

BEND DEMOLITION LANDFILL INFORMATION SUMMARY

The Site and Current Situation

- Bend Demolition Landfill is an inactive construction and demolition (C&D) waste landfill that was previously an old surface mine for pumice. The landfill consists of about 73 acres that was progressively developed in three distinct areas, depicted as **Area 1**, **Area 2**, and **Area 3** in the attached "**Aerial Map of Demolition Landfill**". The landfill operated under a DEQ solid waste permit for 24 years from 1972 to 1996 to dispose of C&D waste, industrial waste, commercial waste, wood waste, brush, tires, and concrete rubble. The initial 23-acre **Area 1** was filled with the highest concentration of wood waste from local saw mills. As **Area 1** approached full capacity, the County purchased 50 adjacent acres to the west which became landfill **Area 2** and **Area 3**. These areas were subsequently filled with similar types of waste, except that the fraction of mill-generated wood waste was significantly reduced.
- Most of the landfill was closed in 1997. Yet closure of the eastern 23-acre portion of the landfill (**Area 1**), which ceased operation in 1982, remains unfinished due to ongoing waste pyrolysis.
- Pyrolysis is the decomposition of organic matter by heating without oxygen. At this landfill, waste pyrolysis has created an unstable landfill cover (sinkholes) and unsafe working conditions.
- Current areas with active pyrolysis are located along the eastern edge of **Area 1**, paralleling Century Drive (14th street) and depicted as a "**High Hazard Area**" in the attached "**Bend Demolition Landfill Monitoring Probe Location Map**" and "**Bend Demolition Landfill Structure Monitoring**" figure. The areas that have historically been pyrolyzing contain large amounts of mill waste (sawdust, wood waste/slash/chips).

The Permit and Post-Closure Care

- **The DEQ Solid Waste Closure Permit #215** for this site contains provisions for post-closure monitoring, inspection and maintenance, including requirements for methane gas monitoring to detect any methane migration from the site, and subsurface temperature monitoring to detect any subsurface fire in **Area 1**.
- **Post-Closure Care.** In response to safety concerns, odor complaints, and permit compliance schedules, significant upgrades were implemented in 2011/2012 to improve post-closure monitoring. These monitoring upgrades, and additional updates to post-closure inspection, maintenance, reporting, and emergency response procedures were incorporated into a new **Post-Closure Monitoring Plan, Bend Demolition Landfill, June 2012** that was approved by DEQ letter dated July 26, 2012. The plan includes details for :
 - **Upgraded Subsurface Temperature Monitoring.** Subsurface temperature monitoring in **Area 1** was suspended in February 2009 for safety reasons after a county employee fell into a sinkhole. Temperature monitoring was reinstated in 2012 after five (5) automated temperature monitoring probes were installed along the eastern edge of **Area 1** (see attached "**Bend Demolition Landfill Monitoring Probe Location Map**") to replace former manually operated probes. Temperature readings are automatically taken and recorded every 30 minutes. In the event that a temperature reading exceeds 200°F, an email alert is sent to the County so that they can evaluate for a potential subsurface landfill fire. During 2012, no temperature reading exceeded 200°F.
 - **Upgraded Landfill Gas (LFG) Monitoring.** Quarterly monitoring for methane was supplemented in 2011/2012 by installing three (3) automated LFG monitoring probes, strategically located to intercept and detect potential LFG gas migration towards commercial buildings located immediately east of **Area 1**. Combustible gas readings are automatically taken and recorded every 30 minutes. In the event that a combustible gas reading exceeds 25% of the Lower Explosive Limit (LEL), an email alert is sent to the County so that they can respond immediately. In addition to automated monitoring, LFG is also manually monitored every quarter in three other probes, located along the northern site perimeter, and in eleven nearby structures. Monitoring locations of LFG probes and structures are depicted in attachments "**Bend Demolition Landfill Monitoring Probe Location Map**" and "**Bend Demolition Landfill Structure Monitoring**" figure. No detections of combustible gases or methane were observed in any of the monitoring probes or structures during 2012.

