

# SITE HAZARD ASSESSMENT

## Worksheet 1

### Summary Score Sheet

#### SITE INFORMATION:

Bow Lake Landfill

S 188th St & I-5

Tukwila, King County, WA 98188

Cleanup Site ID: 57

Facility/Site ID: 2103

Section: 35

Latitude: 47.43416

Township: 23N

Longitude: -122.26799

Range: 4E

Tax/Parcel ID: 3523049037

*Site scored/ranked for the Hazardous Sites List Publication: February 2016*

#### SITE DESCRIPTION:

The Bow Lake Landfill site (Site) is a former landfill located in Tukwila, King County, Washington. The 20.04-acre property is located approximately 750 feet from the Green River, and zoned for commercial and light industrial Tukwila Valley South (TVS) district use.

The Site is bordered on the west by Interstate 5, and on the east by Southcenter Parkway. Adjacent properties include the MA Segale Maintenance Shop [Cleanup Site ID (CSID) 11197] to the southeast, and additional vacant wooded properties owned by Segale Properties LLC to the north and south.

The Site is currently operated as a solid waste transfer station by King County Solid Waste.

Refuse may have been placed at the Site as early as 1943. Throughout the 1950's, when the Site was operated as an active landfill, the Site reportedly received approximately 160,000 cubic yards of refuse per year. In 1961, a transfer station was constructed at the Site. The transfer station was upgraded in 1978. By 1985, at least 60,000 tons of refuse annually was transferred through the station to the Cedar Hills Landfill. According to aerial photographs, the transfer station was upgraded again between 2011 and 2012.

#### SITE BACKGROUND:

A summary of prior operations/tenants at the subject property is presented below.

<u>From</u>	<u>To</u>	<u>Operator/Tenant</u>	<u>Activity</u>
1943	1961	Unspecified	Landfill
1961	2015	King County Solid Waste	Solid waste transfer station; improved in 1978

#### SITE CONTAMINATION:

In 1988 the Bow Lake Landfill site was reported to Washington State Department of Ecology (Ecology) and placed on the Confirmed and Suspected Contaminated Sites (CSCSL) list with ID number 57.

In October 1984, 17 soil borings (borings 1 through 17) were advanced at the Site, and soil gas was analyzed for concentrations of methane and trace gases [parts per million (ppm)] using a field meter. The type of field meter used is unknown. Methane was detected above the lower explosive limit in borings 2 (35% by volume, highest detected at the Site), 3, 6, and 7. A leachate seep with an oily sheen was reportedly observed in the southeastern section of the Site. Groundwater was not reported to have been encountered in any of the borings.

In 1986, a survey was conducted of the Bow Lake Landfill. No surface water or leachate seeps were observed at the Site. King County Solid Waste Division reported that between 1984 and 1986, additional cap material had been placed, and surface water runoff had been diverted away from the area to reduce infiltration and leachate accumulation.

In July 1986, six soil samples (A through F) were collected from the Site and analyzed for 11 metals, a select list of volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and pesticides. Concentrations of methylene chloride [0.160 milligrams per kilogram (mg/kg)] were detected above the Model Toxics Control Act

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(MTCA) Method A cleanup level in sample E, and lindane (0.0198 mg/kg) was detected above the MTCA Method A cleanup level in sample A. Reported concentrations of total chromium in all six samples were above the MTCA Method A cleanup level for hexavalent chromium, but below the MTCA Method A cleanup level for trivalent chromium.

In October 1986, four sampling probes (locations A, B, C, and E) were installed at the Site, and soil gas samples were collected from each location. Benzene and xylenes were detected at all four locations at concentrations above the MTCA Method B (non-carcinogen) cleanup level for air. Tetrachloroethene (PCE) was detected above the MTCA Method B cleanup level for air in locations B, E, and C. Styrene was detected above the MTCA Method B (non-carcinogen) cleanup level at location A. Methylene chloride, acetone, and vinyl chloride were detected above the MTCA Method B cleanup level (non-carcinogen) for air at location C.

Ten test probes (locations 1 through 10) were placed along the perimeter of the Site, and measured for combustible gas levels. Combustible gas levels above 1% (as a percent of the total in methane equivalent values) were detected at locations 4 (27.5%), 6 (19.0%), and 7 (25%).

