed.

Response: The Oregon Department of Fish and Wildlife (ODFW) classified the E.E. Wilson Wildlife Area as Impacted Habitat for resident and migratory deer and elk populations. Impacted Habitat is where deer and elk are considered in conflict with primary land uses and are "subject to anthropogenic development such as areas within urban growth boundaries, city limits, otherwise determined to be less suitable habitat for deer or elk because of conflicts with proximity to humans, disease, damage, or public nuisance resulting from use by local or resident deer or elk". The habitat in the FC zone is non-essential habitat situated between landfill operations and a busy HWY-99W. There is important habitat with higher functions and greater value located farther away from the landfill, away from the facilities, and away from the highway.

53.215 (1) WILDLIFE HABITAT SERIOUSLY INTERFERE: BLUE HERON WILL NOT RECOLONIZE

This location is very advantageous to nesting Blue Herons, with close access both to wetlands to the east and farm fields to the west. Removing the west rookery conifers in the perhaps abandoned west rookery will prevent the Blue Herons that are currently nesting adjacent to the site from ever recolonizing them. Disturbance near the east rookery poplars will also prevent the herons from recolonizing those trees.

Response: Many neighbors have noted observing the east rookery in the exposed hybrid poplar trees prior to the nest abandonment in the middle of the 2022 breeding period. The deciduous nature of this monoculture stand does not provide great cover in the late winter and early spring when the Great Blue Heron is in the nest building, egg laying, and incubating periods. The new rookery location is in a mixed conifer/deciduous stand farther from landfill current operations, on

the E. E. Wilson Wildlife Area, which is likely a location that will provide greater long-term survival. Recolonization of the exposed hybrid poplar stand may lead to future colony collapses and is not necessarily beneficial to the population.

53.215 (1) WILDLIFE HABITAT SERIOUSLY INTERFERE: BLUE HERONS INCOMPATIBLE WITH LANDFILL ACTIVITIES

The Applicant since LU 21-047, has demonstrated that landfill operations are not compatible with Blue Heron habitat by causing rookery abandonment. Moving landfill operations even closer to the Blue Heron's new habitat is likely to drive them away from that as well.

Response: The location of the proposed new facilities is greater than 300 feet from the new and old east rookery nest trees and buffered by mature trees and HWY-99W.

53.215 (1) WILDLIFE HABITAT USES ON ADJACENT PROPERTY: DISEASE

Placing municipal solid waste on the 59-acre parcel will expose BLUE HERONS, BALD EAGLES and RED-TAILED HAWKS to avian disease, both via the ingestion of infected bird carcasses and through mingling with large numbers of diverse bird species that congregate at a landfill

Response: The landfill expansion would not significantly increase the exposure of local bird populations to the avian flu. Even if the surface area of operations increases, there would still be the same amount of infected carcasses arriving at the landfill.

53.215 (2) THE LANDFILL IS "SPOT ZONING" IN A FORESTED AREA OVERWHELMINGLY DEDICATED TO THE PROTECTION OF WILDLIFE. REPLACING THE FOREST WITH A PILE OF GARBAGE WOULD SERIOUSLY INTERFERE WITH THE OVERALL CHARACTER OF THE AREA

The current landfill area is less than 180 acres. Directly across Highway 99 is an 1800-acre wildlife preserve. The character of the area south of Coffin Bute Road – forested gentle slopes that Applicant acknowledges is an important wildlife habitat -- has more in common with the larger wildlife preserve to the east than the relatively small landfill to the north. “Purpose of Conservation Zone The applicant has not met the burden of proof that the proposal will not interfere with the purpose of the Forest Conservation zone for protection of the wildlife resources.”

Response: Reference to 53.215 (2) which states the “proposed use does not impose an undue burden on any public improvements, facilities, utilities, or services available to the area” is likely in error. This is non-essential habitat, important but not essential. There is habitat with greater importance, with higher functions, greater values, that is located farther away from the landfill, away from the facilities, and away from the highway.

Sincerely,

Stephanie James

Environmental Scientist, M.S.

Turnstone Environmental Consultants, Inc.

Offices in Corvallis and Portland, Oregon