

# King County Department of Natural Resources and Parks Solid Waste Division

Phase 1 – Vashon Island Closed Landfill  
CONTRACT NO. E00102E08  
Task No. 310.1.7.6 - D310.1.7.6.4

## Landfill Gas Extraction Well Installation Technical Memorandum

**Prepared by**

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**King County**

Department of  
Natural Resources and Parks  
**Solid Waste Division**

<i>Waste</i> <b>Prevention</b>	<i>Resource</i> <b>Recovery</b>	<i>Waste</i> <b>Disposal</b>
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[www.kingcounty.gov/solidwaste](http://www.kingcounty.gov/solidwaste)

August 10, 2018  
**FINAL**





# VASHON ISLAND CLOSED LANDFILL - LANDFILL GAS EXTRACTION WELL INSTALLATION TECHNICAL MEMORANDUM

Contract No. E00102E08

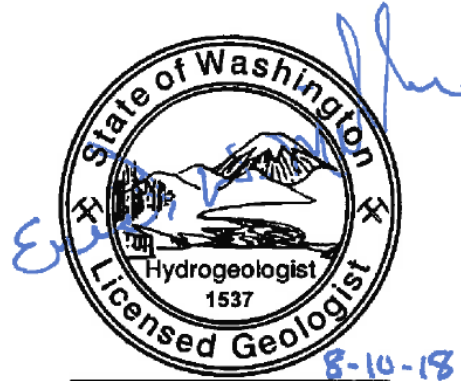
Prepared for: King County Solid Waste Division

Project No. 090057 Task 310.1.7.6 • August 10, 2018 Final

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# 1 Introduction

This Technical Memorandum (Tech Memo) summarizes the installation of two landfill gas (LFG) extraction wells at the Vashon Island Closed Landfill (VLF; the Site; see Figure 1). The installation described in this Tech Memo further expands the existing LFG collection system in order to capture LFG south of the main closure area (Figure 2). The work was designed based on the findings of Task 310.1.7.7, Evaluation of Refuse Areas External to Main Closure Area, and completed according to the amended Task D310.1.7.6.1, “Final Landfill Gas Extraction Well Installation Work Plan Addendum” (Work Plan Addendum; Aspect, 2018a), which is an addendum to the original “Vashon Landfill – Landfill Gas Extraction Well and Temporary Gas Probe Installation Work Plan” (Aspect, 2016b). This work was completed under Task 3.1.7.6, LFG Extraction Well and Temporary Probe Installation (South Slope), of Amendment 10 under King County Contract No. E00102E08 with Aspect Consulting, LLC (Aspect). Activities under this task consisted of the following:

- **Predrilling activities**, including initial Site visit, siting borings, and utility locates of drilling locations.
- **Drilling and installation of LFG extraction wells (GW-10 and GW-11)**, screened within the refuse along the south slope.
- **Site restoration**, disturbed grassy areas were restored to predrilling conditions.
- **Managing investigative-derived waste.**

## 2 Predrilling Activities

Prior to the commencement of field work, drilling locations were field-staked with project engineer from King County Solid Waste Division (KCSWD; County), Aspect, and the drilling contractor, Holt Services (Holt). Public and private utility locates were conducted prior to drilling.

## 3 Landfill Gas Extraction Well Installation

Methods for drilling and installing LFG extraction wells GW-10 and GW-11 are described below.

### 3.1 Drilling Methods

The two LFG extraction wells were installed using a dual-casing rotosonic drilling system that allows the collection of continuous-core soil samples. During drilling,

samples for soil classification and field screening were collected continuously in up to 10-foot lengths using a 6-inch-diameter inner core barrel and an 8-inch-diameter outer casing. No water was encountered in the boreholes during drilling. Holt provided the water necessary for drilling activities from an off-site source.<sup>1</sup>

Soil samples and cuttings were field-screened for the presence of volatile organic compound (VOC) vapors using a MiniRae 3000 photoionization detector (PID). The PID is designed to detect and measure VOC vapors in air, but it does not detect methane. The VOC concentrations were used to monitor worker health and safety during drilling, and to monitor VOCs present in the soil or refuse encountered during drilling. A LandTec GEM 2000 LFG meter was used to monitor methane, carbon dioxide, and oxygen concentrations. A hydrogen sulfide (H<sub>2</sub>S) meter was used to monitor H<sub>2</sub>S concentrations during drilling. LFG and H<sub>2</sub>S measurements were taken from the top of the drill casing after each sample run, and periodic ambient air measurements were recorded as part of Health and Safety monitoring. PID and methane levels in the breathing zone were below concentrations that would trigger mitigation or work stoppage, as specified in the “Vashon Landfill – Project-specific Health and Safety Plan” (Aspect, 2018b). The gas monitoring logs are available in Appendix A. Field logs were reviewed by the Aspect lead hydrogeologist and used to create the final boring and gas probe construction logs included in Appendix B. A summary of landfill gas temporary probe construction details is shown in Table 1.

Soil samples were collected from the inner core barrel during sonic drilling, which provides a near-continuous section of cored soil. The sonic core was carefully extruded from the inner core barrel into a plastic wrap at ground surface to preserve sample moisture content and laid out onto the sample collection and logging area. The plastic wrap was cut open, and the resulting core segment logged by the Aspect field geologist on-Site, including PID field screening. Sample descriptions were made in general accordance with ASTM International (ASTM) Method D2488, *Standard Practice for Description and Identification of Soils* (Visual/Manual Procedure). All information pertaining to the borings was recorded on field boring logs, including PID field screening results. The core was subsampled at 5-foot intervals and at lithologic changes, and then placed in chip trays for archiving. Core samples and chip trays were photographed. These photo logs are available in Appendix C. Soil cuttings were stored in dedicated roll-off containers and managed as described in Section 5.0 – Investigative-Derived Waste.

To ensure targeted depths of new locations were achieved during drilling, an Aspect field geologist was on-Site collecting soil samples, logging cores, measuring water levels, and interpreting stratigraphy. These interpretations were based on the conceptual site model (CSM), including geologic and groundwater conditions encountered during previous investigations conducted at the South Slope area. Aspect’s lead engineer and field

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<sup>1</sup> The source of water was previously sampled on January 12, 2016, during drilling activities at the Hobart Landfill, submitted to the King County Environmental Laboratory for analysis of groundwater quality parameters, and results were documented in Appendix C of the “Hobart Landfill – Piezometer and Transducer Installation Technical Memo” (Aspect, 2016a). The laboratory results indicated no VOCs were detected, and the water source was considered appropriate for drilling purposes.

geologist were in close communication to ensure that accurate stratigraphic interpretations were made.

## 3.2 Landfill Gas Extraction Well Installation

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Two LFG extraction wells were installed in accordance with the Work Plan Addendum (Aspect, 2018a). GW-10 was installed between existing temporary gas probes VTP-4S and VTP-5S, and GW-11 was installed between VTP-5D and VTP-7 (Figure 3). Both wells were screened within the refuse. KCSWD will connect the wellheads at GW-10 and GW-11 into the existing LFG collection system at the EF-1 header to support influence testing and LFG collection using an aboveground lateral.

Boreholes were drilled into native material to define the full refuse thickness. The overdrilled section below the base of the well completions were backfilled and sealed with hydrated bentonite chips. In GW-10, the bottom seal extends from the borehole total depth of 35 feet (ft) below ground surface (bgs) up to 29.5 ft bgs. In GW-11, the bottom seal extends from the borehole total depth of 25 ft bgs to 18 ft bgs.

The LFG extraction wells were completed with a 4-inch-diameter HDPE well casing with a perforated HDPE screen. The screen consists of four 0.5-inch-diameter drilled perforations surrounding the circumference of the casing for every 6 inches of screen length, and a 0.75-inch to 1-inch gravel filter pack. The perforated HDPE screen was welded to an endcap horizontally prior to installation downhole. Once the casing and endcap were fused, the casing was installed at the appropriate depth, and additional HDPE well casing was welded vertically, as needed. The aboveground completion, including the 2-inch-diameter HDPE tee-joint and flange gasket, was welded to the top of the casing to provide adequate stick-up above ground surface.

The screened interval for GW-10 was installed from 15.5 to 28.5 ft bgs and spans approximately 68 percent of the observed refuse thickness with a minimum of 2 ft separation between the top and bottom of refuse to reduce ambient air intrusion to LFG collection. The screened interval for GW-11 was installed from 10.5 to 17 ft bgs and spans approximately 54 percent of the observed refuse thickness with a minimum of 2 ft separation between the top and bottom of refuse to reduce ambient air intrusion to LFG collection. The annular space surrounding the screen was backfilled with a gravel pack. The gravel pack extends from 1 ft below the screen to 1 ft above the screen in both wells.

The upper annular space above the gravel pack was sealed with hydrated bentonite chips. In GW-10, the bentonite seal extends from a depth of 14.5 ft to within approximately 2 ft bgs. In GW-11, the bentonite seal extends from a depth of 9.5 ft to within approximately 2 ft bgs. As the bentonite chips were placed, they were continuously sounded to ensure bridging was not occurring. Water used for hydrating the bentonite chips was provided by Holt. The upper 2 ft of each well was backfilled with a concrete surface seal to provide additional support for the HDPE casing.

At each extraction well, a LFG extraction wellhead assembly was constructed aboveground that included a sealed top flange and a 4-by-4-by-2-inch tee for connection to the LFG collection system. The wellhead was temporarily capped to prevent

unintended discharge of LFG to the atmosphere or inflow of atmospheric air into the refuse.

After extraction well installation, the drilling site was restored to its original condition to the extent feasible. The driller decontaminated drilling equipment at a designated decontamination pad between extraction well borings. As described in the variance approved from the Washington State Department of Ecology (Appendix D), bollards were not installed because the extraction wells were located in an area that is inaccessible to vehicular traffic and mowing equipment.

Methane was monitored during installation of GW-10 and GW-11 as presented in Appendix A. The boring and extraction well installation log is available in Appendix B and includes final survey data. Photos of the completed GW-10 and GW-11 are included in Appendix E. The final survey data provided by the County is included in Appendix F.

## 4 Erosion Control and Site Restoration

During drilling, Holt utilized lumber for cribbing to protect a nearby drainage ditch from damage. Holt restored the site to its original condition at the conclusion of drilling.

## 5 Investigative-Derived Waste

All drill cuttings from the drilling and installation of the extraction wells were contained in a roll-off container designed for hauling to an approved facility following designation sampling. The roll-off container will be disposed of at the Cedar Hills Regional Landfill according to County waste clearance requirements.

All water generated during the drilling and decommissioning activities was temporarily contained in Washington State Department of Transportation-approved 55-gallon drums. The water generated during drilling was removed by a County vector truck for disposal.