A Phase I and II Environmental Site Assessment (ESA) was conducted by HWA Associates, Inc. (2007) for the northern section of tax parcel 3523049037 (formerly tax parcel 3524035555, now part of parcel 3524039037). The report identified three general types of subsurface materials that have been encountered at the Site and surrounding areas: recent fill soil, burned refuse and soil fill, and glacial deposits. The burned fill primarily consists of glass and charred material mixed with silty sand and gravel. The layer thickness varies from approximately 10 to 30 feet across the southern part of the Site. This fill was placed at the Site from the 1940's until the construction of Interstate-5 in the 1960's. Unburned refuse has also been encountered in subsurface fill at the Site, at depths between 10 and 40 feet below ground surface (bgs).

In February and March 2007, 37 soil borings and 11 test pits were completed advanced at the Site. Groundwater was encountered in seven of the borings. Composite and/or discrete soil samples from 24 of the borings and the 11 test pits were analyzed for one or more of the following: petroleum hydrocarbons, pesticides, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and metals. Seven soil samples (locations B-202, B-210, B-218, B-227, B-230, and TP-8) contained gasoline-range hydrocarbons above the MTCA Method A cleanup level. Diesel- and oil-range hydrocarbons were detected in other samples at concentrations below MTCA Method A cleanup levels. One sample (TP-3) reportedly contained total carcinogenic polycyclic aromatic hydrocarbons (cPAHs) above the MTCA Method A cleanup level for benzo(a)pyrene. Xylenes and methylene chloride were also detected above MTCA Method A cleanup levels in one sample each. Arsenic, cadmium, and lead were detected at concentrations above MTCA Method A cleanup levels, and total chromium was detected above the MTCA Method A cleanup level for hexavalent chromium, but below the cleanup level for trivalent chromium.

Several prior investigations have reportedly been conducted at the Site, but these reports were not available for review in Ecology's files. These prior investigations include a site inspection in 1993, when surface seeps were not noted at the Site, and an underground storage tank (UST) removal in 1995, when two USTs (one 600-gallon gasoline tank and one 1,000-gallon diesel UST) were reportedly removed from the south portion of the Site. According to a summary provided in a subsequent report, soil samples collected during the UST removal event did not contain concentrations of petroleum hydrocarbons above MTCA cleanup levels.

#### **PAST REMEDIATION ACTIVITIES:**

Some soil removal occurred during Site redevelopment. The removed soil was disposed of offsite. The majority of the impacted soil and landfilled material remains in place at the Site.

#### **CURRENT SITE CONDITIONS:**

Groundwater elevations have been measured in onsite wells (2007), but groundwater samples were not collected for laboratory analysis. Water samples were collected from test pits but were not analyzed. Some soil was removed during Site redevelopment in approximately 2007, however the majority of the impacted soil remains in place at the Site.

Benzene, xylenes, tetrachloroethene, methylene chloride, acetone, vinyl chloride, and styrene were detected in soil gas samples in the 1980's at concentrations above current MTCA Method B cleanup levels for air. Methylene

# SITE HAZARD ASSESSMENT

## Worksheet 1

### Summary Score Sheet

chloride and lindane were detected in soil samples in the 1980's at concentrations above MTCA Method A cleanup levels. Soil samples collected in 2007 contained concentrations of gasoline-, diesel-, and oil-range hydrocarbons, xylenes, methylene chloride, arsenic, cadmium, and lead at concentrations above their respective MTCA Method A cleanup levels. The toxicity equivalent concentration of cPAHs was greater than the MTCA Method A cleanup level for benzo(a)pyrene in one soil sample.

The approximate depth to groundwater is 15 to 25 feet below ground surface, with groundwater flowing to the east (estimated based on surface topography). Subsurface soils are solid waste fill, silt, and sand.

#### SPECIAL CONSIDERATIONS:

Checked boxes indicate routes applicable for Washington Ranking Method (WARM) scoring

**Surface Water**

Leachate has been observed at the Site, and may be available for transport via the surface water route. There is no documentation of a leachate collection system at the Site.

**Air**

In 1986, VOCs were detected in Site soil gas at concentrations above MTCA Method B cleanup levels.

**Groundwater**

Groundwater at the Site has not been characterized. The refuse placed in the landfill may have the potential to impact groundwater.

