SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 11307

Port of Seattle Terminal 115

Facility/Site ID: 98422914

6020 W Marginal Way SW

Seattle, King County, WA 98106

Section:	30	Latitude:	47.54116
Township:	24N	Longitude:	-122.34277
Range:	4E	Tax/Parcel ID:	5367202505

Site scored/ranked for the Hazardous Sites List Publication: August 2015

SITE DESCRIPTION:

The Port of Seattle Terminal 115 site (Site) is a former and current cargo terminal and property serving a variety of other industrial and commercial activities located in Seattle, King County, Washington. The 98.71-acre property is located adjacent to the Lower Duwamish Waterway (LDW), and zoned for industrial (IG1 U/85) use.

The Site is bound to the east by the LDW, to the west by West Marginal Way Southwest, and to the south by Southwest Michigan Street. Adjacent properties include Glacier Northwest, Inc to the north, and Sea Way Marine to the south.

The Site is currently operated as a marine cargo handling facility by Port of Seattle.

Over two-thirds of the Site is leased and operated by Northland Services. Northland Services loads and unloads barges and handles intermodal containers and other cargo. The southern portion of the Site is leased to Seafreeze Cold Storage, where fish is processed and stored prior to transport and distribution. Other areas of the property are leased and operated as a cardlock (Shultz Distributing) and for other maintenance and storage activities (Sea Pac Transport Services).

The Site is located adjacent to the Lower Duwamish Waterway, along the west bank between river miles 1.6 and 2.1, and is part of the RM 1.6 - 2.1 West Terminal 115 Source Control Area. Another state cleanup site, Terminal 115N (Cleanup Site ID [CSID] 1229), is occupied by Gene Summy Lumber Company and Commercial Fence Corporation and is currently being managed under an Agreed Order No. DE8099 (effective March 2011) between the Port of Seattle and Ecology for further site investigation and cleanup activities. The Terminal 115N site is located northwest of Terminal 115.

Two National Pollutant Discharge Elimination System (NPDES) stormwater permits are active at the Site - Northland Services holds permit WAR000471, and Seafreeze Cold Storage holds permit WAR127040. Stormwater at the Site is managed by the two above Industrial Stormwater General permits. Reportedly, eight active stormwater outfalls are present along the eastern boundary of the site, as well as one combined sewer overflow (CSO) outfall, all discharging to the LDW.

The Site is topographically flat, and was paved with asphalt in 1986, with a few gravel-covered areas and very little vegetation. Four berths are present along the LDW frontage for purposes of mooring barges and other vessels during cargo handling activities. Prior to approximately 1915, the Site was a meander bend of the Duwamish River. The current terminal was constructed between 1915 and 1974 through a series of dredging activities to construct the current waterway configuration, bulkhead construction, and filling events. Much of the Site is constructed on up to 15 feet of fill materials obtained from dredging or other sources.

SITE BACKGROUND:

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

From	To	Operator/Tenant	Activity

1930	1949	Texaco	Gas & service station at 460 W Michigan St
1949	1956	SAV-MOR	Gas & service station at 460 W Michigan St
1938	1964	Richfield	Service station at far SE corner of site
1952	1964	Unknown	Reportedly a refinery was present at far SE corner of site
1923	1965	Standard Oil	Service station at far SE corner of site
1917	1970	Boeing Plant 1	Manufacturing (south end of site now occupied by Seafreeze Cold Storage)
1922	1970	Klinker Sand & Gravel	Gravel mining & mixing, ready-mix concrete plant during 1960s
1963	1970	Unknown	Tavern in former gas station at 460 W Michigan St
1952	1985	Materials Reclamation and Maralco Alumium	Aluminum smelter (current Shultz Distribution location)
1981	1991	Crowley Marine Services	Rail car loading, also tug, barge and vessel maintenance and repir
1995	1996	Foley Cardlock	Cardlock/bulk fueling
1986	2002	JORE Services	Cargo handling on & off barges, storage lot
2003	2008	Smoki Seafood	Fish processing & cold storage (company purchased by Icicle Seafood)
1978	2014	Seafreeze Cold Storage	Fish processing and cold storage
1989	2014	Sea Pac Services	Warehouse, equipment storage & maintenance
1996	2014	Shultz Distributing	Cardlock/bulk fueling
1998	2014	Northwest Container Services	Loading, storage, maintenance and rapir of intermodal and shipping containers
2002	2014	Northland Services	Cargo and intermodal container handling
2008	2014	Icicle Seafood	Fish processing & cold storage

SITE CONTAMINATION:

In 1993 the Port of Seattle Terminal 115 site was reported to Washington State Department of Ecology (Ecology) and placed on the Leaking Underground Storage Tank (LUST) list.