## 6 Decontamination Procedures

Equipment used for drilling or making measurements in boreholes was decontaminated prior to use on-Site and decontaminated between extraction well locations. Drilling equipment was decontaminated by Holt using a mobile hot-water, high-pressure washer, buckets, and brushes.

Any sampling equipment used in the boreholes, such as water level indicators, was decontaminated after use at each borehole location. The decontamination procedure consisted of spraying Alconox or other nonphosphate detergent on the equipment,

scrubbing the equipment with a brush, rinsing it thoroughly with potable water, and then rinsing it thoroughly with distilled water.

## 7 Findings and Path Forward

Soil conditions on the South Slope consisted of 7.5 to 12 ft of silty sands, which are likely placed-fill materials. Below these silty sands was landfill refuse in depths ranging from 12.5 ft bgs (GW-10) to 7.5 ft bgs (GW-11). Below the landfill debris was Vashon Advance Outwash sands, known as Unit B in the CSM. Initial gas monitoring results (provided in Appendix A) indicate that some LFG was detected at GW-11 during drilling.

Task 310.1.6.4, Influence Testing, will evaluate LFG concentrations in the new LFG extraction wells based on the monitoring proposed in Task D310.1.6.4.1, “Draft Influence Testing Work Plan.” The Influence Testing of the new extraction wells will be conducted for 3 months and the results will be presented in Task D310.1.6.4.5, “Influence Testing Summary Report.”

## 8 References

- Aspect Consulting, LLC (Aspect), 2016a, Hobart Landfill – Piezometer and Transducer Installation Technical Memo, Contract No. E00102E08, Prepared for King County Solid Waste Division, June 1, 2016.
- Aspect Consulting, LLC (Aspect), 2016b, Vashon Landfill – Landfill Gas Extraction Well and Temporary Gas Probe Installation Work Plan, Contract No. E00102E08, Prepared for King County Solid Waste Division, July 8, 2016.
- Aspect Consulting, LLC (Aspect), 2018a, Vashon Landfill – Landfill Gas Extraction Well Installation Work Plan Addendum, Contract No. E00102E08, Prepared for King County Solid Waste Division, June 12, 2018.
- Aspect Consulting, LLC (Aspect), 2018b, Vashon Landfill – Project-specific Health and Safety Plan, June 21, 2018.

## Limitations

Work for this project was performed for the King County Solid Waste Division (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

**Please refer to Appendix G titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.**

# TABLES



# Table 1. Summary of Landfill Gas Temporary Probe Construction Details

Project No. 090057-310.1.7.6.4, Vashon Island Closed Landfill, King County, Washington

Well ID	Ground Surface Elevation	Depth of Refuse		Gravel Pack		Perforated Screen Interval		Screen Length
		Top	Bottom	Top	Bottom	Top	Bottom	
	feet	feet bgs	feet bgs	feet bgs	feet bgs	feet bgs	feet bgs	feet
<b>GW-10</b>	359.9	12.5	31.5	14.5	29.5	15.5	28.5	13
<b>GW-11</b>	360.2	7.5	20	9.5	18.0	10.5	17.0	6.5

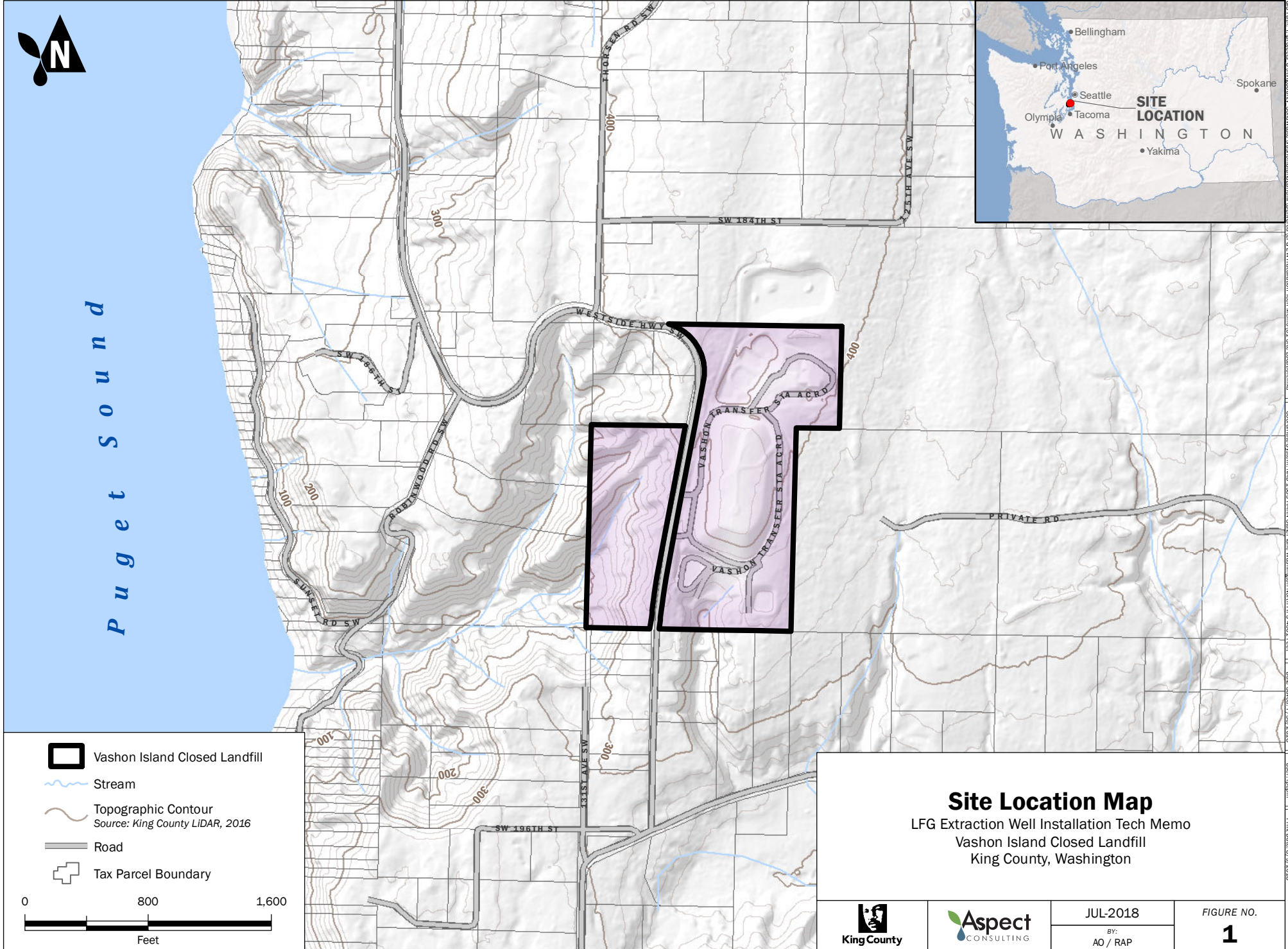
**Notes:**






bgs - below ground surface

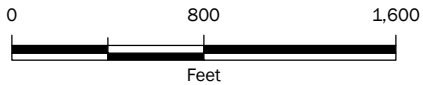
# FIGURES



P u g e t S o u n d



-  Vashon Island Closed Landfill
-  Stream
-  Topographic Contour  
Source: King County LiDAR, 2016
-  Road
-  Tax Parcel Boundary



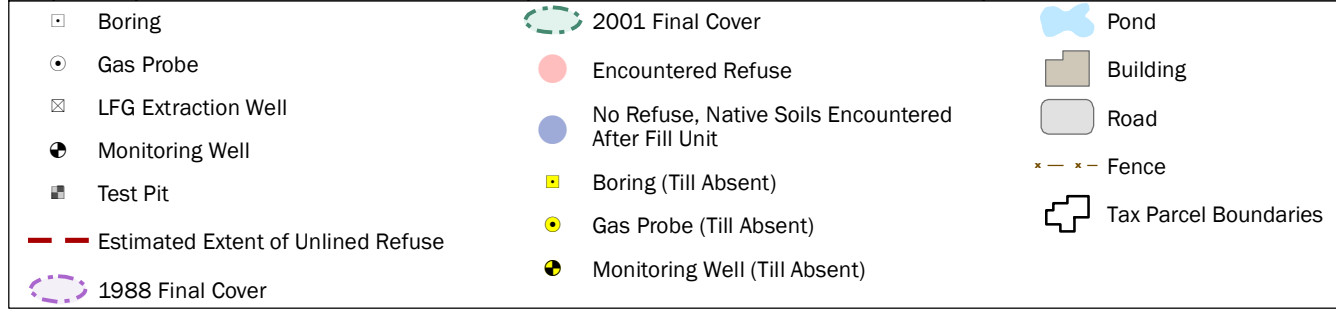
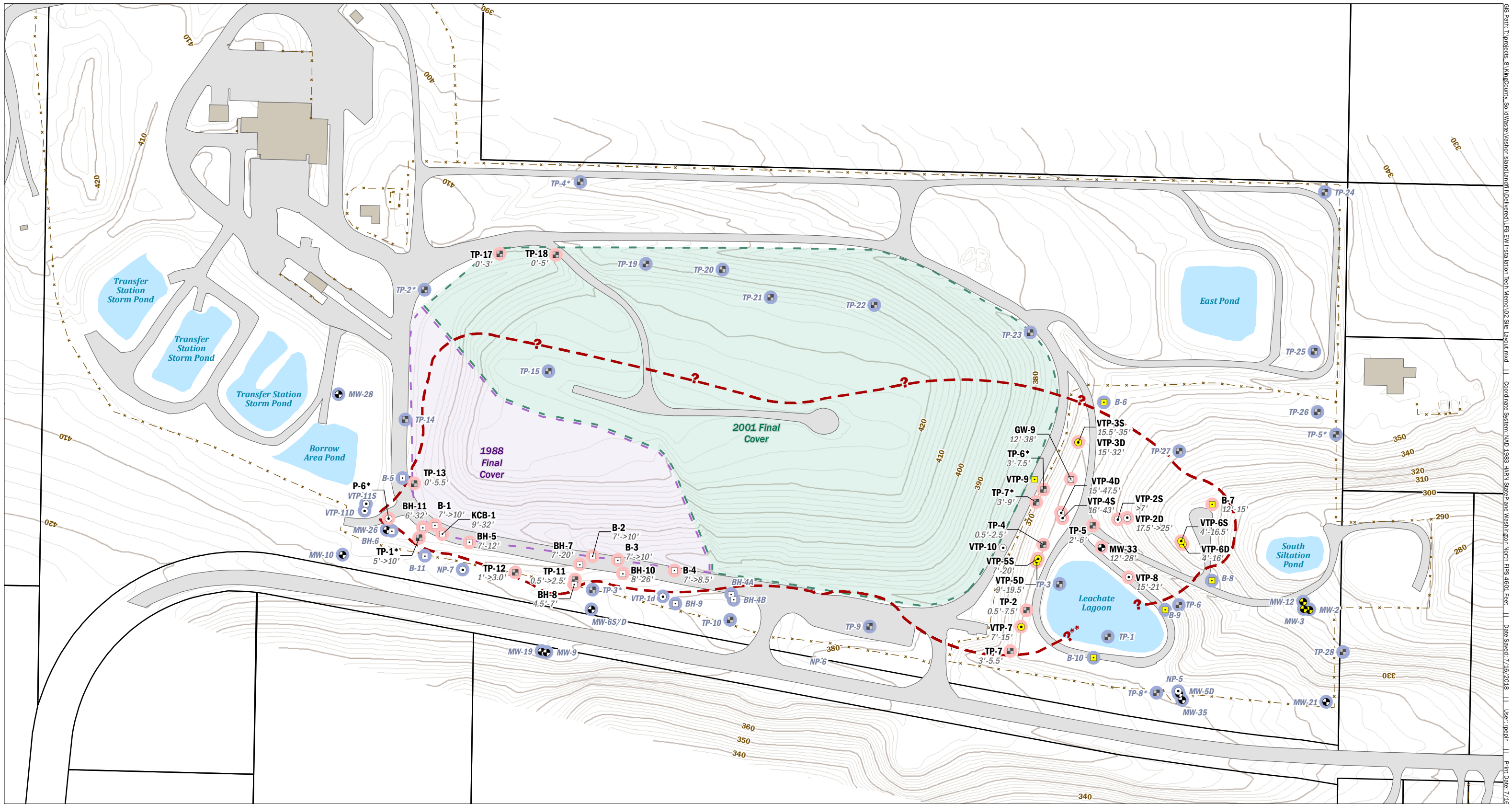
**Site Location Map**  
 LFG Extraction Well Installation Tech Memo  
 Vashon Island Closed Landfill  
 King County, Washington