The surface water and groundwater routes are scored for compounds detected in soil at the Site, but not for compounds detected in soil gas/soil vapor. The addition of substances detected in soil gas would not change the scores in worksheets 4 and 6. The surface water route is scored for fresh water, not marine, as the closest body of water is the Green River. Leachate has been observed at the Site; however, leachate was only measured for field parameters, not for specific chemicals, so release to the surface water route is not considered to be confirmed. Total chromium is not scored for the Site; however, the addition of chromium would not change the route scores.

Surface water intakes in Angle Lake are not considered in the scoring, as they are inferred to be hydraulically upgradient of the Site. The Site is located within 2 miles of the Highline Water District, which supplies over 68,000 people.

#### ROUTE SCORES:

Surface Water/ Human Health:	20.5	Surface Water/ Environment:	32.1
Air/ Human Health:	15.0	Air/ Environment:	3.0
Groundwater/ Human Health:	48.9		

**Overall Rank: 2**

#### REFERENCES:

- 1 Ecology Water Resources Explorer, accessed April 2015.  
<https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx>
- 2 HWA Geosciences, Inc., 2007, Environmental Site Investigation Report, Bow Lake Processing/Transfer Station, Interstate 5 & South 188th Street, Tukwila, Washington. Prepared for R.W. Beck. July 9.
- 3 HWA Geosciences, Inc., 2007, Phase I & II Environmental Site Assessment WSDOT Property - I-5 & S 188th St, Tukwila, Washington. Prepared for HDR Engineering, Inc. September 11.

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### Summary Score Sheet

- 4 HWA Geosciences, Inc., 2008, Final Geotechnical Report, Bow Lake Recycling & Transfer Station, King County Solid Waste Division, Tukwila, Washington. Prepared for R.W. Beck. August 28.
  - 5 King County Department of Natural Resources and Parks, Solid Waste Division, 2010, Bow Lake Recycling and Transfer Station Site Facilities Contract, Contract C00405C09, Contract Volume 8, RFP Volume 5 of 8, Appendix D Environmental Protection Plan. August.
  - 6 King County GIS Center iMAP application, Property Information, Groundwater Program, and Sensitive Areas mapsets. Accessed April 2015.  
<http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx>
  - 7 Missouri Census Data Center, Circular Area Profiles - 2010 census data around a point location. <http://mcdc.missouri.edu/websas/caps10c.html>. Accessed April 2015.
  - 8 National Climatic Data Center 2011 Local Climatological Data for Seattle, Seattle Tacoma Airport. <http://www1.ncdc.noaa.gov/pub/orders/IPS-90B1F39F-6CFA-4A6B-AA82-5ED1FF897CCC.pdf>
  - 9 Seattle-King County Department of Public Health, 1985, Abandoned Landfill Study in King County. April 30.
  - 10 Seattle-King County Department of Public Health, 1986, Seattle-King County Abandoned Landfill Toxicity/Hazard Assessment Project Technical Appendices. December 31.
  - 11 Seattle-King County Department of Public Health, 1986, Seattle-King County Abandoned Landfill Toxicity/Hazard Assessment Project. December 31.
  - 12 WARM Scoring Manual
  - 13 WARM Toxicological Database
  - 14 Washington Department of Transportation 24-hour Isopluvial Maps, January 2006 update. <http://www.wsdot.wa.gov/publications/fulltext/Hydraulics/Wa24hrIsopluvials.pdf>
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# SITE HAZARD ASSESSMENT

## Worksheet 2

### Route Documentation

Cleanup Site ID: 57

Bow Lake Landfill

Facility/Site ID: 2103

#### 1. SURFACE WATER ROUTE

**List those substances to be considered for scoring:**

Methylene chloride, lindane, gasoline, cPAHs [benzo(a)pyrene], xylenes, arsenic, cadmium, lead

**Explain the basis for choice of substances to be used in scoring:**

Prior detection in Site soil at concentrations above MTCA Method A cleanup levels; additional substances listed here but not scored in Worksheet 4 would not affect the route score

**List those management units to be considered for scoring:**

Surface water

**Explain basis for choice of unit to be used in scoring:**

Potential for transport to surface water

#### 2. AIR ROUTE

**List those substances to be considered for scoring:**

Benzene, xylenes, tetrachloroethene, methylene chloride, acetone, vinyl chloride, and styrene

