

# SITE HAZARD ASSESSMENT

## Worksheet 1

### Summary Score Sheet

#### SITE INFORMATION:

Elliott Bay Marina  
2601 W Marina Pl  
Seattle, King County, WA 98199

Cleanup Site ID: 11210  
Facility/Site ID: 95698261

Section:	26	Latitude:	47.63040
Township:	25N	Longitude:	-122.39144
Range:	3E	Tax/Parcel ID:	2314000000

*Site Scored/ranked for the August 2013 Hazardous Sites List Publication*

#### SITE DESCRIPTION:

The Elliott Bay Marina site is a former (and current) marina facility located in Seattle, King County, Washington. The 58.46-acre property is located approximately 50 feet from Elliott Bay, and zoned for Commercial (C2-40) use.

Adjacent properties include vacant land (owned by Elliott Bay Marina) and residential properties to the north, Port of Seattle facilities (Terminal 91) to the east, and Elliott Bay to the south and west.

The site is currently operated as a marina by Elliott Bay Marina.

Current site uses include marina facilities with boat moorage and a fueling dock. Marina support, retail, and condominium facilities are also located on the property.

The site is located at the southernmost end of the Magnolia neighborhood in Seattle. It includes an upland area with parking and marina support facilities, and an on-water marina with boat moorage and fueling facilities. The listed acreage (58.46) appears to include the upland and on-water portions of the property.

The Puget Sound Initiative was established by the Governor's office in 2007 with the goal of restoring the health of Puget Sound by 2020. A leading source of pollution to Puget Sound is contaminated sites around its shorelines. Ecology's Toxics Cleanup Program has identified contaminated sites within one-half mile of the Sound. This site is a Puget Sound Initiative site.

#### 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>
	2013	Elliott Bay Marina	Marina with moorage, support, and fueling facilities

#### SITE CONTAMINATION:

In 2005 the Elliott Bay Marina site was reported to Washington Department of Ecology and placed on the LUST list with ID number 6100.

A release from piping (specifically from a valve-packing nut) associated with a UST system at the site was identified during routine maintenance in 2005. The release was to subsurface soil (confirmed) and to shallow groundwater (suspected).

The site currently has two active USTs including one 10,000-gallon gasoline (unleaded) and one 10,000-gallon diesel UST. The USTs are located in the upland portion of the site, and supply fuel to dispensers located on a fueling dock at the southern end of the marina facility. The release occurred in the upland area and reportedly did not affect surface water.

Upon discovery of the release, excavation of affected soil was performed in the leak area. Impacts to soil were identified starting at approximately 4 feet bgs and excavation continued to approximately 12 feet bgs. A vault,

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pipings unions, and valves were removed to access the affected soil. The excavation was extended laterally until field observations indicated that the affected soil was removed, where accessible. Excavation was restricted in some areas by the presence of buried utilities.

A total of approximately 14 tons of petroleum-affected soil was excavated and disposed offsite.

Soil samples were collected from the excavation bottom and sidewalls and tested for gasoline and BTEX. Two of the final soil samples contained benzene at concentrations slightly above the MTCA Method A cleanup level including one bottom sample (0.16 mg/kg benzene) and one sidewall (west) sample (0.04 mg/kg benzene). A majority of the affected soil was reportedly removed during the initial remedial action.

Groundwater was encountered during excavation activities at a depth of approximately 11 feet bgs. A slight oily sheen was observed on the excavation water, but a water sample was not analyzed at the time.

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

Remedial activities have included excavation and offsite disposal of approximately 14 tons of petroleum-contaminated soil, as previously described. The UST Notice of Confirmed Release in Ecology's file indicated that bio-remediation was planned for the residual soil impacts, but no information regarding whether or not this was performed was identified in Ecology's files. No other remedial activities have been reported for the site, but three groundwater monitoring wells were installed in the vicinity of the release, including two down-gradient wells, in 2008.

Five rounds of groundwater sampling results have been reported to Ecology including results for sampling performed in June 2008, September 2008, January 2009, July 2009, and March 2013. The results for BTEX, gasoline, and oil-range TPH have all been non-detect, although gasoline was sampled only in July 2009 and March 2013. Reporting limits were all below MTCA Method A groundwater cleanup levels. Diesel-range TPH was detected in two monitoring events at a maximum concentration of 65 ug/l, well below the cleanup level of 500 ug/l. Depth to groundwater in monitoring wells was typically 8 to 9 feet bgs.

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

Residual soil impacts remain in the immediate vicinity of the release from UST system piping identified in 2005. Most of the affected soil has been removed and the remaining quantity appears to be de-minimus. Groundwater monitoring results do not indicate that groundwater (or surface water via the groundwater to surface water pathway) has been affected by the release.