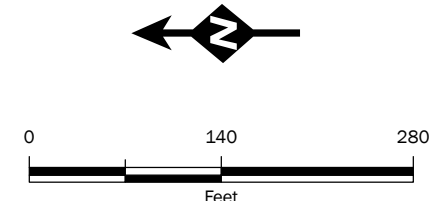
JUL-2018  
 BY:  
 AO / RAP

FIGURE NO.  
**1**





Notes:  
 \*Exploration from Golder 1986  
 \*\*TP-1 and TP-3, completed in 1987, indicates refuse does not extend under Leachate Lagoon  
 -For explorations where refuse was not encountered and underlying native soils were not encountered, a blue or red halo was not applied to those explorations. These explorations were likely too shallow to provide data on refuse extent.  
 -Topographic contours from King County Survey, Spring 2017

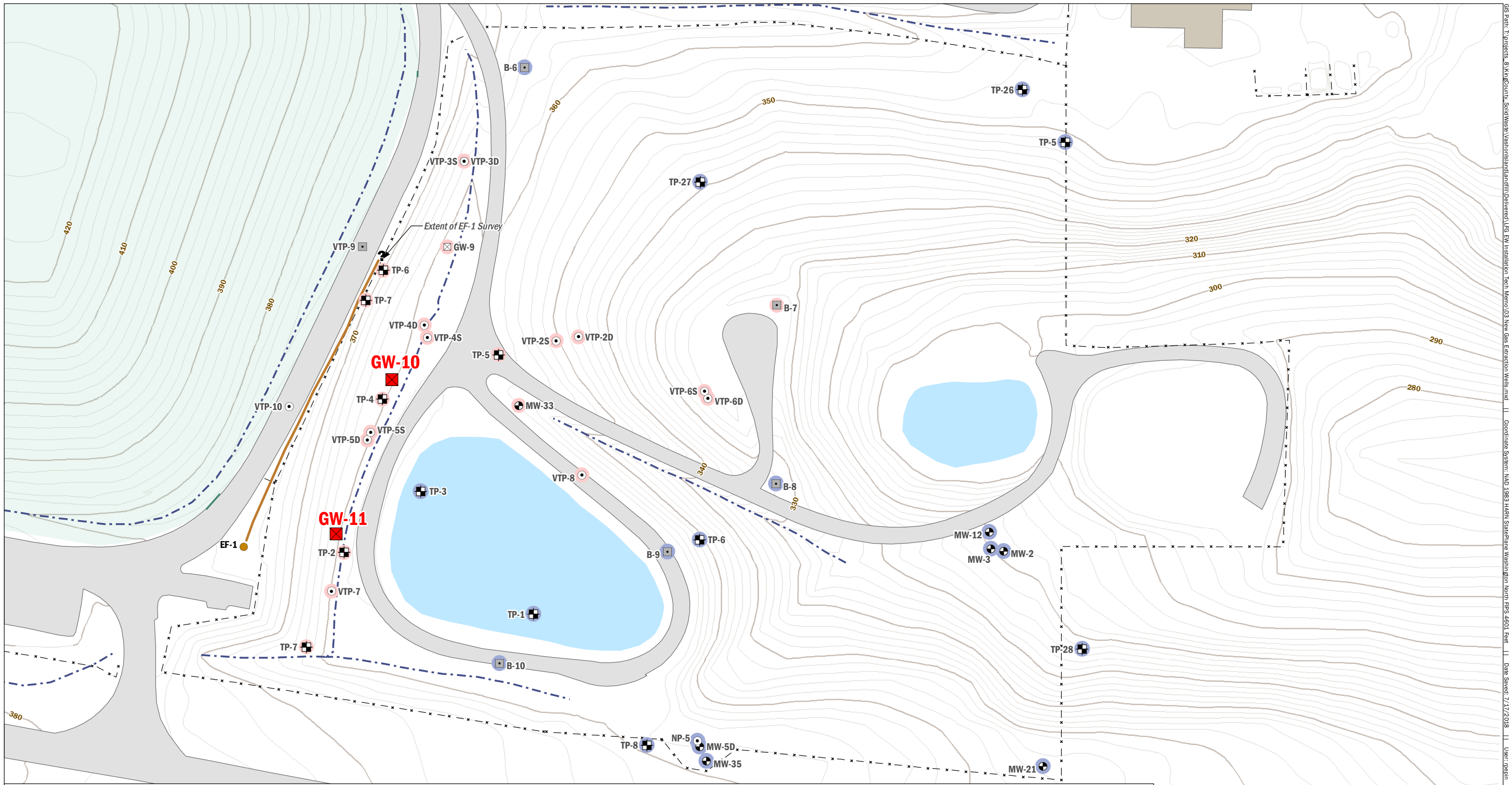


## Site Layout

LFG Extraction Well Installation Tech Memo  
 Vashon Island Closed Landfill  
 King County, Washington

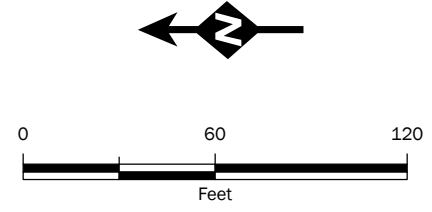
		JUL-2018	FIGURE NO. <b>2</b>
		BY: AO / RAP	

GIS Path: T:\projects\_8\KingCounty\_SolidWaste\WashonIsland\landfill\Online\UGR\_EW\_Installation\_Tech\_Memo\_02\_Site\_Layout.mxd | Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet | Date Saved: 7/16/2018 | User: rapain | Print Date: 7/16/2018



<p><b>New Exploration</b></p> <ul style="list-style-type: none"> <li><span style="color: red;">■</span> LFG Extraction Well</li> </ul>	<p><b>Existing Exploration</b></p> <ul style="list-style-type: none"> <li><span style="border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span> Boring</li> <li><span style="border: 1px solid black; border-radius: 50%; width: 10px; height: 10px; display: inline-block;"></span> Gas Probe</li> <li><span style="border: 1px dashed black; border-radius: 50%; width: 10px; height: 10px; display: inline-block;"></span> LFG Extraction Well</li> <li><span style="border: 1px solid black; border-radius: 50%; width: 10px; height: 10px; display: inline-block; text-align: center;">+</span> Monitoring Well</li> <li><span style="border: 1px solid black; width: 10px; height: 10px; display: inline-block; text-align: center;">+</span> Test Pit</li> </ul>	<ul style="list-style-type: none"> <li><span style="border: 1px solid red; border-radius: 50%; width: 10px; height: 10px; display: inline-block;"></span> Encountered Refuse</li> <li><span style="border: 1px solid blue; border-radius: 50%; width: 10px; height: 10px; display: inline-block;"></span> No Refuse Encountered</li> <li><span style="border: 1px dashed green; border-radius: 50%; width: 10px; height: 10px; display: inline-block;"></span> 2001 Final Cover</li> <li><span style="color: orange;">●</span> EF-1</li> <li><span style="border-bottom: 1px solid orange; width: 20px; display: inline-block;"></span> Landfill Gas System Pipe <i>Partial System Shown Query indicates Landfill Gas Pipe Location Beyond Survey Limits Unknown</i></li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: lightblue; border-radius: 50%;"></span> Pond</li> <li><span style="border-bottom: 1px dashed blue; width: 20px; display: inline-block;"></span> Ditch</li> <li><span style="border-bottom: 1px dashed black; width: 20px; display: inline-block;"></span> Fence</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: lightgrey; border: 1px solid black;"></span> Road</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: lightgrey; border: 1px solid black;"></span> Building</li> </ul>
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*Approximate proposed explorations locations shown. Exact locations contingent on accessibility.*



### New Gas Extraction Wells

LFG Extraction Well Installation Tech Memo  
Vashon Island Closed Landfill  
King County, Washington

		JUL-2018 BY: AO / RAP	FIGURE NO. <b>3</b>
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GIS Path: T:\projects\_8\KingCounty\_SolidWaste\WashonIsland\GIS\Deliverables\EF-1\Installation\_Tech\_Memo\03 New Gas Extraction Wells.mxd | Coordinate System: NAD 1983 NADN StatePlane Washington North FIPS 4601 Feet | Date Saved: 7/17/2018 | User: rapin | Print Date: 7/17/2018

# **APPENDIX A**

## **Field Logs**





## **APPENDIX B**

### **Landfill Gas Extraction Well Construction and Boring Logs**



Soil Classification		Terms Describing Relative Density and Consistency		
		Density	SPT <sup>(2)</sup> blows/foot	
Coarse-Grained Soils - More than 50% Retained on No. 200 Sieve	Gravels - More than 50% <sup>(1)</sup> of Coarse Fraction Retained on No. 4 Sieve	Well-graded gravel and gravel with sand, little to no fines	Very Loose 0 to 4	
	Sands - 50% <sup>(1)</sup> or More of Coarse Fraction Passes No. 4 Sieve	GP	Poorly-graded gravel and gravel with sand, little to no fines	Loose 4 to 10
		GM	Silty gravel and silty gravel with sand	Medium Dense 10 to 30
	Fine-Grained Soils - 50% or More Passes No. 200 Sieve	GC	Clayey gravel and clayey gravel with sand	Dense 30 to 50
		SW	Well-graded sand and sand with gravel, little to no fines	Very Dense >50
			SP	Poorly-graded sand and sand with gravel, little to no fines
SM		Silty sand and silty sand with gravel		
Highly Organic Soils	SC	Clayey sand and clayey sand with gravel		
	ML	Silt, sandy silt, gravelly silt, silt with sand or gravel		
		CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay	
			OL	Organic clay or silt of low plasticity
	MH	Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt		
		CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel	
Highly Organic Soils	OH	Organic clay or silt of medium to high plasticity		
	PT	Peat, muck and other highly organic soils		