**Explain the basis for choice of substances to be used in scoring:**

Prior detection in soil gas at concentrations above MTCA Method B cleanup levels; additional substances listed here but not scored on Worksheet 5 would not affect the route score

**List those management units to be considered for scoring:**

Soil gas

**Explain basis for choice of unit to be used in scoring:**

Potential for transport to indoor or outdoor air

#### 3. GROUNDWATER ROUTE

**List those substances to be considered for scoring:**

Methylene chloride, lindane, gasoline, cPAHs [benzo(a)pyrene], xylenes, arsenic, cadmium, lead

**Explain the basis for choice of substances to be used in scoring:**

Prior detection in Site soil at concentrations above MTCA Method A cleanup levels; additional substances listed here but not scored in Worksheet 6 would not affect the route score

**List those management units to be considered for scoring:**

Groundwater

**Explain basis for choice of unit to be used in scoring:**

Potential for transport to groundwater

**Worksheet 4**  
**Surface Water Route**

CSID: 57

Site Name: Bow Lake Landfill

**1.0 Substance Characteristics**

**1.1 Human Toxicity**

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Methylene chloride	8	3	X	2
Lindane	10	8	5	4
Gasoline	8	3	X	5
Xylenes	2	10	1	X
Arsenic	8	5	5	7
Lead	6	X	10	X

Highest Value 10  
 Bonus Points? 2  
 Human Health Toxicity Value **12**

**1.2 Environmental Toxicity**

Substance	Acute Water Quality Criteria		Non-human Mammalian Acute Toxicity	
	ug/L	Value	mg/kg	Value
Methylene chloride	X	X	1600	3
Lindane	2	8	76	8
Gasoline	5300	2	3306	3
Xylenes	X	X	5000	3
Arsenic	360	4	763	5
Lead	82	6	X	X

Environmental Toxicity Value **8**

**1.3 Substance Quantity**

Amount: Approximately 90,000 square feet

Basis: Estimated extent of impacted soil

Substance Quantity Value **9**

**2.0 Migration Potential**

**2.1 Containment**

Containment Value **5**

Explain Basis: Following redevelopment of the Site in 2011, aerial imagery of the Site

suggests that there is pavement cover; however, the maintenance is unknown

**2.2 Surface Soil Permeability**

Soil Permeability Value **3**

Expected to be fill with sand and silt

**2.3 Total Annual Precipitation**

Total Precipitation Value **3**

37 inches

**2.4 Max 2-yr/24-hour Precipitation**

2YR/24HR Precipitation Value **3**

2.4 inches

**2.5 Floodplain**

Floodplain Value **0**

Not in the floodplain

**2.6 Terrain Slope**

Slope Value **5**

>8% slope to the Green River

**Worksheet 4**  
**Surface Water Route**

CSID: 57

Site Name: Bow Lake Landfill

**3.0 Targets**

**3.1 Distance to Surface Water**

Approximately 750 feet to the Green River

Surface Water Distance Value

**3.2 Population Served within 2 miles**

0 people

Population Value

**3.3 Area Irrigated within 2 miles**

550 acres

Irrigation Value

**3.4 Distance to Nearest Fishery Resource**

Approximately 1,100 feet to the Green River

Fishery Value

**3.5 Distance to and Name of Nearest Sensitive Environment**

Approximately 1,200 feet to Briscoe Park

Sensitive Environment Value

**4.0 Release**

Explain basis for scoring a release to surface water

No confirmed release to surface water

Release to Surface Water Value

**Pathway Scoring - Surface Water Route, Human Health Pathway**

$$SW_H = (SUB_{SH} * 40/175) * [(MIG_S * 25/24) + REL_S + (TAR_{SH} * 30/115)] / 24$$

Where:

$SUB_{SH}$  = (Human Toxicity Value + 3) \* (Containment + 1) + Substance Quantity

$MIG_S$  = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope

$REL_S$  = Release to Surface Water

$TAR_{SH}$  = Distance to Surface Water + Population Served by Surface Water + Area Irrigated

$SUB_{SH}$	99
$MIG_S$	14
$REL_S$	0
$TAR_{SH}$	27.6
$SW_H$	20.5

**Pathway Scoring - Surface Water Route, Environmental Pathway**

$$SW_E = (SUB_{SE} * 40/153) * [(MIG_S * 25/24) + REL_S + (TAR_{SE} * 30/34)] / 24$$

Where:

$SUB_{SE}$  = (Env Tox Value + 3) \* (Containment + 1) + Substance Qty

$MIG_S$  = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope

$REL_S$  = Release to Surface Water

$TAR_{SE}$  = Distance to Surface Water + Distance to Fishery + Distance to Sensitive Environment

$SUB_{SE}$	75
$MIG_S$	14
$REL_S$	0
$TAR_{SE}$	28.0
$SW_E$	32.1

**Worksheet 5**

**Air Route**

CSID: 57

Site Name: Bow Lake Landfill

**1.0 Substance Characteristics**

**1.1 Introduction (WARM Scoring Manual) - Please Review before scoring**

**1.2 Human Toxicity**

Substance	Ambient Air Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Benzene	10	3	X	5
Xylenes	1	3	1	X
Tetrachloroethene	9	5	X	X
Methylene chloride	9	3	1	4
Styrene	4	5	X	2
Vinyl chloride	10	1	X	X

Highest Value 10  
 Bonus Points? 2  
 Toxicity Value

**1.3 Mobility**

Gaseous Mobility	Max Value:	4
Particulate Mobility	Soil Type:	
	Erodibility:	
	Climatic Factor:	

Mobility Value

**1.4 Final Human Health Toxicity/Mobility Matrix Value**

HH Final Matrix Value

**1.5 Environmental Toxicity/Mobility**

Substance	Non-human Mammalian Inhalation Toxicity (mg/m3)	Acute Value	Mobility Value	Table A-7 Matrix Value
Benzene	31947	3	4	6
Xylenes	21714	3	3	5
Tetrachloroethene	4000	5	4	10
Methylene chloride	88000	3	4	6
Styrene	9500	5	3	8
Vinyl chloride	460123	1	4	2

Env. Final Matrix Value

**1.6 Substance Quantity**

Amount: 90,000 square feet

Basis: Estimated extent of impacted soil

Substance Quantity Value

**Worksheet 5**

**Air Route**

**CSID:** 57

**Site Name:** Bow Lake Landfill

**2.0 Migration Potential**

**2.1 Containment**

Containment Value

Explain Basis: At least 6 inches of soil cover, but no vapor collection system

**3.0 Targets**

**3.1 Nearest Population**

Population Distance Value

Approximately 600 feet to the nearest dwellings

**3.2 Distance to and name of nearest sensitive environments**

Sensitive Environment Value

Approximately 1,200 feet to Briscoe Park

**3.3 Population within 0.5 miles**

Population Value

828 population

**4.0 Release**

Release to Air Value

Explain basis for scoring a release to air:  
Confirmed release to air

**Pathway Scoring - Air Route, Human Health Pathway**

$$AIR_H = (SUB_{AH} * 60/329) * [REL_A + (TAR_{AH} * 35/85)] / 24$$

Where:

SUB <sub>AH</sub> = (Human toxicity + 5) * (Containment + 1) + Substance Qty	SUB <sub>AH</sub> 94
REL <sub>A</sub> = Release to Air	REL <sub>A</sub> 5
TAR <sub>AH</sub> = Nearest Population + Population within 1/2 mile	TAR <sub>AH</sub> 38.8
	<b>AIR<sub>H</sub> 15.0</b>

**Pathway Scoring - Air Route, Environmental Pathway**

$$AIR_E = (SUB_{AE} * 60/329) * [REL_A + (TAR_{AE} * 35/85)] / 24$$

Where:

SUB <sub>AE</sub> = (Environmental Toxicity Value + 5) * (Containment + 1) + Substance Qty	SUB <sub>AE</sub> 52
REL <sub>A</sub> = Release to Air	REL <sub>A</sub> 5
TAR <sub>AE</sub> = Nearest Sensitive Environment	TAR <sub>AE</sub> 6.0
	<b>AIR<sub>E</sub> 3.0</b>

**Worksheet 6**  
**Groundwater Route**

CSID: 57

Site Name: Bow Lake Landfill

**1.0 Substance Characteristics**

**1.1 Human Toxicity**

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Methylene chloride	8	3	1	2
Lindane	10	8	5	4
Gasoline	8	3	X	5
Xylenes	2	10	1	X
Arsenic	8	5	5	7
Lead	6	X	10	X