Terminal 115 was originally listed with Ecology on the basis of an underground storage tank (UST) release reported in 1993. Ecology's Integrated Site Information System (ISIS) database, lists benzene, lead, non-halogenated solvents, diesel, and gasoline as confirmed at concentrations above cleanup levels in Site soil and/or groundwater.

Concentrations of diesel-range hydrocarbons in soil above MTCA Method A cleanup levels were detected in two samples collected following excavation and removal of a UST located near Berth 1. The tank (Tank No. 33) was removed in April 1993. Approximately 220 tons of petroleum-impacted soil were excavated, and confirmation soil samples indicated diesel concentrations were below MTCA Method A cleanup levels. Groundwater was

encountered at 13 feet below ground surface (bgs) and a groundwater grab sample was collected from the excavation and analyzed for diesel-range hydrocarbons. Results of that groundwater sample (8,000 micrograms per liter [ug/L]) indicated diesel was present at a concentration above the MTCA Method A cleanup level.

PAST REMEDIATION ACTIVITIES:

In April 2011, Sound Earth Strategies prepared an Environmental Conditions Report (ECR) for the Terminal 115 property, on behalf of the Port of Seattle. The findings in the ECR were later incorporated into the Summary of Existing Information and Data Gaps Summary Report prepared by Ecology and SAIC for the Terminal 115 source control area. The ECR and Data Gaps summary report reviewed available historic records and information available regarding prior site activities, ownership and tenants, environmental investigations, waste management, and state and federal databases. A number of Issues of Environmental Concern (IECs) were identified and are summarized below. The ECR and Data Gaps summary report contain more detailed information regarding the complete history of development and dredging and fill activities, as well as individual investigations previously conducted.

The Terminal 115 property has been altered from its natural state by the addition of fill materials over a period of time beginning in approximately 1915. Fill materials used to construct the current Site are known to be a combination of dredge spoils and imported fill materials. Previous reports by others have suspected cement kiln dust (CKD) may have been used in fill materials, particularly near the location of the former Turning Basin No. 1 (reportedly located near the northen portion of the site), however this has not been confirmed in documentation or analytical findings. As identified in the ECR, no investigations have been conducted to assess impacts to soil or groundwater associated with fill materials used at the Site.

Boeing Plant 1 is identified in the ECR and Data Gaps summary report as IEC-4. Between 1917 and approximately 1970, Boeing Plant 1 occupied much of the southern portion of the site, currently occupied by Seafreeze Cold Storage. The nature of prior manufacturing activities and waste disposal practices suggest environmental impacts to soil and/or groundwater may be present, however no sampling or analytical data is available to confirm impacts. The report indicates that a number of USTs and aboveground storage tanks (ASTs) have been present at the site, and sumps were used in Boeing's manufacturing activities. The report also states that chromic acid was used and spent acid was disposed into Turning Basin No. 1 (no longer present). Reportedly a 26,000-volt electric transformer was located in a transformer house prior to 1968, however it is unknown whether polychlorinated biphenyl(PCB)-containing oils were present or used. The Boeing Plant 1 facility was demolished during the 1970s and redeveloped as a fish processing and cold storage facility in 1978.

Reportedly gasoline and service stations, as well as a refinery, were operated prior to 1965 in the far southeast corner of the Terminal 115 property, near the northeast corner of 2nd Ave Southwest and Southwest Michigan Street. These areas are identified as IEC-1, -2 and -3 in the ECR and Data Gaps summary report. No soil or groundwater analytical data was available for review to confirm potential environmental impacts which may have occurred as a result of past operations.