Component Definitions	
Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

Estimated Percentage		Moisture Content
Percentage by Weight	Modifier	
<5	Trace	Dry - Absence of moisture, dusty, dry to the touch
5 to 15	Slightly (sandy, silty, clayey, gravelly)	Slightly Moist - Perceptible moisture
15 to 30	Sandy, silty, clayey, gravelly	Moist - Damp but no visible water
30 to 49	Very (sandy, silty, clayey, gravelly)	Very Moist - Water visible but not free draining
		Wet - Visible free water, usually from below water table

Symbols	
Sampler Type	Description
2.0" OD Split-Spoon Sampler (SPT)	Continuous Push
Bulk sample	Non-Standard Sampler
Grab Sample	3.0" OD Thin-Wall Tube Sampler (including Shelby tube)
	Portion not recovered

Groundwater Symbols	
Symbol	Description
▽	ATD = At time of drilling
▽	Static water level (date)
▽	BGS = below ground surface

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

	<h1>Exploration Log Key</h1>	DATE: _____	PROJECT NO. _____
		DESIGNED BY: _____	
		DRAWN BY: _____	FIGURE NO. _____
		REVISED BY: _____	<b>B-1</b>



# King County Vashon Island Landfill - 090057

# Monitoring Well Log

Project Address & Site Specific Location  
18900 Westside Highway SW, Vashon, WA 98070, North of leachate lagoon, between VTP-4S and VTP-5S.

Coordinates (SPN NAD83 ft)

E: -122.500 N: 47.4340

Exploration Number

## GW-10

Ecology Well Tag No. BKX482

Contractor

Holt Services, Inc.

Equipment

Rotary drill rig

Sampling Method

Rotary core

Ground Surface (GS) Elev. (NAVD88)

359.9499'

Operator

Pete

Exploration Method(s)

Sonic

Work Start/Completion Dates

6/25/2018 to 6/26/2018

Top of Casing Elev. (NAVD88)

363.7966'

Depth to Water (Below GS)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
		Sealed top flange gasket						
		HDPE Tee-joint						
0	360	Concrete surface seal, 0 to 2 feet bgs			PID = 5.7		<b>FILL</b> SILTY SAND WITH GRAVEL (SM); Moist, light brown; medium to coarse gravels, fine to coarse sand, non-cohesive material.	0
		4-inch Sch 80 HDPE, +3.85 to 15.5 feet bgs			PID = 20.8		Geotextile fabric observed at 3.5 feet bgs	
5	355	3/8-inch bentonite chip backfill, 2 to 14.5 feet bgs			PID = 8.0		SANDY SILT WITH GRAVEL (ML); Moist, dark gray; fine to coarse sands, medium to coarse gravels, more cohesive.	5
10	350				PID = 20.2 CH4 = 0.0		SILTY SAND WITH GRAVEL (SM); Moist, dark gray; fine to coarse gravels with cobbles, fine to coarse sand.	10
					PID = 57.8		SAND WITH SILT (SP-SM); Moist, light brown; fine to coarse sand.	
15	345	3/4-inch to 1-inch gravel filter pack, 14.5 to 29.5 feet bgs			PID = 112.5		<b>LANDFILL DEBRIS</b> SILTY SAND WITH GRAVEL (SM); Moist, dark gray to black; plastic bags, plastic, glass, metal scraps.	15
		4-inch Sch 80 HDPE screen with 1/2-inch perforations, 15.5 to 28.5 feet bgs			PID = 29.0		Debris includes red plastic, red painted lumber, plywood, woody debris, metal scraps.	
20	340				PID = 33.9 CH4 = 0.0		Debris includes glass, plastic bags, textiles, woody debris, newspaper	20

### Legend

Continuous core 7" ID

Water Level

No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: ACO  
Approved by: MVA/PSB

**Exploration Log**  
**GW-10**

Sheet 1 of 2



# King County Vashon Island Landfill - 090057

# Monitoring Well Log

*Project Address & Site Specific Location*  
 18900 Westside Highway SW, Vashon, WA 98070, North of leachate lagoon, between VTP-4S and VTP-5S.

*Coordinates (SPN NAD83 ft)*

*Exploration Number*

E: -122.500 N: 47.4340

**GW-10**

*Contractor*  
Holt Services, Inc.

*Equipment*  
Rotary drill rig

*Sampling Method*  
Rotary core

*Ground Surface (GS) Elev. (NAVD88)*  
359.9499'

Ecology Well Tag No. BKX482

*Operator*  
Pete

*Exploration Method(s)*  
Sonic

*Work Start/Completion Dates*  
6/25/2018 to 6/26/2018

*Top of Casing Elev. (NAVD88)*  
363.7966'

*Depth to Water (Below GS)*  
No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
25	335	Welded endcap  Backfilled with bentonite chips to 35 feet bgs			PID = 59.6		<b>LANDFILL DEBRIS</b> SILTY SAND WITH GRAVEL (SM); Moist, dark gray to black; plastic bags, plastic, glass, metal scraps. (continued) Debris includes blue plastic jugs, glass, aluminum cans, lumber, egg cartons, concrete	25
	PID = 85.5				Debris includes charcoal, ash debris, glass, metal, burned paper (appears visibly burnt)			
	PID = 37.1				Debris includes blue plastic, glass, wood debris			
30	330				PID = 14.4 CH4 = 0.0		SILTY SAND (SM); Moist, light brown; charcoal debris, trace lumber debris	30
35	325				PID = 8.8		<b>Vashon Advance Outwash/B unit</b> SAND (SP); Moist, light brown; trace silt, fine to coarse sand, trace fine to coarse gravels, no visible landfill debris.	35
					PID = 4.1		Bottom of exploration at 35 ft. bgs.	
40	320							40
45	315							45

**Legend**

Continuous core 7" ID

Water Level

No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: ACO  
 Approved by: MVA/PSB

**Exploration Log GW-10**

Sheet 2 of 2



# King County Vashon Island Landfill - 090057

Project Address & Site Specific Location  
18900 Westside Highway SW, Vashon, WA 98070, Northwest of leachate lagoon, between VTP-7 and VTP-5D.

## Monitoring Well Log

Coordinates (SPN NAD83 ft)

E: -122.501 N: 47.4341

Exploration Number

### GW-11

Ecology Well Tag No. BKX483

Contractor

Holt Services, Inc.

Equipment

Rotary drill rig

Sampling Method

Rotary core

Ground Surface (GS) Elev. (NAVD88)

360.1557'

Operator

Pete

Exploration Method(s)

Sonic

Work Start/Completion Dates

6/25/2018 to 6/26/2018

Top of Casing Elev. (NAVD88)

363.6807'

Depth to Water (Below GS)

No Water Encountered

Depth (feet)	Elev. (feet)	Exploration Completion and Notes	Sample Type/ID	Analytical Sample Number & Lab Test(s)	Field Tests	Material Type	Description	Depth (ft)
0	360	Sealed top flange gasket HDPE Tee-joint Concrete surface seal, 0 to 2 feet bgs					TOPSOIL; Dry, light brown; root mass, non-cohesive material.	0
5	355	4-inch Sch 80 HDPE, +3.53 to 10.5 feet bgs 3/8-inch bentonite chip backfill, 2 to 9.5 feet bgs			PID = 3.2		<b>FILL</b> SAND WITH SILT AND GRAVEL (SW-SM); Moist, dark brown; fine to coarse sand, fine to coarse gravels, minor orange staining.	5
10	350	3/4-inch to 1-inch gravel filter pack, 9.5 to 18 feet bgs 4-inch Sch 80 HDPE screen with 1/2-inch perforations, 10.5 to 17 feet bgs			PID = 3.2 PID = 11.1		Geotextile fabric at 6.5 feet bgs <b>LANDFILL DEBRIS</b> SILTY SAND WITH GRAVEL (SM); Moist, dark brown to black; debris includes plastic, metal, glass shards, brick, plastic dish gloves.	10
15	345	Welded endcap			PID = 7.0 CH4 = 1.1 PID = 35.0 PID = 290.0		Debris includes wood debris, plastic, metal Debris includes fiberglass, shredded paper, metal wires	15
20	340	Backfilled with bentonite chips to 25 feet bgs			PID = 132.1 PID = 202.7 CH4 = 0.0 PID = 19.3		Debris includes plastic, plastic bags, cardboard, lumber SAND (SP); Moist, dark blue-gray; trace gravel, and trace plastic debris. <b>Vashon Advance Outwash/B Unit</b> SAND (SW); Moist, dark gray; trace gravel and trace silt, no debris observed, noticeable refuse odor.	20
25	335				PID = 11.9		Bottom of exploration at 25 ft. bgs.	25