Highest Value 10  
 Bonus Points? 2  
 Toxicity Value

**1.2 Mobility**

Cations/Anions Max Value:  
 Solubility Max Value: 3 Mobility Value

**1.3 Substance Quantity**

Amount: Approximately 10,000 cubic yards  
 Basis: Estimated volume of impacted soil

Substance Quantity Value

**2.0 Migration Potential**

**2.1 Containment** Containment Value

Explain Basis: Landfill with unknown liner, low permeability cover with unknown maintenance, unknown leachate collection system, possible free liquids

**2.2 Net Precipitation**  Net Precipitation Value

**2.3 Subsurface Hydraulic Conductivity** Conductivity Value

Expected to be fill with sand and silt

**2.4 Vertical Depth to Groundwater**   
 Confirmed release: No Depth to Aquifer Value

**3.0 Targets**

**3.1 Groundwater Usage** Aquifer Use Value

Public and private supply, but alternate sources available with minimum hookup requirements

**3.2 Distance to Nearest Drinking Water Well**   
 Well Distance Value

**3.3 Population Served within 2 Miles** Population Served Value

68,300 people

**Worksheet 6**  
**Groundwater Route**

CSID: 57

Site Name: Bow Lake Landfill

**3.4 Area Irrigated by GW Wells within 2 miles**

Area Irrigated Value

305 acres

**4.0 Release**

Release to Groundwater Value

Explain basis for scoring a release to groundwater:

No confirmed release to groundwater

**Pathway Scoring - Groundwater Route, Human Health Pathway**

$$GW_H = (SUB_{GH} * 40 / 208) * [(MIG_G * 25 / 17) + REL_G + (TAR_{GH} * 30 / 165)] / 24$$

Where:

$SUB_{GH} = (\text{Human toxicity} + \text{mobility} + 3) * (\text{Containment} + 1) + \text{Substance Qty}$

$MIG_G = \text{Depth to Aquifer} + \text{Net Precip} + \text{Hydraulic Conductivity}$

$REL_G = \text{Release to Groundwater}$

$TAR_{GH} = \text{Aquifer Use} + \text{Well Distance} + \text{Population Served} + \text{Area Irrigated}$

SUB <sub>GH</sub>	149
MIG <sub>G</sub>	13
REL <sub>G</sub>	0
TAR <sub>GH</sub>	120.1
GW <sub>H</sub>	48.9

## Washington Ranking Method

### Route Scores Summary and Ranking Calculation Sheet

**Site Name:** Bow Lake Landfill

**CSID:** 57

**Site Address:** South 188th Street & I-5

**FSID:** 2103

#### HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	20.5	3
Air	15.0	2
Groundwater	48.9	4

H=	4
M=	3
L=	2

$$\begin{array}{c}
 H^2 + 2M + L \\
 \hline
 16 + 6 + 2 \\
 \hline
 8
 \end{array}$$

**Human Health  
Priority Bin Score:**  
3  
 rounded up to next  
whole number

#### ENVIRONMENT ROUTE SCORES

Enter Environment Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	32.1	4
Air	3.0	3

