

**Site Hazard Assessment
Worksheet 1
Summary Score Sheet**

SITE INFORMATION

Name: ~~Marine View Sand & Gravel~~2 Tacoma Port of Parcel 88
Address: 1621 Marine View Dr.
City: Tacoma, **County:** Pierce **State:** WA **Zip:** 98422
Section/Township/Range: 36/21N/03E
Latitude: 47° 15' 35.9"N **Longitude:** 122° 21' 16.5"W
Facility Site ID Number: 34114562

Site assessed/ranked for August 20, 2008 update

July 7, 2008

Site Description (Include management areas, substances of concern, and quantities):

Marine View Sand and Gravel operated over seven parcels and two different addresses, 1621 and 1635 Marine View Drive. 1621 Marine View Drive encompasses almost 51.9 acres over six (6) parcels (APN's: 042131-3007, -3010, -3048, -3049, -3073, and -3090). The property located at 1635 Marine View Drive is comprised of one 31.3 acre parcel, 0421313091. The contamination issues addressed in this Site Hazard Assessment (SHA) are restricted to 1621 Marine View Drive's twenty seven (27) acre parcel (APN 0421313048).

GeoEngineers prepared a Phase I and Phase II Environmental Site Assessment (ESA) and Fill Material Evaluation for the Port of Tacoma, dated May 27, 2005, as part of a potential purchase transaction by the Port of Tacoma. The Port has since finalized that purchase. The following information is a summary of the information presented in GeoEngineer's report.

The site is an existing aggregate borrow pit and an inert waste recycling/disposal facility. The eastern portion of the site is located on, and adjacent to, a steep bluff that forms the eastern margin of the Tacoma Tideflats. The elevation ranges from about twenty feet (20') above mean sea level (MSL) on the west side to four hundred feet (400') above MSL on the east side. Hylebos Creeek borders the site on the south and Marine View Drive borders the west side.

The Phase II ESA investigated soil and groundwater conditions at the site with 19 test pits excavated, 17 hand excavations, 4 borings drilled, and the borings completed as groundwater monitoring wells. The primary focus of the sampling occurred on parcel 0421313048 at 1621 Marine View Drive and that is where soil contamination was detected. Soil samples were collected and selectively analyzed for Hydrocarbon Identification (HCID), and/or diesel range total petroleum hydrocarbons (NWTPH-dx), semivolatile organic compounds (SVOCs), metals; very limited sampling for and analysis of gasoline range total petroleum hydrocarbons (NWTPH-gx), volatile organic compounds (VOCs), and asbestos was also conducted.

Soil analysis results indicated contamination was present in the soils on parcel 0421313048, with heavy oil concentrations exceeding Model Toxics Control Act Method A Cleanup Levels (MTCA CULs) in soils between the repair shop and log cabin, and arsenic and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) exceeding MTCA CULs in the fill/soil material adjacent to Hylebos Creek. GeoEngineers estimated that 9,000 cubic yards of petroleum impacted material was present in the vicinity of the repair shop and a log cabin.

Specifically, sample TP2-S2 contained concentrations of benzo (a) pyrene of 0.46 mg/kg and was collected at a depth of nine to nine and one-half feet below ground surface (9' – 9.5' bgs), sample TP3-S1 contained concentrations of Arsenic of 34 mg/kg and Total cPAHs of 2.09 mg/kg and was collected at a depth of three to three and one-half feet (3'-3.5') bgs, and sample TP15-S1 contained concentrations of TPH-Heavy Oil of 2,300 mg/kg and was collected at a depth of one foot to one and one-half feet (1' – 1.5') bgs. TP3 was also sampled (TP3-S2) at a lower depth of thirteen and one-half feet to fourteen feet (13.5' – 14') bgs. The laboratory results indicate that significant SVOC and cPAH contamination was not present at this depth in this location (TP3). Deeper soil investigation was not conducted at the locations of TP2 and TP15.