- **Phase II Site Characterization.** On December 26, 2012, Deschutes County submitted a permit-required work plan for conducting a “Phase II Site Characterization” to assess the landfill’s impact on groundwater. The proposed work plan was approved by DEQ letter dated February 28, 2013. The Phase II site characterization consisted of the construction and sampling of three deep groundwater monitoring wells to assess groundwater quality beneath the landfill. The geology beneath the site consisted of interconnected basalt flows. The Phase II site characterization was completed on September 24, 2013 and no groundwater contamination was found. The monitoring wells were left onsite for use in future monitoring events.
- **Monthly Facility Inspections.** The County conducts and documents, at least, monthly inspections of the entire site. Noted deficiencies are corrected as soon as possible.
- **Sinkhole Repair Procedures.** When sinkholes are noted, repairs are made at the earliest opportunity following procedures, described in the post-closure plan, that were developed based on years of experience, and have proven to be safe and effective. Pyrolysis-caused sink holes and related gas emissions are repaired by safely backfilling these areas with soil as soon as possible. This approach complies with the permit and has worked to temporarily reduce odors and visible emissions, but it does not solve the problem of ongoing pyrolysis and the potential for landfill fires.
- **Fire Response Contingency Plan.** With ongoing evidence of pyrolysis in **Area 1**, the possibility of a subsurface landfill fire continues to be of concern. The County reviewed and updated its Fire Response Contingency Plan in 2011/2012 to better prepare the County’s and Bend Fire Department’s response to a fire at the site.
- **Reporting.** In addition to reporting exceedences, non-compliances, damages, and emergencies as they arise, the County also submits an annual report to DEQ summarizing and evaluating the preceding year’s monitoring results, and describing significant events related to inspection and maintenance activities, and/or complaints.

Next Steps:

- **Prospective Site Development.** The size and location of the landfill within the City of Bend make it desirable for development of other uses. From the perspective of DEQ’s solid waste closure permit any future development of the Bend Demolition Landfill site should consider the following:
 - Site development involving landfill closure by processing and removing all on-site buried waste would be eligible for termination of the solid waste permit (i.e., no further regulation by DEQ’s solid waste program).
 - Site development involving partial processing and removal of buried waste could be eligible for a modified solid waste permit boundary, provided that acceptable buffer zones are maintained between buried waste and adjacent property.
 - Site development must keep away from **Area 1**, as long as there are concerns with subsurface instability and potential landfill fire related to ongoing waste pyrolysis.
 - Methane gas is and will be produced by decomposing organic waste in all three landfill areas. Any site development on or adjacent to the permitted landfill site must be designed to account for potential methane gas migration.
 - Site development must preserve or enhance the landfill cover integrity. Designs or activities that would increase percolation of precipitation into the waste should be prevented.
 - Until **Area 1** is safe and properly closed it must remain gated and secured against trespass by the public, including the increased nearby public traffic that could be expected as the site is developed.
 - Any future site development must be conducted in a manner that is sensitive to nearby residents. Nuisance conditions that could be created during development must be minimized through good planning, and mitigated as they arise.



FIGURE 1.
Bend Demolition Landfill
Monitoring Probe
Location Map



LEGEND

- High Hazard Area**
 Area subject to sudden surface failure, subsidence formation, settlement, erosion, foot and vehicle travel not advised
- LFG Monitoring Probe (Manual)**
- LFG Monitoring Probe (Automatic)**
- Temperature Monitoring Probe (Automatic)**
- Gate**
- Fence**



Bend, Oregon City of Solid Waste
 6200 E 22nd Street
 Bend, Oregon 97702
 541.317.2613
www.bendoregon.org/5413172613