H=	4
L=	3

$$\begin{array}{c}
 H^2 + 2L \\
 \hline
 16 + 6 \\
 \hline
 7
 \end{array}$$

**Environment  
Priority Bin Score:**  
4  
 rounded up to next  
whole number

**Comments/Notes:**

**FINAL MATRIX  
RANKING**

2

#### FOR REFERENCE:

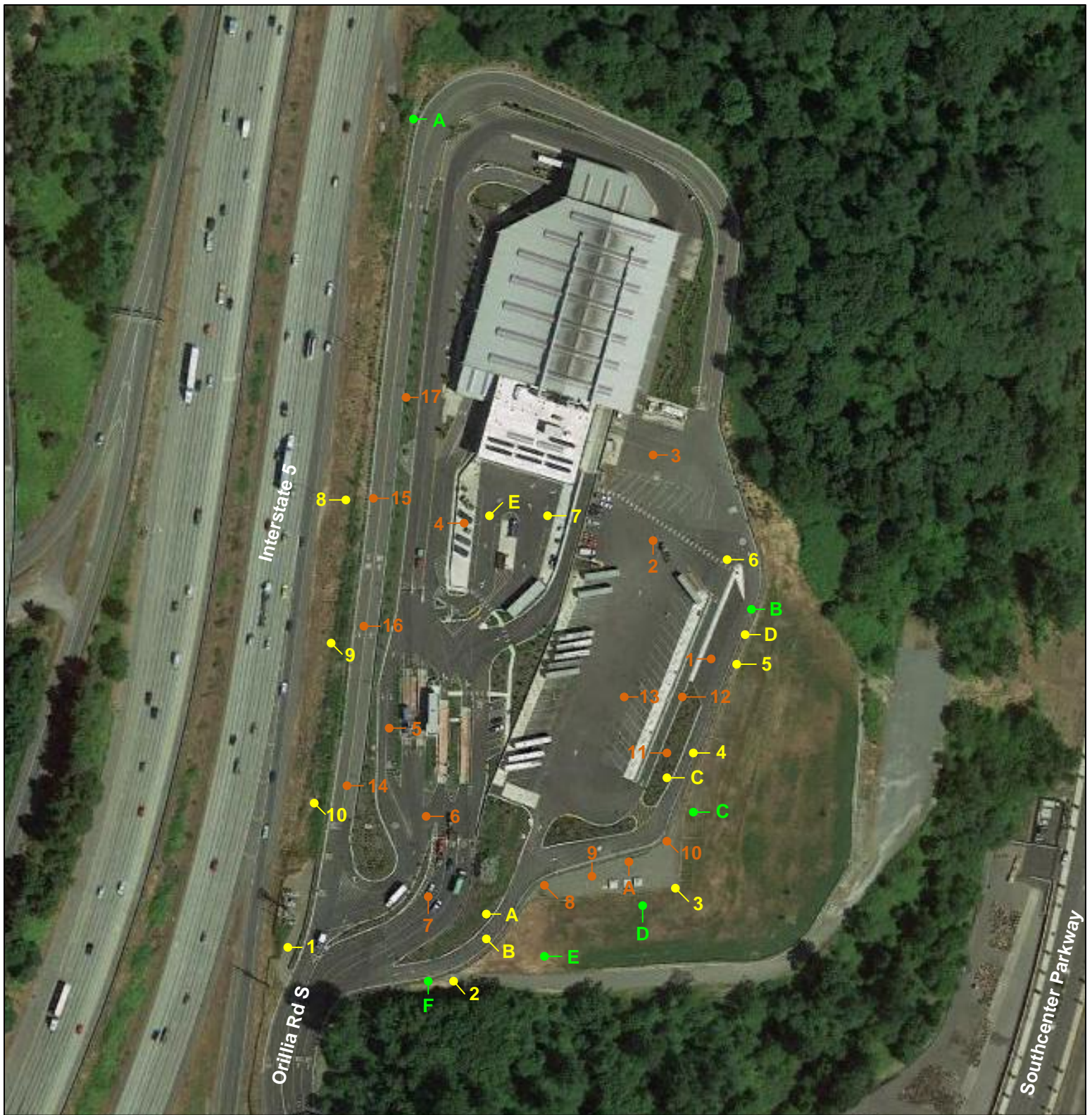
##### Final WARM Bin Ranking Matrix

Human Health Priority	Environment Priority					
	5	4	3	2	1	N/A
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	5
N/A	3	4	5	5	5	NFA

##### Quintile Values for Route Scores - September 2015 Values

Quintile	Human Health			Environment	
	Surface Water	Air	Ground Water	Surface Water	Air
5	>= 29.9	>= 39.4	>= 50.1	>= 50.0	>= 28.2
4	>= 22.7	>= 25.0	>= 40.2	>= 32.0	>= 16.5
3	>= 15.5	>= 16.0	>= 32.9	>= 24.0	>= 2.5
2	>= 8.0	>= 8.5	>= 23.6	>= 11.1	>= 1.5
1	<= 7.9	<= 8.4	<= 23.5	<= 11.0	<= 1.4

Quintile value associated with each route score entered above



**Legend:**

- Property location (approximate)
- 1984 soil boring (approximate)
- 1986 gas sample (approximate)
- 1986 soil sample (approximate)

**Notes:**

1. All locations are approximate, and not to scale.



**Bow Lake Landfill**  
**South 188<sup>th</sup> St & I-5**  
**Seattle, WA 98188**

**Site Overview Map**

**CSID 57**  
 CSID57.vsd