Two monitoring wells (MW1 and MW2) were advanced along the southern edge of the property bordering Hylebos Creek. One monitoring well (MW3) was advanced at the southern edge of the repair shop. A fourth monitoring well (MW4) was advanced at the north end of the site adjacent to "Marineview Drive". Groundwater was encountered between twelve and twenty feet. The groundwater was sampled and analyzed for HCID and total metals; results were non-detect for those parameters. Hylebos Creek was not directly sampled, but a number of surface water samples were collected from ponded water on the site and field tested for pH. High pH levels were found in ponded surface water near the repair shop and on fill rubble on the hillside, and attributed to the presence of concrete fill at the site.

An evaluation of the fill material was also conducted. The site generally consisted of very dense native sand and gravel soils, overlain along Hylebos Creek by soft alluvial and tidal marsh soils. A variety of imported fill materials partially overlays the site in previously mined areas. GeoEngineers estimated that about 1,200,000 cubic yards of fill material was present with soil comprising approximately 1,112,000 cubic yards of the fill material. The remainder of the material consisted of stockpiled processed concrete and asphalt aggregate, concrete and asphalt rubble, and crushed window debris.

On April 20, 2007, the Port of Tacoma forwarded copies of two reports prepared by Environmental Chemical Solutions (ECS), dated May 19, 2006 and May 25, 2006. Both reports were prepared by ECS for the prior owner of the property.

ECS's remediation efforts were restricted to two areas identified by GeoEngineers as TP15, where heavy oil was detected above MTCA CULs, and TP10, where gasoline was detected at levels approaching the MTCA CUL when combined with benzene detection. No remediation efforts were undertaken in the vicinity of Hylebos Creek where soil was found to be contaminated with arsenic and cPAHs at concentrations exceeding MTCA CULs.

ECS excavated both locations in a volume described identically at each location as being 15 foot square and about 18 inches deep. The excavated soils were stockpiled on site, treated with "nutrients" of some sort, and remain on site. Five soil confirmation samples were collected from each excavation at a depth ranging from six to twelve inches and another five samples were collected from each excavation's stockpile

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for characterization. Each set of five samples was subsampled and composited prior to analysis, rendering the results unacceptable for confirmation of clean limits within the excavations. Two pre-existing stockpiles of soil were also sampled in a similar manner, with compositing subsamples prior to analysis, as were soil samples collected from the excavated soils stockpile after 20 days of treatment.

All samples were submitted to Spectra Laboratories for HCID analysis, with follow-up quantification for gasoline or diesel range organics as needed. Diesel and oil were detected in all samples, but at concentrations significantly below MTCA CULs. The laboratory report included limited lab QA/QC on the samples; method blanks, replicates, and matrix spikes were not provided in the lab report provided by ECS.

The deficiencies in ECS' remediation efforts were reported to Mr. Hooton, who stated the contamination issues at this site will likely be addressed by the Port in several years as part of a redevelopment package.

Characterization of the excavation margins was inadequate and the arsenic and cPAH contamination in the vicinity of Hylebos Creek was not addressed at all.

GeoEngineers estimated that 9,000 cubic yards of petroleum impacted material was present in the vicinity of the repair shop and a log cabin, ECS reports to have removed and remediated approximately 25 cubic yards. Due to the concerns of ECS' sampling methodology the potential that more than 8,000 cubic yards of petroleum contaminated soil remains.

On September 13, 2007, the TPCHD recommended including this site on Ecology's Confirmed and Suspected Contaminated Sites list (CSCS), and inclusion in the Puget Sound Initiative sites list.

On June 24, 2008, the TPCHD conducted a site visit in support of this SHA. Weather conditions were partly sunny and the temperature was approximately 70°F. The area of former test pit fifteen (TP-15) was identified. Soil staining or odor was not observed. Ambient air field screening with a photoionization detector did not indicate elevated concentrations of VOCs. The surface area around TP-15 consisted of hard packed dirt and gravel. The two monitoring wells (MW-1 and MW-2) advanced in the vicinity of Hylebos Creek were located. Both were intact and appeared to be in good condition. The shoreline of Hylebos Creek was visually examined. No obvious staining of the sediment or surface water was apparent.

Special Considerations (Include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site):

The air route was not scored because significant contamination lies in the subsurface soil.

The surface water pathway's containment value was scored to reflect the subsurface nature of the contamination.