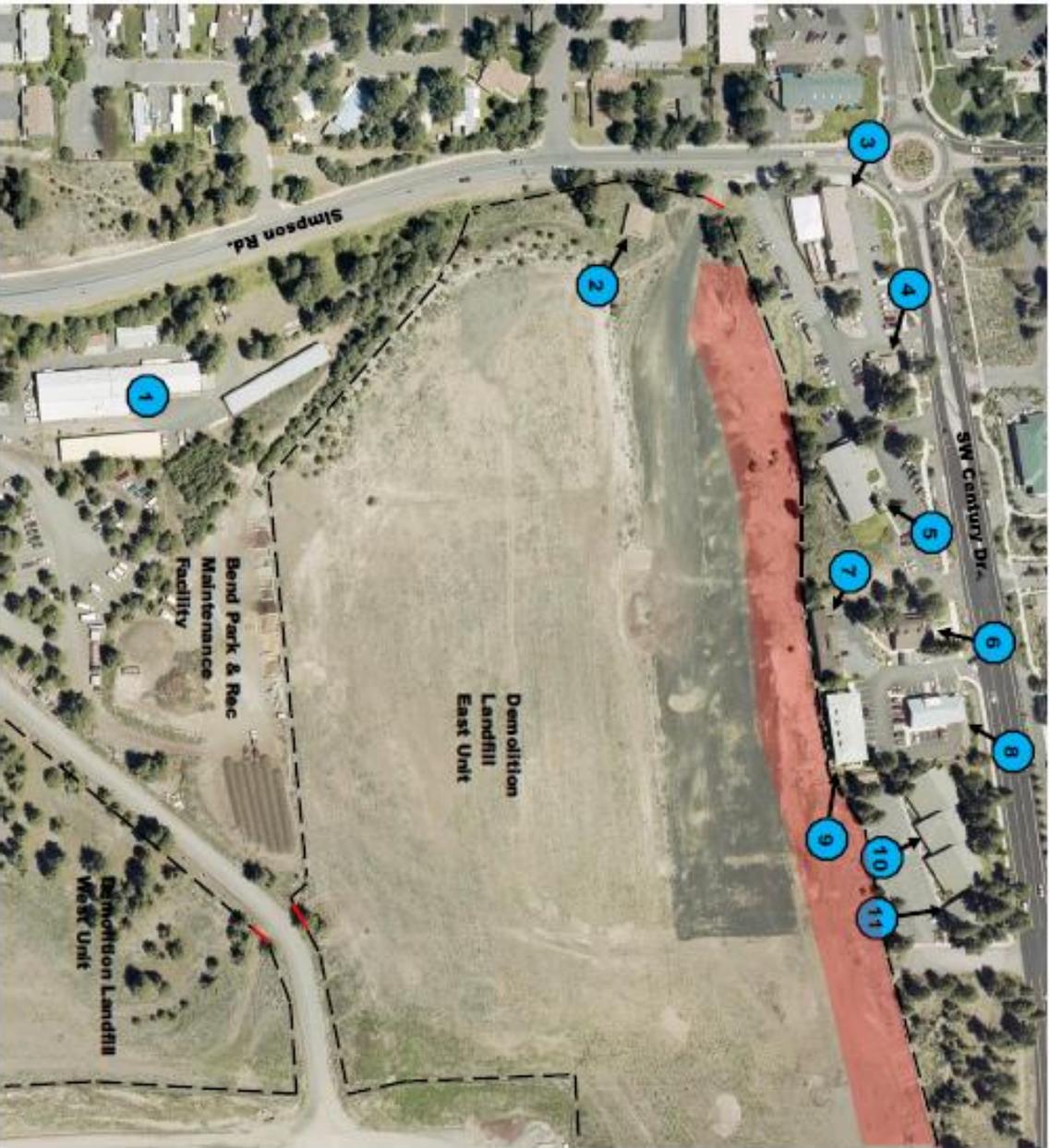


FIGURE 2.
Bend Demolition Landfill
Structure Monitoring



LEGEND

 **High Hazard Area**

Area subject to sudden surface failure, sinkhole formation, settlement cracking. Foot and vehicle travel not advised

 **Gate**

 **Fence**

-  **1** Bend Park & Rec Maintenance Facility
-  **2** Restroom (unmanned building)
-  **3** 311 S. Century Drive
-  **4** 335 S. Century Drive
-  **5** 339 S. Century Drive
-  **6** 345A S. Century Drive
-  **7** 345B S. Century Drive
-  **8** 359 S. Century Drive
-  **9** 377 S. Century Drive
-  **10** 387A S. Century Drive
-  **11** 397B S. Century Drive