### Legend

Continuous core 7" ID

Water Level

No Water Encountered

See Exploration Log Key for explanation of symbols

Logged by: ACO  
Approved by: MVA/PSB

**Exploration Log**  
**GW-11**

Sheet 1 of 1

## **APPENDIX C**

### **Boring Photo Logs**

GW-10 Photo Log





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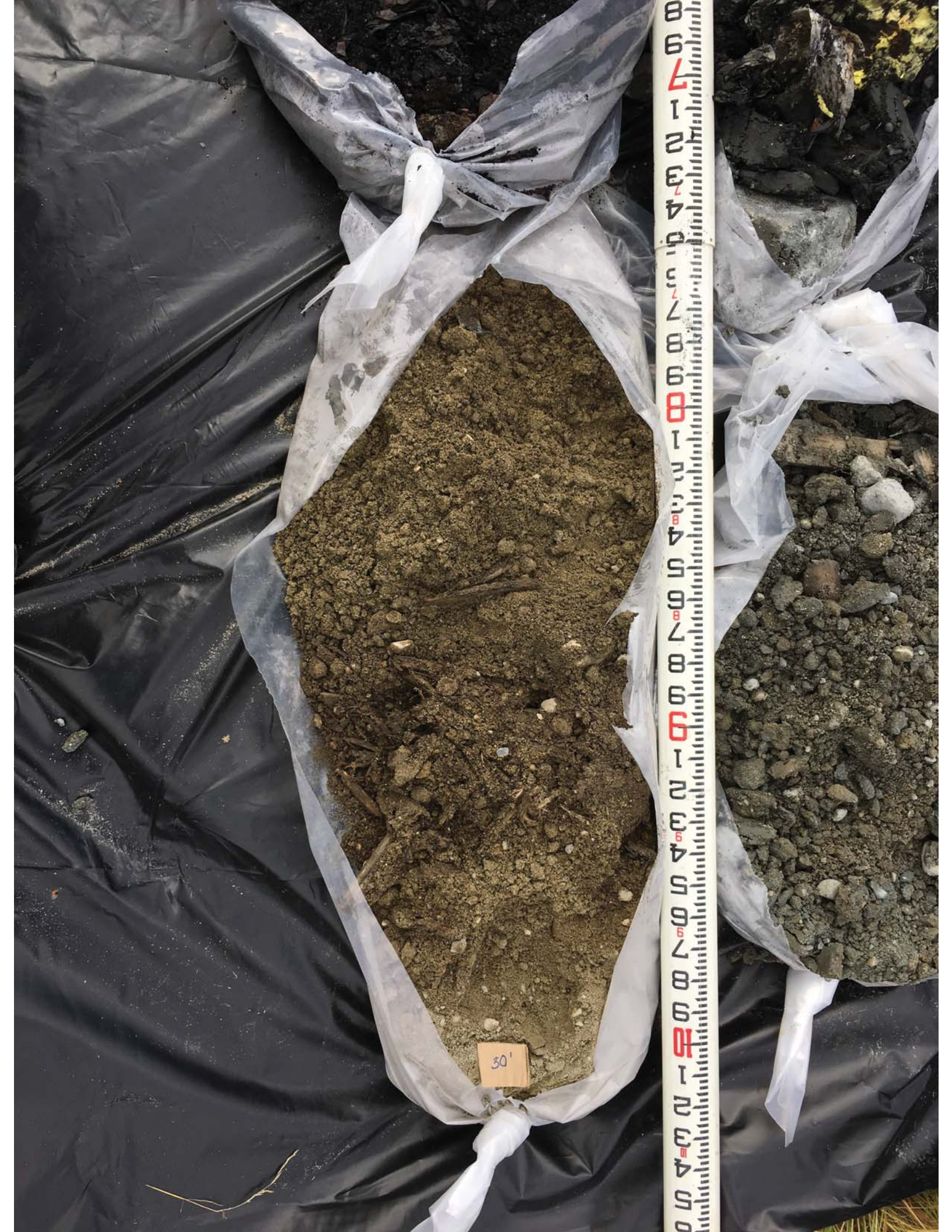
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GW-11  
Photo Log













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## **APPENDIX D**

**WAC 173-160-420**

**Variance Request and Approval**



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000  
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

June 1, 2018

Peter S. Bannister  
Aspect Consulting  
for King County Solid Waste Division  
350 Madison Ave. N  
Bainbridge Island, WA 98110

**CERTIFIED MAIL**

**RE:** Variance request from Washington Administrative Code (WAC) 173-160-420, surface protection requirements for resource protection wells. The property address is 18900 Westside Hwy SW, Vashon Island, in the NW  $\frac{1}{4}$  NW  $\frac{1}{4}$  of Section 36, Township 23 North, Range 02 East, W.M., in King County.

Dear Mr. Bannister:

The variance you requested to WAC 173-160-420, which details surface protection requirements for resource protection wells, is **granted** in accordance with WAC 173-160-106, to allow for construction of the two wells in the manner described in your variance request. This variance **expires December 31, 2018** and is granted with the following provisions:

1. A "Notice of Intent to Construct a Resource Protection Well" and fees shall be submitted to the Department of Ecology (Ecology) at PO Box 47611, Olympia, WA, 98504-7611.
2. All other minimum construction standards found in WAC 173-160 shall be followed to prevent degradation of the groundwater resource.
3. A well report containing the details required by WAC 173-160-141 shall be submitted to Ecology at 3190 160<sup>th</sup> Ave SE, Bellevue, WA 98008, within 30 days of completion of work on the well.
4. With the exception of the specific provisions set forth (above) in this variance, all federal, state, and local requirements shall apply.



5. This variance expires **December 31, 2018**. After this date, approval of a new request for variance or an extension must be requested in writing for the work proposed.

Ecology received your variance request via email on May 24, 2018. The request provides a map of the proposed well locations and a picture of the wellhead configuration, showing bollards are not necessary to protect from vehicular traffic, the well is capped, and the existing security of the site is reasonable to deter vandalism. Equal protection of the groundwater resource will occur through compliance with minimum standards for well construction.

You have a right to appeal this action to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this document. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

**To appeal, you must do the following within 30 days of the date of receipt of this document:**

- File your appeal and a copy of this document with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this document on Ecology in paper form - by mail or in person (see addresses below). Email is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk P.O. Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board Environmental Hearings Office 1111 Israel Road SW, Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board P.O. Box 40903 Olympia, WA 98504-0903

Peter S. Bannister  
Aspect Consulting  
for King County Solid Waste Division  
Variance Request  
Page 3

**Please also send a copy of your appeal to:**

Ria Berns  
Department of Ecology  
Northwest Regional Office  
3190 160<sup>th</sup> Avenue SE  
Bellevue, WA 98008

*For additional information, visit the Environmental Hearings Office  
Website: <http://www.eho.wa.gov>*

*To find laws and agency rules, visit the Washington State Legislature Website:  
<http://www1.leg.wa.gov/CodeReviser>*

Your attention to these laws and regulations, and cooperation with the Department of Ecology in this matter, is appreciated. Please telephone Noel S. Philip at (425) 649-7044 or email him at [noel.philip@ecy.wa.gov](mailto:noel.philip@ecy.wa.gov) if you have any questions concerning this variance.

DATED this 1 day of June, 2018, at Bellevue, Washington.

Sincerely,



Ria Berns  
Section Manager  
Water Resources Program

By certified mail: 9171 9690 0935 0203 0511 41

Enclosure: Your Right to be Heard

cc: Noël S. Philip, NWRO WR

I certify that I mailed this Order, or an identical copy thereof, postage prepaid, to the above addressee(s) this 1st day of June, 2018.

W. Holt (SIGNATURE)





WASHINGTON STATE POLLUTION CONTROL HEARINGS BOARD  
ENVIRONMENTAL AND LAND USE HEARINGS OFFICE

**Physical address:**

Environmental and Land Use Hearings Office  
1111 Israel Rd. SW, Ste 301  
Tumwater WA 98501

**Mailing address:**

Environmental and Land Use Hearings Office  
PO Box 40903  
Olympia WA 98504-0903

(360) 664-9160 Fax: (360) 586-2253  
Web Address: <http://www.eluho.wa.gov>  
E-Mail: [eluho@eluho.wa.gov](mailto:eluho@eluho.wa.gov)

**“Your Right to Be Heard”**

**Board Members**

Joan M. Marchioro, Chair  
Kay M. Brown, Member  
Neil Wise, Member

**Administrative Appeals Judge**

Carolina Sun-Widrow  
Heather Francks

**Administrative Manager**

Paulette Yorke  
Case Management/Legal Assistant  
Lynn Eccles  
Administrative Assistant  
Desiree Ortiz  
Office Assistant  
Morgan Pilon

This is your informal guide to your rights and responsibilities in an appeal. It is not exclusive, it is not legal advice, and **does not have force and effect of state law or regulation**. More detailed information, in RCW 43.21B, the act creating the Pollution Control Hearings Board, and in a chapter of the Washington Administrative Code entitled, "Rules of Practice and Procedure of the Pollution Control Hearings Board, WAC 371-08," is available at your county law library or upon request from the Environmental and Land Use Hearings Office and at the Environmental and Land Use Hearings Office website at <http://www.eluho.wa.gov>.

For more detailed information, please open up on the web page the *Frequently Asked Questions and Forms*. ALTERNATE FORMAT AVAILABLE UPON REQUEST

**YOUR RIGHT TO BE HEARD**

The Pollution Control Hearings Board (PCHB) hears appeals from orders and decisions made by:

1. Local and regional air pollution control agencies or authorities.
2. The State Department of Ecology.
3. The Department of Fish and Wildlife (WDFW) pertaining to hydraulic project approval (HPA) decisions.
4. The Department of Natural Resources (DNR) pertaining to forest practices, surface mining, and forest health orders, and
5. Other agencies and orders as provided by law.

The Board's sole function is to give you and all other litigants in a disputed matter an opportunity for a full and complete hearing, as promptly as possible, followed by a fair and impartial written decision based on the facts and law.

The Board is not affiliated with the Department of Ecology or any other agency.

To insure the Board's impartiality, the state Legislature created this independent, quasi-judicial state agency entirely separate from any other state, or regional resource or regulatory agency or local unit of government.

The Board consists of three full-time members, who are appointed by the governor and confirmed by the State Senate for staggered six-year terms. One of the three must be an attorney. All are salaried employees of the State, who also serve on the Shorelines Hearings Board.

**DO YOU NEED AN ATTORNEY?**

An attorney may represent you, but the law does not require one. Consider this very carefully before deciding to represent yourself. The appeal process can be complicated and significant rights may be at stake. The hearings are conducted more like court trials, instead of city council meetings.

**WHEN, WHERE, AND HOW TO FILE AN APPEAL**

No fee is required for filing an appeal.

Generally, the Board must RECEIVE your appeal within 30 days of the "receipt" of the order or decision. "Date of Receipt" is defined in RCW 43.21B.001(2)

If the appeal pertains to a decision or action by a state agency regarding a derelict vessel, the appeal must be filed and served within 30 days of when the state agency acquired custody of the vessel, or within 30 days of the date of redemption if the vessel is redeemed before the agency acquires custody.

Different deadlines apply to some types of decisions made by the Department of Natural Resources pertaining to forest practices. Refer to the Forest Practices Act, Ch. 76.09 RCW for specific information pertaining to the type of decision you want to appeal. Note some deadlines are as short as 15 days. The decision document itself will also generally include appeal information about the timeline for appeal.

An appeal may be filed with the Board by personal deliver and commercial delivery at the physical address, by fax, by electronic

mail, or by first-class, registered mail sent to the mailing address.  
Pollution Control Hearings Board

Physical address:  
1111 Israel Rd. SW, Ste 301  
Tumwater, WA, 98501

Mailing address:  
PO Box 40903  
Olympia WA 98504-0903

Fax:  
360-586-2253

E-Filing address:  
[pchb-shbappeals@eluhw.wa.gov](mailto:pchb-shbappeals@eluhw.wa.gov)

An **ORIGINAL** and one copy should be sent in the mail in addition to the fax filing and e-filing. Mailed and personally served originals should also include one copy.

Within 30 days of receipt of the decision, you must also serve a copy of your appeal with the Department of Ecology or Clean Air Agency or other agency whose order or decision you are appealing.