A former gasoline service station was located in the far southwest corner of the property prior to 1970. This facility was located at the northeast corner of Highland Park Way Southwest and West Marginal Way Southwest, and is identified as IEC-6. Reportedly USTs and ASTs were used to store fuel at the site, and a former service garage was present with a hydraulic vehicle lift. The service station was operated by Texaco, and later SAV-MOR, and was demolished by 1970. No soil or groundwater analytical data was available for review to confirm potential environmental impacts which may have occurred as a result of past operations.

In 1994, three 6,000-gallon USTs were encountered and removed, along with reportedly 750 cubic yards of petroleum impacted soil from the former Boeing Plant 1 area. The three tanks were located along the south side of the current Seafreeze fish processing facility, immediately north of Southwest Michigan Street. The confirmed release of petroleum hydrocarbons to soil and groundwater is identified in the ECR and Data Gaps summary report as IEC-5. Free-phase hydrocarbons were observed on groundwater, and several monitoring wells were installed at the site. Reportedly four monitoring wells are still present in this area, MW-8 in the tank release area, MW-9 located upgradient (to the west) and MW-10 and MW-11 are located downgradient (to the east).

IEC-7 and IEC-8 are located near the current Shultz cardlock facility. An old aluminum smelter was operated in this area between approximately 1952 and 1985. In 1995-1996, a 9,500-gallon UST containing diesel/heating oil, and a 600-gallon heating oil UST were removed from the site, as well as petroleum contaminated soils. Free-

phase hydrocarbons were encountered in groundwater in this area beginning in 1995. In 1996, three 10,000-gallon USTs were installed as part of the current Shultz cardlock fueling facility. In 1998, high-vacuum extraction and hydrogen peroxide treatment alternatives were considered to address free-phase hydrocarbons in groundwater, as well as concentrations of diesel in groundwater at wells MW-15 and MW-16 which reportedly exceeded MTCA Method A cleanup levels for diesel. A network of recovery wells was installed at the site for product-recovery and remediation activities. Groundwater was sampled in 2009, during which time diesel was reportedly present in well MW-19 at concentrations exceeding the MTCA Method A cleanup level, and additional groundwater sampling activities were planned for 2011, but no information is available in Ecology's files to confirm whether this occurred.

The area identified as IEC-12 is the area originally listed for Terminal 115 Site, related to a LUST release near the current W-2 Maintenance building. In April 1993, one UST and 220 tons of diesel-range hydrocarbon contaminated soil were reportedly removed. Reportedly, concentrations of oil-range hydrocarbons in soil exceeded the MTCA Method A cleanup levels at MW6, however groundwater samples reported concentrations below MTCA Method A cleanup levels for petroleum hydrocarbons. Soils may still be present above MTCA Method A cleanups levels, and current groundwater conditions are not known.

A former car wash was located in the central portion of the site, and has been identified as IEC-10 in the ECR and Data Gaps summary report. In 1989, a 5,000-gallon kerosene UST was reportedly removed, and soil sampled contained concentrations of diesel exceeding MTCA Method A cleanup levels (up to 20,000 parts per million [ppm]). Reportedly, four groundwater monitoring wells were installed in the area, however no groundwater analytical data was available for review.

CURRENT SITE CONDITIONS:

Sediments in the Lower Duwamish Waterway are currently being managed as part of the LDW Superfund Site. In support of these cleanup activities, Ecology is managing source control investigation activities to reduce potential re-contamination of Lower Duwamish sediments. Chemicals of concern in sediment adjacent to Terminal 115 have been identified based on sampling activities conducted between 1997 and 2010. Chemicals of concern in sediment include several polycyclic aromatic hydrocarbons (PAHs), PCBs, phthalates, semi-volatile organic compounds (SVOCs), dioxins and furans, and organo-tin compounds. The upland portion of the Terminal 115 site may present several potential pathways, including stormwater runoff, stormwater discharge through outfalls, and groundwater discharges. It is unclear which, if any chemicals of concern in sediment are present in the upland portions of the Site.