ROUTE SCORES:

Surface Water/Human Health: 4.5

Surface Water/Environ. 10.7

Air/Human Health: NS

Air/ Environmental: NS

Ground Water/Human Health: 61.3

OVERALL RANK: 3

Worksheet 2--Route Documentation

1. SURFACE WATER ROUTE:

- a. List those substances to be considered for scoring:

Source: 1,2

Arsenic
cPAHs (Benzo[a]pyrene)

- b. Explain basis for choice of substances(s) to be used in scoring:

The substance listed above will be scored for the surface water route due to levels detected in contaminated subsurface soil, and because it was available to the surface water route through less than perfect containment.

- c. List those management units to be considered for scoring:

Source: 1,2

Spills, discharges, and soil contamination.

- d. Explain basis for choice of unit to be used in scoring:

Contaminated soil presence is likely due to fill material consisting of wood-waste(s).

2. AIR ROUTE: *Not Scored*

3. GROUND WATER ROUTE:

- a. List those substances to be considered for scoring:

Source: 1,2

Arsenic
cPAHs (Benzo[a]pyrene)
TPH- Heavy Oil

- b. Explain basis for choice of substances(s) to be used in scoring:

The substances listed above will be scored for the groundwater route due to levels detected in subsurface soils and because it was available to the groundwater route through less than perfect containment.

- c. List those management units to be considered for scoring:

Source: 1,2

Landfill with no liner system, compacted soil cover, no leachate collection system, and no liquids present.

- d. Explain basis for choice of unit to be used in scoring:

Contaminated subsurface soil capped with remediated soil.

Worksheet 4 - Surface Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity										
Substance	Drinking Water Standard (ug/l)	Val.	Acute Toxicity (mg/kg-bw)	Val.	Chronic Toxicity (mg/kg-bw)	Val.	Carcinogenicity		Val.	
							WOE	PF*		
1	Arsenic	10	8	763 (rat)	5	0.001 (RfD)	5	A	1.75	7
2	Benzo[a]pyrene	0.2	10	50 (rat)	10	--	--	B2	12	7
3										
4										
5										
6										

*Potency Factor

Source: 2,3
Highest Value: 10
(Max=10)
Plus 2 Bonus Points? 2
Final Toxicity Value: 12
(Max=12)

1.2 Environmental Toxicity

Substance	<input checked="" type="checkbox"/> Freshwater <input type="checkbox"/> Marine Acute Water Quality Criteria		Non-human Mammalian Acute Toxicity (mg/kg)		
	Value	Value	Value	Value	
1	Arsenic	360 ug/l	4	763 (rat)	5
2	Benzo[a]pyrene	ND	--	50 (rat)	10
3					
4					
5					
6					

Source: 2,3
Value: 10
(Max 10)

1.3 Substance Quantity

Substance Quantity: 5,000 yd³

Source: 1,2
Value: 8
(Max 10)

Explain Basis: Estimate of fill material in vicinity of known contamination consisting of concrete and wood debris.

Worksheet 4 (cont'd)

2.0 MIGRATION POTENTIAL

		SOURCE	VALUE
2.1	Containment: Contaminated Soil Explain Basis: Contaminated subsurface soil covered with clean soil.	1, 2, 8	0 (Max = 10)
2.2	Surface Soil Permeability: Adjacent to surface water.	1, 2	7 (Max = 7)
2.3	Total Annual Precipitation: 37"	2, 6	3 (Max = 5)
2.4	Max. 2-Yr/24-hour Precipitation: 2.5 inches	2	3 (Max = 5)
2.5	Flood Plain: Zone A1 on FIRM	2, 8	2 (Max = 2)
2.6	Terrain Slope: <2%	1, 2	1 (Max = 5)

3.0 TARGETS

		SOURCE	VALUE
3.1	Distance to Surface Water: Adjacent to site, < 1,000 ft	1, 2, 7	10 (Max = 10)
3.2	Population served within 2 miles (See WARM Scoring Manual regarding direction): $\sqrt{\text{pop.}} = \sqrt{0} = 0$	2, 5, 7	0 (Max = 75)
3.3	Area irrigated within 2 miles: $(0.75) \sqrt{\text{no. acres (39)}} = 4.68$ (Refer to note in 3.2.) : $(0.75) \sqrt{0} = 0$	2, 4	5 (Max = 30)
3.4	Distance to nearest fishery resource: Adjacent to Hylebos Creek, A fishery resource for Chinook Salmon	2, 7	12 (Max = 12)
3.5	Distance to, and name(s) of, nearest sensitive environment(s) Adjacent to Hylebos Creek, A fishery resource for Chinook Salmon	2, 7	12 (Max = 12)