If you are appealing a decision on a permit, you should also serve a copy of your appeal on the holder of the permit unless you are the permittee.

In some situations pertaining to forest practices a copy of your appeal must also be filed with the attorney general. Refer to the Forest Practices Act, Ch. 76.09 RCW for specific information pertaining to the type of decision you are appealing.

Failure to observe the 30 day deadline for filing with the Board and serving the Department of Ecology or Air Pollution Control Authority or other agency will result in termination and dismissal of the appeal.

Service on all parties shall be by personal service or by mail. Service by mail is effective on the date of mailing; however, filing with the Board is only effective on actual receipt by the Board.

**Filing of the appeal does not stop (stay) the effectiveness of an appealed permit. For information on how to obtain a stay or temporary restraining order for all appeals except for forest practices appeals, please refer to RCW 43.21B.320 and Civil Rules for Superior Court 65 (CR 65).**

#### TEMPORARY SUSPENSION OR DISCONTINUANCE (STAY)

A person appealing a Department of Natural Resources approval under RCW 76.09.205, or any operator, timber owner, or forest landowner appealing a stop work order, may request a temporary suspension or discontinuance of the department's decision. The Appellant must file a motion, supported by affidavit, setting forth specific facts supporting a temporary suspension or discontinuance. Upon receipt of the motion, the presiding officer will schedule a hearing and serve notice of the hearing on all parties.

In emergency situations, a temporary suspension or discontinuance may be granted by the presiding officer without a hearing, only if it clearly appears from specific facts shown by affidavit that immediate and irreparable injury, loss, or damage will result to the moving party before any adverse party can be heard in opposition.

For more information on the temporary suspension or discontinuance process, refer to WAC 223-08-087.

#### CONTENT OF THE APPEAL

Your appeal should include the following items:

- A copy of the order or decision you are appealing, and if the order or decision followed an application, a copy of the application.
- Your name and address (mailing and legal, if different) and, if applicable, the name and address of your representative.
- A daytime phone number, and an e-mail address if available.
- A brief statement why you are appealing.
- The relief you seek (what you want the Board to do).
- A statement, signed by you or your representative, attesting the content of the appeal is true.

#### IF YOUR PERMIT IS APPEALED

Perhaps you have been granted a permit by the Department of Ecology, air authority or another agency, but another party has appealed. You have a right to defend the permit and are automatically a respondent in the appeal before the Board. All subsequent sections in this publication apply to you as well as to the appellant.

#### HEARING DATES

When an appeal is filed, the Board will assign and notify you of a date for hearing the case.

#### THE PRE-HEARING CONFERENCE

Soon after the appeal is filed, a pre-hearing conference is scheduled with the Presiding Officer. The pre-hearing conference is usually held within 4-6 weeks of the appeals' filing and is generally conducted by telephone. The scheduling letter will provide you with a phone number and pin code for you to call in for the pre-hearing conference at the designated time. This conference is not for the purpose of arguing your case. The conference has three purposes: to discuss interest in settlement, including use of the Board's no-cost mediation program, to determine the legal issues, and to set a schedule for preparing the case for hearing if settlement is not reached. Prior to the pre-hearing conference each party is required to submit a preliminary list of legal issues, proposed witnesses and exhibits. After the pre-hearing conference, a written pre-hearing order will be mailed to the parties. It will include the hearing date, the list of legal issues, hearing preparation deadlines, and other important procedural information.

#### CAN THIS DISPUTE BE SETTLED?

Litigation is time and energy consuming for the parties. Each party needs to think about possible compromise. For settlement to be reached, each side needs to offer something. Parties are encouraged to begin settlement talks, without waiting for Board participation.

The Board has a no-cost mediation program to assist parties in reaching settlement. It is a voluntary program offered to the parties without charge. All parties must agree to mediate before a mediation can be scheduled. A trained Administrative Appeals Judge will work with the parties to resolve the case.

If the parties settle directly or through mediation, a written document containing the settlement terms will ultimately be signed by all, and filed with the Board, which will dismiss the appeal if the settlement conforms to the law.

#### BEFORE THE HEARING

Before the hearing you will want to prepare. You have the right to review the agency's file of their decision. Contact it to arrange a time and place to see the file.

You and the other parties have the right to find out in advance what witnesses and other evidence will be used at the hearing. This may be provided to you without formal procedures, such as by looking at public records. If done formally, this **discovery** is best accomplished with the assistance of a lawyer. Examples of formal discovery are: **Deposition**-questioning witnesses before the hearing, under oath with a court reporter present. **Interrogatory**-presenting written questions to the other side. There are formal rules that apply to discovery.

## MOTIONS

Any party may file a motion. A motion is a request by one of the parties asking the Board, or the Presiding Officer to rule on a particular issue.

A motion may be dispositive or non-dispositive. A dispositive motion may be based on an issue or issues, or the whole case. A non-dispositive motion is a request for relief, which does not decide an issue or issues or the whole case. An example of a non-dispositive motion is a motion in limine. A motion in limine asks the Board, in advance of the hearing to exclude certain evidence. Dispositive motions are decided by the full Board. An example of a dispositive motion is a motion for summary judgment. A motion for summary judgment is typically based on sworn statements of fact from a person having personal knowledge of the facts alleged. A sworn statement may be either a declaration or an affidavit. An example of a declaration may be found on our website at <http://www.etuho.wa.gov>. After you have opened to the home page, click on the "Practice and Procedure" button on the top of the page.

A declaration or affidavit may also identify and attach documents as exhibits. This is the format of the declaration contained in the sample forms on the website.

## Dispositive Motions

The scheduling of dispositive motions is set forth in the pre-hearing order. Please file with the Board an original and sufficient copies of the dispositive motion for each Board member and the presiding officer, if the presiding officer is not a Board member. A copy should be served simultaneously on the date the motion is filed, on each party in the case.

Any party opposing the motion will typically have 14 days from the day it received the motion, to file an original and the requisite copies of a response with the Board, and serve a copy on each of the other parties. The moving party generally will have 10 days from the date it receives the response, to file an original and the requisite copies of a reply with the Board, and serve a copy on each of the other parties. Any party may request an oral hearing from the Presiding Officer on the motion. The Presiding Officer determines whether to grant or deny the request. If the request is granted, the parties will typically personally appear and present their oral argument to the Board at its hearing room in Tumwater, Washington.

## Non-dispositive Motions

The deadlines for responding and replying to non-dispositive motions will generally be shorter than the above deadlines for dispositive motions. Additionally, most non-dispositive motions will be reviewed and decided solely by the Presiding Officer. In those situations, the parties need only supply an original and one copy of the pleadings to the Board.

## HEARING

At the hearing, it is important to be **on time**. A party's failure to appear may result in default.

You will have your full opportunity to present your side of the case, but there is a judicial procedure to be followed, so that all sides can be heard in an orderly manner.

The Presiding Officer for the Board manages the proceedings. A court reporter will record what is said. The appellant usually has the obligation to present his or her case first. Then, the respondent will present its case. In a case involving a penalty or a regulatory order, the agency assessing the penalty is required to present its case first.

Each side has the right to make an **opening statement**, briefly outlining what its evidence will be. After the opening statements, the parties with the burden of proof will present its evidence. In a penalty or regulatory action, the agency has the burden of proof and will call witnesses first. In a permit appeal, the appealing party has the burden of proof and presents its witnesses first at the hearing.

In certain cases, the Presiding Officer may determine a **site visit** would be helpful to the Board's understanding of the evidence. At such a visit, the parties are requested to limit communication with the Board during the site visit. It is appropriate to point out physical landmarks, to help the Board later, at the hearing, but a court reporter is not present during the site visit, and it is not the time to present evidence or argue your case.

After the site visit, we return to the hearing. **Witnesses** who are sworn to tell the truth, testify from their personal knowledge in response to questions from the party calling that witness. After this **direct testimony**, the witness answers questions asked by the other parties during "**cross-examination**." The Board members may also ask questions.

Persons essential to your case need to be present at the hearing to testify as witnesses. The "hearsay" rule prevents you from testifying for them or relating what they know or what they have said.

**Exhibits**, such as letters, contracts, photographs, and maps, etc. may be offered as evidence. Before the hearing, number your exhibits and prepare an exhibit list. At the hearing, you will need to have the original and one copy for each member of the Board, the Presiding Officer, if not a Board member, and for the other parties. If you have multiple exhibits, please place them in a binder. In the alternative, the Board has now implemented a process to accept exhibits electronically. If you are interested in this process, please ask the presiding officer at the pre-hearing conference.

After all the evidence has been presented, litigants can summarize their arguments in closing statements. The hearing is then closed and no further evidence is taken.

## THE BOARD'S DECISION

The Board will deliberate on the testimony, exhibits, and final arguments, before issuing a written decision.

The written decision called "Findings of Fact, Conclusions of Law, and Order" is prepared and mailed to all parties generally within 90 days after the hearing, or after the submission of memoranda, briefs, or proposed findings.

## YOU MAY APPEAL THE FINAL ORDER

The Board's decision may be appealed to Superior Court within 30 days from the date the **ORDER is mailed**, or you may file a

petition with the Board for reconsideration within 10 days of the date of the mailing of the **ORDER**.

You may appeal the Board's final action on a petition for reconsideration within 30 days from the date the order is mailed. Please note, if the Board fails to act on the petition for reconsideration within 20 days of its filing, it is deemed denied. In certain cases raising urgent statewide or regional issues or involving significant precedential matters, a procedure for direct review by the Court of Appeals may be available.

### FREQUENTLY USED TERMS

#### **AIR POLLUTION CONTROL**

**AGENCY:** a local or regional agency authorized under the Washington Clean Air Act, RCW 70.94, to issue orders and assess penalties for air pollution violations, and to issue notices of construction for new air emission sources.

**APPEAL:** A request for review of a decision filed with the Board.

**APPELLANT:** A person or entity bringing the appeal.

**BOARD:** The Washington State Pollution Control Hearings Board.

**DISMISSAL:** Dismissal is an order entered by the Board terminating the appeal, canceling the hearing, and ending the Board's consideration of the case.

**DISPOSITIVE MOTION:** Motions concerning matters that are central to the case (such as a motion for summary judgment or a motion to dismiss) are called "dispositive" motions because they can "dispose of" (or end), all or part of the appeal.

**ECOLOGY:** The Washington State Department of Ecology.

**INTERVENOR:** A third party asking to be heard in an appeal.

**PARTY:** A person who is an appellant, respondent, or intervenor.

**PERSON:** An individual, partnership, corporation, association, organization, governmental subdivision, agency, or entity of any character.

**PRESIDING OFFICER:** A member of the Board or an Administrative Appeals Judge who is assigned by the chair or vice-chair to conduct a conference or hearing.