The Terminal 115N site is being separately managed and considered under an Agreed Order between Ecology and the Port of Seattle. The adjacent Glacier/Reinhold site is also being managed under a separate Agreed Order. Site stormwater runoff and discharge is being monitored by Ecology's Water Quality division under existing NPDES Industrial Stormwater General permits.

Portions of the Site have soils and groundwater confirmed to be impacted by diesel- and gasoline- range hydrocarbons, lead, and benzene. Toluene, ethylbenzene and xylenes are suspected hazardous substances associated with gasoline-range hydrocarbon impacts to soil and groundwater. A number of areas of environmental concerns or past issues have been identified at the Site, where othercompounds may be present in soil and/or groundwater.

The approximate depth to groundwater is 10 to 15 feet below ground surface, with groundwater flowing to the east (toward Lower Duwamish Waterway; based on confirmed hydraulic connectivity to surface water). Subsurface soils are silty sands and gravels derived from imported and dredged fill materials (based on fill history and lithologic descriptions from previous environmental investigations).

SPECIAL CONSIDERATIONS:

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

☑ **Surface Water**

Confirmed impacted soils and groundwater at the site. Affected groundwater may be discharging to adjacent surface water. Stormwater runoff is managed under two NPDES permits.

☑ **Air**

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Shallow soils and groundwater are confirmed to be impacted by gasoline and volatile contaminants, which are potentially available for vapor-phase transport.

☑ **Groundwater**

Confirmed and suspected releases of hydrocarbons and associated compounds to groundwater at the site.

Several areas of the site where potential environmental impacts may be present, have been identified in the Past Remediation Activities. For example, in the Boeing Plant 1 area additional chemicals of concern such as PCBs may be present, but are not confirmed. Groundwater and soil analytical data were not available for a number of identified areas of concern, and the actual lateral and vertical extents of impacted soil and groundwater and the list of chemicals of concern are not fully defined. Chemicals of concern in sediment located in the LDW include PAHs, PCBs, phthalates, SVOCs, organo-tin compounds, dioxins and furans. The sources of these materials, particular upland sources located on this Site, have not be identified or fully characterized.

ROUTE SCORES:

Surface Water/ Human Health:	21.3	Surface Water/ Environment:	37.0
Air/ Human Health:	11.4	Air/ Environment:	1.3
Groundwater/ Human Health:	47.9		

Overall Rank: 3

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19 Port of Seattle, 1989, Port of Seattle Record of Closure of Underground Storage Tank. 18 July.

20 Port of Seattle, 1996, Letter report documenting the abandonment of three monitoring wells at Terminal 115. 30 May.

21 SAIC, 2011, Lower Duwamish Waterway RM 1.6 to 2.1 West (Terminal 115) Summary of Existing Information and Identification of Data Gaps. June 2011

22 Sound Earth Strategies, 2011, Terminal 115 Environmental Conditions Report. 6 April 2011

23 WARM Scoring Manual

24 WARM Toxicological Database

25 Washington Department of Transportation 24-hour Isopluvial Maps, January 2006 update. http://www.wsdot.wa.gov/publications/fulltext/Hydraulics/Wa24hrIspoluvials.pdf

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 11307 Port of Seattle Terminal 115

Facility/Site ID: 98422914

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Gasoline, diesel, benzene, ethylbenzene, toluene and xylenes

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

Confirmed or highly suspected to be present in surface water or discharged to surface water by groundwater.

List those management units to be considered for scoring:

Lower Duwamish Waterway, stormwater and groundwater discharging to surface water.

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

Confirmed hydraulic connectivity and confirmed impacts to sediments in surface water.

2. AIR ROUTE

List those substances to be considered for scoring:

Gasoline, benzene, toluene, ethylbenzene, and xylenes

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

Confirmed or highly suspected to be present in shallow soil or groundwater.

List those management units to be considered for scoring:

Soil vapor

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

Substances are present in shallow soil or groundwater and available for vapor phase transport to air.

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Gasoline, diesel, benzene, ethylbenzene, toluene and xylenes

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

Confirmed or highly suspected to be present in Site soil and/or groundwater. Other substances may be present but are not considered as their inclusion would not change the Toxicity Value.

List those management units to be considered for scoring:

Site groundwater.