The Port of Seattle Terminal 91 (T91) site is located east of Elliott Bay Marina. Impacts to soil, groundwater, and surface water have been reported for the T91 site with a range of contaminants including (but not necessarily limited to) metals, halogenated organics, solvents, TPH, phenols, PCBs and PAHs. The Ecology status for the T91 is "cleanup started".

Current site conditions include de-minimus residual impacts (benzene at concentrations nominally above MTCA Method A) to soil from the UST piping release.

The approximate depth to groundwater is 8 feet below ground surface, with groundwater flowing to the south toward Elliott Bay (assumed). Subsurface soils are sandy fill material.

#### **SPECIAL CONSIDERATIONS:**

Checked boxes indicate routes applicable for WARM scoring

**Surface Water**

Groundwater data does not indicated a potential groundwater to surface water pathway.

**Air**

Volatile contaminants present in soil.

**Groundwater**

# SITE HAZARD ASSESSMENT

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### Summary Score Sheet

Known soil impacts and shallow groundwater.

#### ROUTE SCORES:

Surface Water/ Human Health:		Surface Water/ Environment:	
Air/ Human Health:	22.3	Air/ Environment:	1.5
Groundwater/ Human Health:	27.2		

**Overall Rank: 4**

#### REFERENCES:

WARM Toxicological Database

WARM Scoring Manual

Washington Department of Transportation 24-hour Isopleth Maps, January 2006 update.  
<http://www.wsdot.wa.gov/publications/fulltext/Hydraulics/Wa24hrIsoplethMaps.pdf>

King County GIS Center iMAP application, Property Information, Groundwater Program, and Sensitive Areas mapsets. Accessed January 2013.  
<http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx>

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>

Washington State Department of Health Source Water Assessment Maps. March 2011 update.  
<https://fortress.wa.gov/doh/eh/dw/swap/maps/>

Ecology Water Resources Explorer, accessed January 2013.  
<https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx>

FEMA Map Service Center, accessed January 2013.  
<https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1>

Missouri Census Data Center, Circular Area Profiles - 2010 census data around a point location.  
<Http://mcdc.missouri.edu/websas/caps10c.html>. Accessed February 2013

UST Notice of Confirmed Release. Ecology NW Regional Office. 28 June 2005.

Early Notice Letter UST Site 101713, Elliot Bay Marina, Inc., 2601 W. Marina Pl., Seattle, WA, 98199. Ecology. 4 August 2005.

Independent Cleanup Report, Elliot Bay Marina, Underground Storage Tank System, Seattle, Washington, E-11780, ERTS No. 546854. Earth Consultants, Inc. 10 June 2005.

Groundwater Monitoring Report: Summer Quarter 2009, Elliot Bay Marina, 2601 West Marina Place, Seattle, Washington 98059. The Riley Group, Inc. 28 August 2009.

Laboratory analytical report from Friedman & Bruya, Inc. for March 2013 groundwater samples. Friedman & Bruya, Inc. 20 March 2013.

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**SITE HAZARD ASSESSMENT**  
**Worksheet 2**  
**Route Documentation**

Cleanup Site ID: 11210

Elliott Bay Marina

Facility/Site ID: 95698261

**1. SURFACE WATER ROUTE**

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

Not applicable

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

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

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

**2. AIR ROUTE**

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

Gasoline/benzene

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

Present in soil

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

Soil vapor

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

Known volatile contaminants

**3. GROUNDWATER ROUTE**

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

Gasoline/benzene

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

Present in soil

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

Groundwater

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

Known impacts to soil and shallow groundwater

**Worksheet 5**

**Air Route**

CSID: 11210

Site Name: Elliott Bay Marina

**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
Gasoline (benzene)	10	3	X	5

Highest Value 10

Bonus Points? 0

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
gasoline (benzene)	31947	3	4	6

Env. Final Matrix Value

**1.6 Substance Quantity**

Amount: 250 square feet

Basis: Estimated surface area of contaminated soil

Substance Quantity Value

**Worksheet 5**

**Air Route**

**CSID:** 11210

**Site Name:** Elliott Bay Marina

**2.0 Migration Potential**

**2.1 Containment**

Containment Value

Explain Basis: Assume 2' thick cover, no vapor collection system

**3.0 Targets**

**3.1 Nearest Population**

Population Distance Value

Less than 1000 feet to marina with live-aboard residents

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

Sensitive Environment Value

<1000 ft; Elliott Bay, Magnolia Park, Smith Cove Park

**3.3 Population within 0.5 miles**

Population Value

1363 population

**4.0 Release**

Release to Air Value

Explain basis for scoring a release to air  
no confirmed release

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

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

Where:

$$SUB_{AH} = (\text{Human toxicity} + 5) * (\text{Containment} + 1) + \text{Substance Qty}$$

$$REL_A = \text{Release to Air}$$

$$TAR_{AH} = \text{Nearest Population} + \text{Population within 1/2 mile}$$

SUB <sub>AH</sub>	152
REL <sub>A</sub>	0
TAR <sub>AH</sub>	47
<b>AIR<sub>H</sub></b>	<b>22.3</b>