**RESPONDENT:** A person or entity on the other side of the dispute from the appellant.

**STIPULATION:** An agreement between the parties.

The Environmental and Land Use Hearings Office does not discriminate in employment or any of its services against persons with disabilities, and will make reasonable accommodations for any citizen who needs assistance to participate in our hearings or other activities. If a party or a witness requires an interpreter, or qualifies for

reasonable accommodations, that person shall notify the presiding officer at least three weeks before the hearing or situation for which assistance is needed.



## Water Resources Program Variance Request- Minimum Standards for Well Construction

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WAC173-160-106(1) allows you to request a variance from the Department of Ecology when strict compliance with state well construction standards is impractical. The variance request must propose comparable alternative specifications that will provide equal or greater human health and resource protection than the minimum standards. You must apply for a variance in writing and receive approval before constructing or decommissioning the well. (All fields must be completed.)

Requested by: Aspect Consulting on behalf of King County Solid Waste Division

Mailing Address: 350 Madison Avenue North City: Bainbridge Island State: WA Zip: 98110

Daytime Phone: 206-780-7728 (Peter Bannister) Date: May 24, 2018

Property Owner (if different): King County Solid Waste Division - Dan Swope Project Manager

Site Location: NW¼ SW ¼ Section: 36 Township: 23N Range: 02E E or WWM

Tax Parcel Number: 3623029009

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Well Address: 18900 Westside Highway SW, Vashon Island, WA 98070

Well Driller/Company (if known): Holt Services

Check one:  Water Well  Resource Protection Well  Dewatering Well

What construction standard cannot be met?

We propose to construct two landfill gas extraction wells (GW-10 and GW-11) using roto-sonic drilling methods. According to WAC 173-160-420(11), protective surface casing must be installed when the well has been complete, unless a variance is obtained. According to WAC 173-160-420(12), the well shall be protected from damage with three protective bollards. Due to the position of the well away from traffic, we intend to not install bollards.

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Describe the reason why standard cannot be met. Include site map and distances from all known potential sources of contamination if setback variance is being requested.

The gas extraction wells will be installed and connected to the current landfill gas extraction system; the protective casing standard (WAC 173-160-420(11)) cannot be met. The position of the well away from traffic and on a sloping hill; the protective bollards standard (WAC 173-160-420(12)) cannot be met (see attached map showing proposed locations). The HDPE well head will be constructed in a similar fashion to the existing extraction well (attached photo).

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Describe the alternative construction method that will provide equal or greater protections than those provided by the minimum standard.

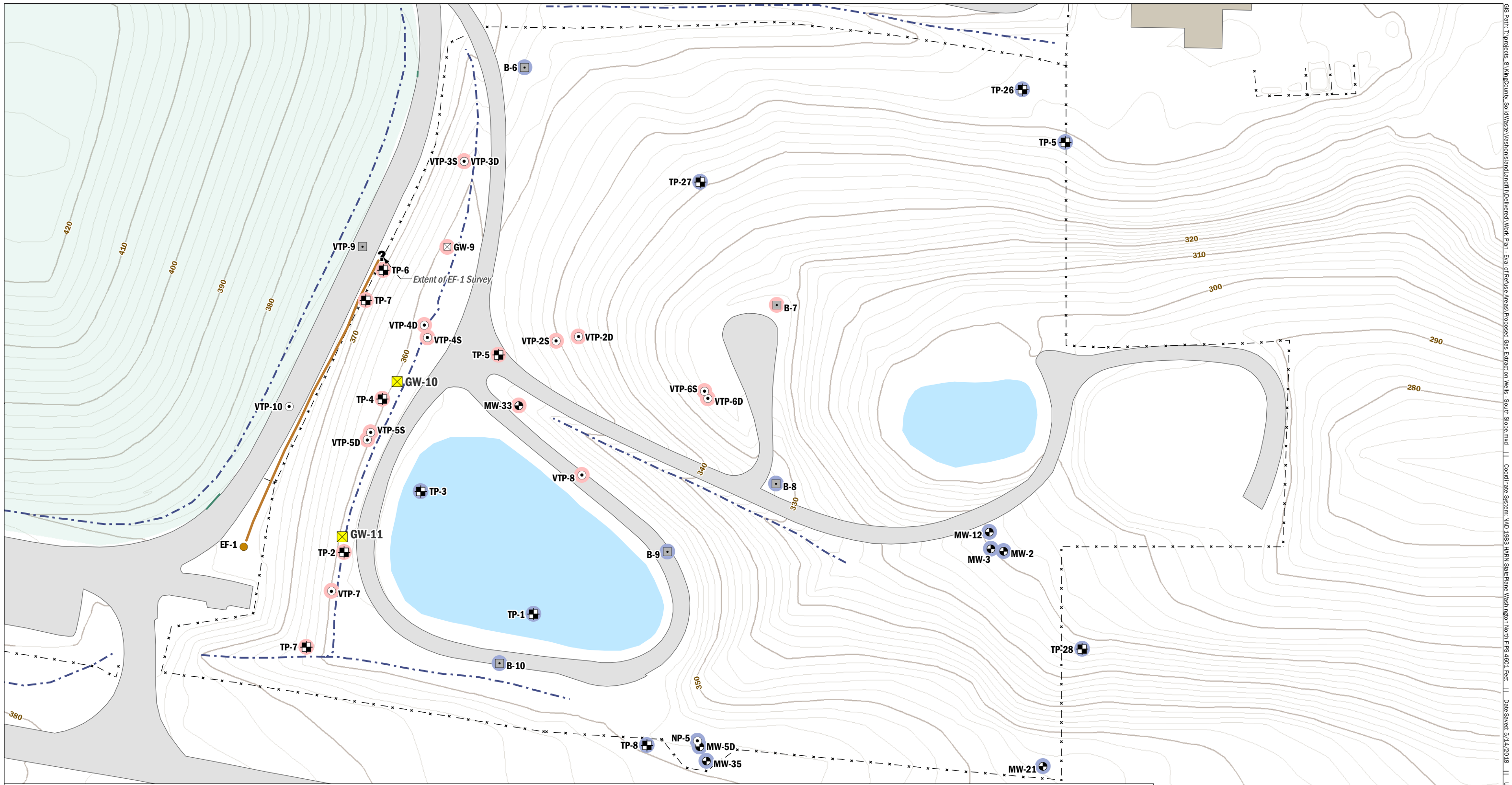
We propose to install the extraction wells according to the attached diagram and the construction method will provide equal protection as provided by the minimum standard. The extraction wells will be located in unpaved areas away from vehicle traffic, separated by a ditch, and in an area inaccessible to the general public. The landfill facility is surrounded by a fence with a gated entrance and is a secure facility. Site Map, Extraction Well completion diagram and photo attached.

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(Attach additional pages if necessary.) Complete and return with your site map to the appropriate regional office:

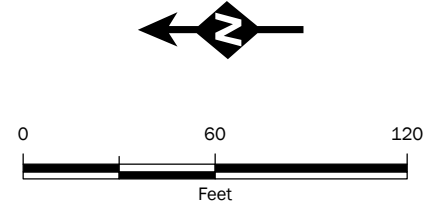
Northwest Regional Office ATTN: Noel Philip 3190 160 <sup>th</sup> Avenue SE Bellevue, WA 98008  425-649-7044 Fax: 425-649-7098 <a href="mailto:nphi461@ecy.wa.gov">nphi461@ecy.wa.gov</a>	Southwest Regional Office ATTN: John Pearch  PO Box 47775 Olympia, WA 98504  360-407-0297 Fax: 360-407-6305 <a href="mailto:jope461@ecy.wa.gov">jope461@ecy.wa.gov</a>	Eastern Regional Office ATTN: Mark Ader N 4601 Monroe St. Spokane, WA 99205  509-329-3544 Fax: 509-329-3529 <a href="mailto:made461@ecy.wa.gov">made461@ecy.wa.gov</a>	Central Regional Office ATTN: Avery Richardson 1250 W Alder St. Union Gap, WA 98903  509-575-2639 Fax: 509-454-7830 <a href="mailto:aric461@ecy.wa.gov">aric461@ecy.wa.gov</a>
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<p><b>Proposed Exploration</b></p> <ul style="list-style-type: none"> <li>☒ LFG Extraction Well</li> </ul>	<p><b>Existing Exploration</b></p> <ul style="list-style-type: none"> <li>■ Boring</li> <li>○ Gas Probe</li> <li>⊠ LFG Extraction Well</li> <li>⊕ Monitoring Well</li> <li>⊞ Test Pit</li> </ul>	<ul style="list-style-type: none"> <li>● Encountered Refuse</li> <li>● No Refuse Encountered</li> <li>○ 2001 Final Cover</li> <li>● EF-1</li> <li>— Landfill Gas System Pipe <i>Partial System Shown</i> <i>Query indicates Landfill Gas Pipe Location Beyond Survey Limits Unknown</i></li> </ul>	<ul style="list-style-type: none"> <li>☁ Pond</li> <li>- - - Ditch</li> <li>- - - Fence</li> <li>▭ Road</li> <li>▭ Building</li> </ul>
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*Approximate proposed explorations locations shown. Exact locations contingent on accessibility.*