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

Confirmed impacts to soil and groundwater.

Worksheet 4

Surface Water Route

CSID: 11307 **Site Name:** Port of Seattle Terminal 115

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
diesel	4	5	3	X
ethylbenzene	4	3	1	X
toluene	2	3	1	X
xylenes	2	10	1	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
gasoline/benzene	5100	2	3306	3
diesel	2350	2	490	5
ethylbenzene	430	4	3500	3
toluene	6300	2	5000	1
xylenes	X	X	5000	1

(assumes Marine WQC)

Environmental Toxicity Value 4

1.3 Substance Quantity

Amount: 5000 square feet

Basis: Estimated aerial extent of soil contamination. Actual contributing area may be different following site characterization activities.

Substance Quantity Value 7

2.0 Migration Potential

2.1 Containment

Containment Value 10

Explain Basis: Impacted groundwater discharges to Lower Duwamish Waterway

2.2 Surface Soil Permeability

Soil Permeability Value 3

Sandy-silt in saturated soil, ground surface is paved with asphalt

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 floodplain

2.6 Terrain Slope

Slope Value 1

< 2%

Worksheet 4

Surface Water Route

CSID: 11307 **Site Name:** Port of Seattle Terminal 115

3.0 Targets

3.1 Distance to Surface Water — Surface Water Distance Value: 10

Depending on source area, between 150 and 1500 feet

3.2 Population Served within 2 miles — Population Value: 0

0 people

3.3 Area Irrigated within 2 miles — Irrigation Value: 0

0 acres

3.4 Distance to Nearest Fishery Resource — Fishery Value: 12

<150' to Lower Duwamish Waterway

3.5 Distance to and Name of Nearest Sensitive Environment — Sensitive Environment Value: 12

<150' to Lower Duwamish Waterway

4.0 Release — Release to Surface Water Value: 0

Explain basis for scoring a release to surface water

No confirmed release to surface water, however groundwater is hydraulically connected

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	SUB_{SH}	172
MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope	MIG_S	10
REL_S = Release to Surface Water	REL_S	0
TAR_{SH} = Distance to Surface Water + Population Served by Surface Water + Area Irrigated	TAR_{SH}	10.0
	SW_H	21.3

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	SUB_{SE}	84
MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope	MIG_S	10
REL_S = Release to Surface Water	REL_S	0
TAR_{SE} = Distance to Surface Water + Distance to Fishery + Distance to Sensitive Environment	TAR_{SE}	34.0
	SW_E	37.0

Worksheet 5

Air Route

CSID: 11307 **Site Name:** Port of Seattle Terminal 115

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
toluene	1	X	1	X
ethylbenzene	1	X	X	X
xylenes	1	3	1	X

Highest Value 10

Bonus Points? 0

Toxicity Value 10

1.3 Mobility

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

Mobility Value 4

1.4 Final Human Health Toxicity/Mobility Matrix Value **HH Final Matrix Value** 20

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
xylenes	21714	3	3	5

Env. Final Matrix Value 6

1.6 Substance Quantity

Amount: 5,000 square feeet

Basis: Assumed surface area of soil contamination

(less than 1% of total surface area of site) Substance Quantity Value 5

Worksheet 5

Air Route

CSID: 11307 **Site Name:** Port of Seattle Terminal 115

2.0 Migration Potential

2.1 Containment Containment Value: 5

Explain Basis: Contaminated soil with assumed cover of 2 feet (including asphalt) and no functioning vapor collection system

3.0 Targets

3.1 Nearest Population Approximately 1/2 mile Population Distance Value: 6

3.2 Distance to and name of nearest sensitive environments Sensitive Environment Value: 6

Approximately 1,500' west to Puget Park

3.3 Population within 0.5 miles Population Value: 17

304 population

4.0 Release Release to Air Value: 0

Explain basis for scoring a release to air:

No 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_{AH} =(Human toxicity + 5) * (Containment + 1) + Substance Qty	SUB_{AH}	155
REL_A = Release to Air	REL_A	0
TAR_{AH} = Nearest Population + Population within 1/2 mile	TAR_{AH}	23
	AIR_H	11.4