4.0 RELEASE	Source	Value
Explain basis for scoring a release to surface water: Release not confirmed.	1, 2	0 (Max = 5)

Worksheet 6 – Ground Water Route

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human Toxicity										
Substance	Drinking Water Standard (ug/l)	Val	Acute Toxicity (mg/kg-bw)	Val	Chronic Toxicity (mg/kg/day)	Val	Carcinogenicity		Val	
							WOE	PF*		
1	Arsenic	10	8	763 (rat)	5	0.001 (RfD)	5	A	1.75	7
2	Benzo[a]pyrene	0.2	10	50 (rat)	10	--	--	B2	12	7
3	TPH-Oil	ND	--	ND	--	2.0 (RfD)	1	ND	--	--
4										
5										
6										

*Potency Factor

Source: 2,3

Highest Value: 10

(Max=10)

Plus 2 Bonus Points? 2

Final Toxicity Value: 12

(Max=12)

1.2 Mobility (Use numbers to refer to above listed substances)	
Cations/Anions:	Solubility (mg/l):
1= Arsenic = 3	1=
2=	2= Benzo [a] pyrene = 0.001 mg/l = 0
3=	3= TPH-Oil = 0.0066 mg/l = 0
4=	4=
5=	5=
6=	6=
	Source: <u>2,3</u> Value: <u>3</u> (Max=3)

1.3 Substance Quantity: 14,875 cubic yards

Explain basis: Sum of 5,000 yd³ reported quantity of fill material consisting of concrete rubble and wood debris and remaining 8,975 yd³ of petroleum contaminated soil near the repair shop.

Source: 1,2

Value: 9

(Max=10)

Worksheet 6 (cont'd)

2.0 MIGRATION POTENTIAL

2.1	Containment: spills, discharges, and contaminated soil. Explain basis: contaminated subsurface soil	Source: <u>1, 2, 8</u>	Value: <u>10</u> (Max = 10)
2.2	Net precipitation: <u>19.1 inches</u>	Source: <u>2, 6</u>	Value: <u>2</u> (Max = 5)
2.3	Subsurface hydraulic conductivity: sand and gravel	Source: <u>1, 2</u>	Value: <u>4</u> (Max = 4)
2.4	Vertical depth to ground water: 12-20 feet	Source: <u>1, 2</u>	Value: <u>8</u> (Max = 8)

3.0 TARGETS

3.1	Ground water usage: Aquifer recharge area, ground water public supply (greater than two households); no alternate unthreatened sources available.	Source: <u>2, 7</u>	Value: <u>9</u> (Max = 10)
3.2	Distance to nearest drinking water well: <u>~3,000 feet</u> (City of Fife Public Works)	Source: <u>2, 7</u>	Value: <u>2</u> (Max = 5)
3.3	Population served within 2 miles: $\sqrt{\text{pop.}} = \sqrt{6141} = 78.36$	Source: <u>2, 5, 7</u>	Value: <u>79</u> (Max = 100)
3.4	Area irrigated by (groundwater) wells within 2 miles: (0.75) $\sqrt{0}$ No. acres = 0	Source: <u>2, 4</u>	Value: <u>0</u> (Max = 50)

4.0 RELEASE

	Explain basis for scoring a release to ground water: Release not confirmed.	Source: <u>1, 2</u>	Value: <u>0</u> (Max = 5)
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Sources Used in Scoring

1. Tacoma-Pierce County Health Department Site Hazard Assessment File/Ecology TCP File
2. Washington State Department of Ecology, WARM Scoring Manual, April 1992.
3. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992.
4. Water Rights Application Tracking System (WRATS), Ecology
5. Washington State Department of Health Public Water Supply System
6. Washington Climate for Pierce County, National Weather Service Forecast Office
7. Pierce County Geographic Information System Countyview Database
8. June 24, 2008, SHA Site Visit