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

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

Where:

$$SUB_{AE} = (\text{Environmental Toxicity Value} + 5) * (\text{Containment} + 1) + \text{Substance Qty}$$

$$REL_A = \text{Release to Air}$$

$$TAR_{AE} = \text{Nearest Sensitive Environment}$$

SUB <sub>AE</sub>	68
REL <sub>A</sub>	0
TAR <sub>AE</sub>	7
<b>AIR<sub>E</sub></b>	<b>1.5</b>

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

CSID: 11210

Site Name: Elliott Bay Marina

**1.0 Substance Characteristics**

**1.1 Human Toxicity**

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
Gasoline (benzene)	8	3	X	5

Highest Value 8  
 Bonus Points? 0  
 Toxicity Value

**1.2 Mobility**

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

**1.3 Substance Quantity**

Amount: 10 cubic yards of soil  
 Basis: Estimated volume of impacted soil remaining in-place  
 Substance Quantity Value

**2.0 Migration Potential**

**2.1 Containment** Containment Value   
 Explain Basis: Contaminated soil

**2.2 Net Precipitation** 10-20 inches Net Precipitation Value

**2.3 Subsurface Hydraulic Conductivity** Conductivity Value   
 sand

**2.4 Vertical Depth to Groundwater** Depth to Aquifer Value   
 11 feet

**3.0 Targets**

**3.1 Groundwater Usage** Aquifer Use Value   
 Industrial, domestic irrigation, commercial irrigation, fish propagation.

**3.2 Distance to Nearest Drinking Water Well** Well Distance Value   
 >2 miles

**3.3 Population Served within 2 Miles** Population Served Value   
 0 population (estimated)

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

CSID: 11210

Site Name: Elliott Bay Marina

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

Area Irrigated Value

3.2 acres

**4.0 Release**

Release to Groundwater Value

Explain basis for scoring a release to groundwater:

No confirmed release, however groundwater is in contact with affected soil in-situ

<b>Pathway Scoring - Groundwater Route, Human Health Pathway</b>	
$GW_H = (SUB_{GH} * 40 / 208) * [(MIG_G * 25 / 17) + REL_G + (TAR_{GH} * 30 / 165)] / 24$	
Where:	
$SUB_{GH} = (\text{Human toxicity} + \text{mobility} + 3) * (\text{Containment} + 1) + \text{Substance Qty}$	SUB <sub>GH</sub> 155
$MIG_G = \text{Depth to Aquifer} + \text{Net Precip} + \text{Hydraulic Conductivity}$	MIG <sub>G</sub> 14
$REL_G = \text{Release to Groundwater}$	REL <sub>G</sub> 0
$TAR_{GH} = \text{Aquifer Use} + \text{Well Distance} + \text{Population Served} + \text{Area Irrigated}$	TAR <sub>GH</sub> 7.341640786
	<b>GW<sub>H</sub> 27.2</b>



Legend:

Property location (approximate)

Notes:

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



**Elliott Bay Marina**  
**2601 West Marina Place**  
**Seattle, WA 98119**

**Site Overview Map**

**CSID 11210**  
 CSID11210.vsd

DEPARTMENT OF  
**ECOLOGY**  
 State of Washington

## Washington Ranking Method Route Scores Summary and Ranking Calculation Sheet

**Site Name:** Ellitott Bay Marina

**CSID:** 11210

**Site Address:** 2601 W Marina Place, Seattle, 98119

**FSID:** 95698261

### HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	na	0
Air	22.3	4
Groundwater	27.2	2

H=	4
M=	2
L=	0

$$\frac{H^2 + 2M + L}{8} = \frac{16 + 4 + 0}{8} = 3$$

**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	na	0
Air	1.5	1

H=	1
L=	0

$$\frac{H^2 + 2L}{7} = \frac{1 + 0}{7} = 1$$

**Environment  
Priority Bin Score:**

**1**

rounded up to  
next whole  
number

**Comments/Notes:**

**FINAL  
MATRIX  
RANKING**

**4**

### 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 - February 2013 Values**

Quintile	Human Health			Environment	
	Surface Water	Air	Ground Water	Surface Water	Air
5	>= 27.0	>= 32.0	>= 50.1	>= 47.0	>= 32.0
4	>= 18.5	>= 21.1	>= 40.4	>= 30.3	>= 26.1
3	>= 12.4	>= 13.1	>= 31.6	>= 21.4	>= 21.1
2	>= 7.5	>= 7.1	>= 22.4	>= 11.0	>= 14.6
1	< 7.5	< 7.1	< 22.4	< 11.0	< 14.6

Quintile value associated with each route score entered above