Pathway Scoring - Air Route, Environmental Pathway

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

Where:

SUB_{AE} =(Environmental Toxicity Value +5)*(Containment +1) +Substance Qty	SUB_{AE}	71
REL_A = Release to Air	REL_A	0
TAR_{AE} = Nearest Sensitive Environment	TAR_{AE}	6
	AIR_E	1.3

Worksheet 6

Groundwater Route

CSID: 11307 **Site Name:** Port of Seattle Terminal 115

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
diesel	4	5	3	X
ethylbenzene	4	3	1	X
toluene	2	3	1	X
xylenes	2	10	1	X

Highest Value 10

Bonus Points? +2

Toxicity Value 12

1.2 Mobility

Cations/Anions Max Value:

Solubility Max Value: 3 Mobility Value 3

1.3 Substance Quantity

Amount: <600 cubic yards

Basis: Estimated volume of impacted soil. Actual volume may be significantly different as site characterization is not complete

Substance Quantity Value 3

2.0 Migration Potential

2.1 Containment Containment Value 10

Explain Basis: Contaminated soil

2.2 Net Precipitation 10-20 inches Net Precipitation Value 5

2.3 Subsurface Hydraulic Conductivity sandy silt Conductivity Value 3

2.4 Vertical Depth to Groundwater 10-15 feet

Confirmed release: Yes Depth to Aquifer Value 8

3.0 Targets

3.1 Groundwater Usage Aquifer Use Value 4

Private supply, alternate sources available

3.2 Distance to Nearest Drinking Water Well 9500 feet

Nearest drinking water well is located upgradient of the site Well Distance Value 1

3.3 Population Served within 2 Miles Population Served Value 2

3 people

Worksheet 6

Groundwater Route

CSID: 11307 **Site Name:** Port of Seattle Terminal 115

3.4 Area Irrigated by GW Wells within 2 miles Area Irrigated Value 0

0 acres

4.0 Release Release to Groundwater Value 5

Explain basis for scoring a release to groundwater:

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} =(Human toxicity + mobility + 3) * (Containment + 1) + Substance Qty	SUB_{GH}	201
MIG_G=Depth to Aquifer+Net Precip + Hydraulic Conductivity	MIG_G	16
REL_G = Release to Groundwater	REL_G	5
TAR_{GH} = Aquifer Use + Well Distance + Population Served + Area Irrigated	TAR_{GH}	6.7
	GW_H	47.9

Washington Ranking Method

Route Scores Summary and Ranking Calculation Sheet

Site Name: Port of Seattle Terminal 115 **CSID:** 11307

Site Address: 6020 W Marginal Way SW; Seattle, WA 98106 **FSID:** 98422914

HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	21.3	3
Air	11.4	2
Groundwater	47.9	4

H= 4
M= 3
L= 2

$$\frac{H^2 + 2M + L}{8} = \frac{16 + 6 + 2}{8}$$

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	37.0	4
Air	1.3	1

H= 4
L= 1

$$\frac{H^2 + 2L}{7} = \frac{16 + 2}{7}$$

Environment Priority Bin Score: **3**

rounded up to next whole number

Comments/Notes:

FINAL MATRIX RANKING **3**

FOR REFERENCE:

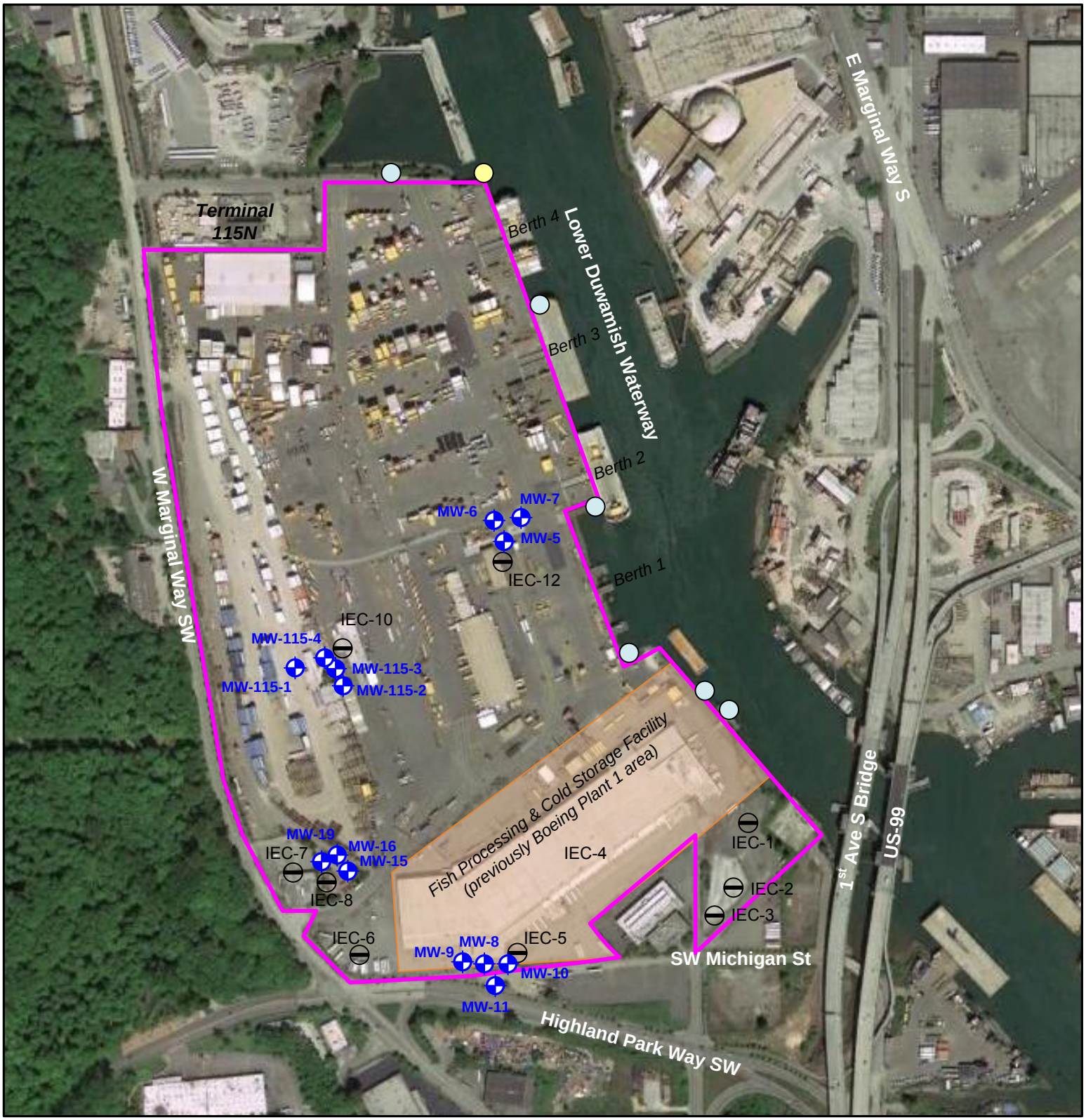
Final WARM Bin Ranking Matrix

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 2015 Values

Quintile	Human Health Surface Water	Air	Ground Water	Environment Surface Water	Air
5	>= 30.7	>= 37.6	>= 51.6	>= 50.9	>= 29.9
4	>= 23.1	>= 23.8	>= 40.9	>= 31.2	>= 22.5
3	>= 14.1	>= 15.5	>= 33.2	>= 23.6	>= 14.0
2	>= 7.0	>= 8.5	>= 23.5	>= 11.0	>= 1.6
1	<= 6.9	<= 8.4	<= 23.4	<= 10.9	<= 1.5

Quintile value associated with each route score entered above



Legend:

- Property location (approximate)
- Issue of Environmental Concern (IEC)
- Stormwater outfall
- Combined Sewer Overflow (CSO) outfall
- Monitoring well location (approximate; not all wells depicted)

Notes:

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

N

Port of Seattle Terminal 115
6000-6700 West Marginal Way Southwest
Seattle, WA 98108

Site Overview Map

DEPARTMENT OF ECOLOGY
State of Washington

CSID 11307
CSID11307.vsd