**Proposed Gas Extraction Wells**  
Vashon Island Closed Landfill  
King County, Washington

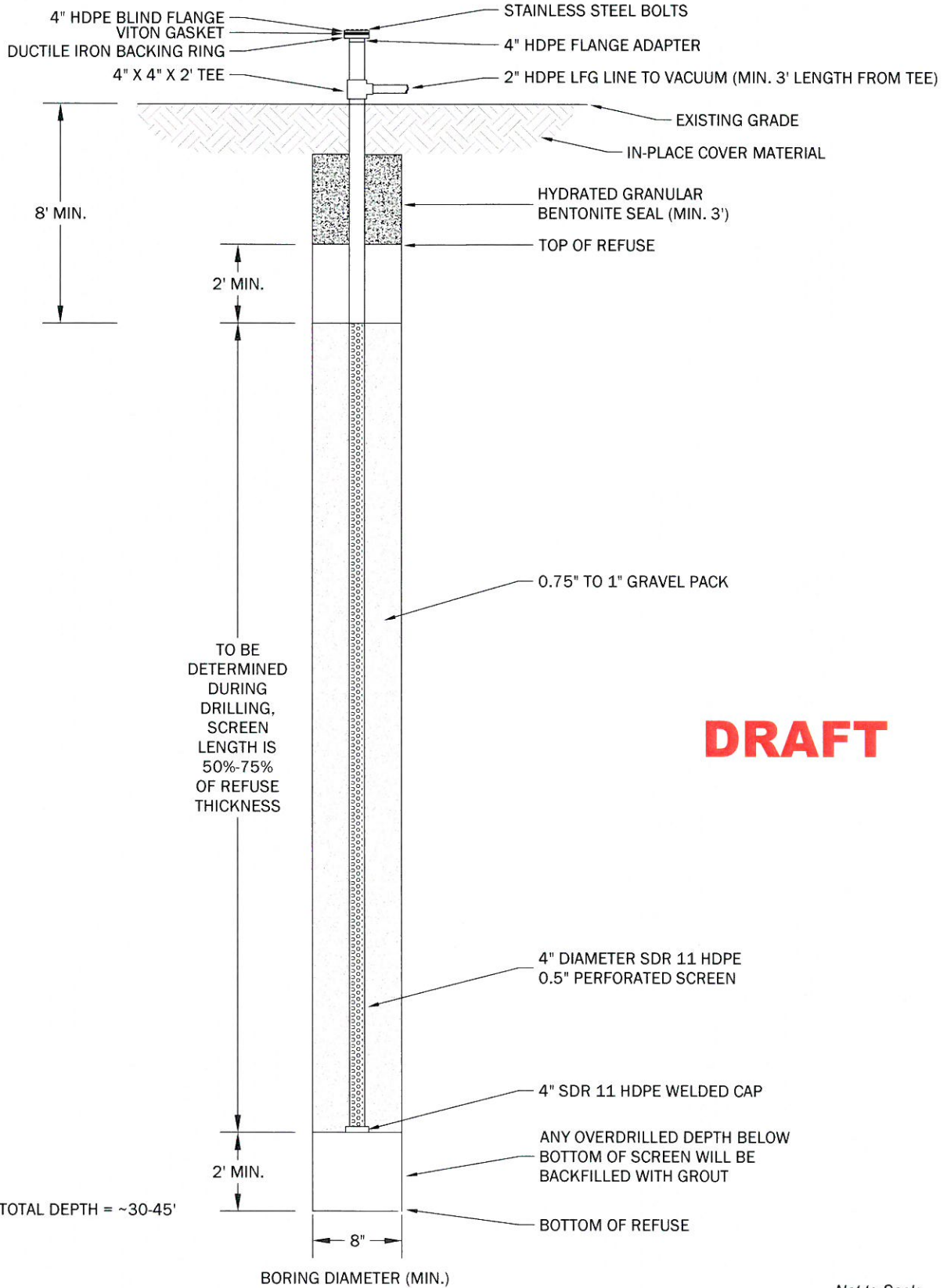
		MAY-2018	FIGURE NO. <b>3</b>
		BY: PSB / RAP	

GIS Data: T:\projects\_8\KingCounty\_SolidWaste\Washingtonlandfill\Delivered\Work Plan - Eval of Refuse Areas\Proposed Gas Extraction Wells - South Superfund - Coordinate System: NAD 1983 HARN Spheroid Washington North TPRS 4001 Feet | Date Saved: 5/14/2018 | User: rppm | Print Date: 5/16/2018



Photograph 1. Gas extraction well GW-9, completed before connection to gas collection system





Not to Scale



### Typical LFG Extraction Well Completion Diagram

Vashon Island Landfill Work Plan  
 Vashon Island Landfill, King County, Washington

DATE:	JUN 2016
DESIGNED BY:	ELG
DRAWN BY:	SCC
REVISED BY:	-

PROJECT NO.	090057
FIGURE NO.	4

## **APPENDIX E**

### **Extraction Well Completion Photos**





Photograph 1. View facing northwest showing newly installed LFG extraction wells (black stick-ups) GW-10 (right) and GW-11 (left).





Photograph 2. View of completed extraction well GW-10, facing north up-slope.





Photograph 3. View of completed extraction well GW-11 facing northwest up-slope. The 2-inch tee fitting is facing east along the topographic contour of the hill.

# **APPENDIX F**

## **King County Survey Data**



# Vashon Landfill - Task 310.1.7.6.3

## Landfill Gas Extraction Well Survey Information

NAD 83/11 NAVD88

1000,162764.6607,1227899.9754,359.9499,GW-10 GD

1001,162764.1807,1227899.8021,363.7966,GW-10 TOP CTR FLANGE

1002,162764.0606,1227900.2171,361.8129,GW-10 TOP PVC

1003,162801.1725,1227799.4627,360.1557,GW-11 GD

1004,162801.0859,1227799.9908,363.6807,GW-11 TOP CTR FLANGE

1005,162800.9588,1227800.4153,361.5836,GW-11 TOP OF PVC



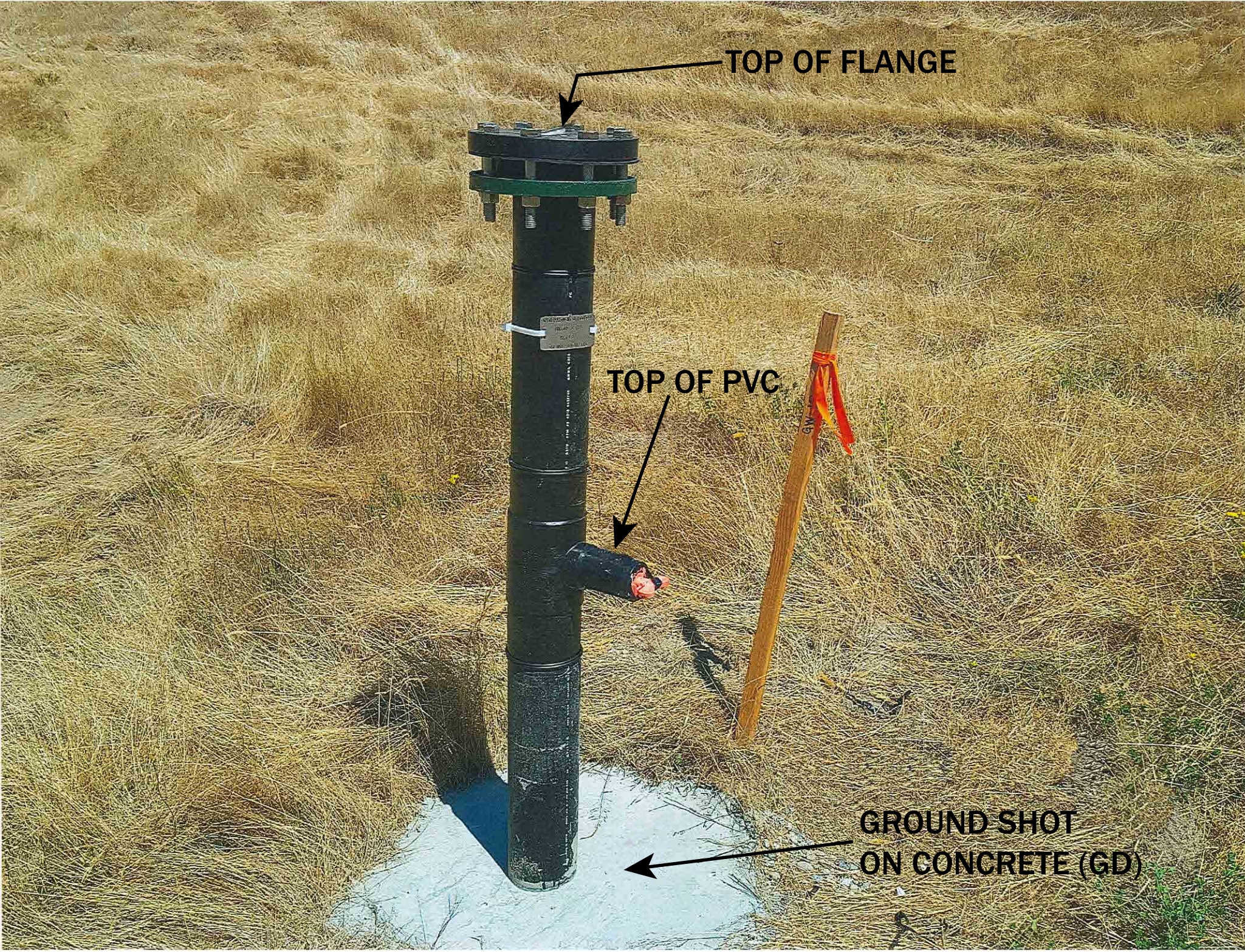
**TOP OF FLANGE**



**TOP OF PVC**



**GROUND SHOT  
ON CONCRETE (GD)**





## **APPENDIX G**

### **Report Limitations and Guidelines for Use**

# REPORT LIMITATIONS AND USE GUIDELINES

## Reliance Conditions for Third Parties

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This report was prepared for the exclusive use of the Client. No other party may rely on this report or the product of our services without the express written consent of Aspect Consulting, LLC (Aspect). This limitation is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual conditions or limitations and guidelines governing their use of the report. Within the limitations of scope, schedule and budget, our services have been executed in accordance with Contract No. E00102E08 (Agreement) and recognized standards of professionals in the same locality and involving similar conditions.

## Services for Specific Purposes, Persons and Projects

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Aspect has performed the services in general accordance with the scope and limitations of our Agreement. This report has been prepared for the exclusive use of the Client and their authorized third parties, approved in writing by Aspect. This report is not intended for use by others, and the information contained herein is not applicable to other properties.

This report is not, and should not, be construed as a warranty or guarantee regarding the presence or absence of hazardous substances or petroleum products that may affect the Site. The report is not intended to make any representation concerning title or ownership to the Site. If real property records were reviewed, they were reviewed for the sole purpose of determining the Site's historical uses. All findings, conclusions, and recommendations stated in this report are based on the data and information provided to Aspect, current use of the Site, and observations and conditions that existed on the date and time of the report.

Aspect structures its services to meet the specific needs of our clients. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and Site. This report should not be applied for any purpose or project except the purpose described in the Agreement.

## This Report Is Project-Specific

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Aspect considered a number of unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you
- Not prepared for the specific purpose identified in the Agreement
- Not prepared for the specific real property assessed
- Completed before important changes occurred concerning the Site, project or governmental regulatory actions



If changes are made to the project or Site after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

## **Geoscience Interpretations**

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The geoscience practices (geotechnical engineering, geology, and environmental science) require interpretation of spatial information that can make them less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Use Guidelines" apply to your project or site, you should contact Aspect.

## **Discipline-Specific Reports Are Not Interchangeable**

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The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the Site.

## **Environmental Regulations Are Not Static**

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Some hazardous substances or petroleum products may be present near the Site in quantities or under conditions that may have led, or may lead, to contamination of the Site, but are not included in current local, state or federal regulatory definitions of hazardous substances or petroleum products or do not otherwise present potential liability. Changes may occur in the standards for appropriate inquiry or regulatory definitions of hazardous substance and petroleum products; therefore, this report has a limited useful life.

## **Property Conditions Change Over Time**

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This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, slope failure or groundwater fluctuations. If more than six months have passed since issuance of our report, or if any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

## **Historical Information Provided by Others**

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Aspect has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data does not provide definitive information with regard to all past uses, operations or incidents affecting the Site or adjacent properties. Aspect makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others.