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REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN



Site:
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Prepared for:
Mr. James Gilmur
16 South Michigan Street
Seattle, Washington

Report Date:
May 13, 2013

Remedial Investigation/Feasibility Study Work Plan

Prepared for:

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May 13, 2013

SoundEarth Strategies

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
Agreed Order	Agreed Order Number DE 8072
ARAR	applicable or relevant and appropriate requirement
AST	aboveground storage tanks
bgs	below ground surface
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
COPC	chemicals of potential concern
cm/s	centimeter per second
cPAHs	carcinogenic-polycyclic aromatic hydrocarbons
CSM	conceptual site model
CSO	combined sewer overflow
DMC	Duwamish Marine Center
DMF	Duwamish Metal Fabricators
DRPH	diesel-range petroleum hydrocarbon
Duwamish fill	Duwamish dredge spoils
EAA	early action areas
EA Report	Phase I Environmental Audit by EAI
EAI	Environmental Associates, Inc.
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
Farallon	Farallon Consulting, LLC

ACRONYMS AND ABBREVIATIONS (CONTINUED)

FS	feasibility study
Greylock	Greylock Consulting LLC
KCIW	King County Industrial Waste
LDW	Lower Duwamish Waterway
LQG	Large Quantity Generator
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MHHW	mean higher high water
MTCA	Washington State Model Toxics Control Act
NPDES	National pollutant Discharge Elimination System
ORPH	oil-range petroleum hydrocarbons
Out1	Outfall No. Out1
Out2	Outfall No. Out2
Out3	Outfall No. Out3
Pacific Crest	Pacific Crest Environmental LLC
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Port	Port of Seattle
PQL	practical quantitation limit
the Property	16 South Michigan Street and 6365 1st Avenue South, Seattle Washington
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RI/FS	Remedial Investigation and Feasibility Study

ACRONYMS AND ABBREVIATIONS (CONTINUED)

Riley Group	Riley Group, Inc.
RM	river mile
ROW	right-of-way
SAIC	Science Application International Corporation
SAP	Sampling and Analysis Plan
Site	the full lateral and vertical extent of contamination that has resulted from the release of hazardous materials on the Property
SoundEarth	SoundEarth Strategies, Inc.
STB	Samson Tug and Barge
SVOC	semi-volatile organic compounds
SWPPP	Stormwater Pollution Prevention Plan
TCLP	Toxicity Characteristics Leaching Procedure
VOC	volatile organic compound
WAC	Washington Administrative Code
Work Plan	Remedial Investigation and Feasibility Study Work Plan prepared by SoundEarth Strategies, Inc.

1.0 INTRODUCTION

SoundEarth Strategies, Inc. (SoundEarth) has prepared this Remedial Investigation/Feasibility Study Work Plan (Work Plan) on behalf of Mr. James Gilmur, owner of the Duwamish Marine Center property (the Property and/or the Gilmur/Hale Family Trust Property) located at 6365 First Avenue South in Seattle, Washington (Figure 1). This Work Plan was prepared as part of a remedial investigation/feasibility study (RI/FS) for the Property pursuant to Agreed Order Number DE 8072 (Agreed Order) dated September 2, 2011, and in accordance with the Washington State Model Toxics Control Act (MTCA) as established in Section 350 Chapter 173-340 of the Washington Administrative Code (WAC 173-340-350). As established in WAC 173-340, the Site is defined by the full lateral and vertical extent of contamination that has resulted from the release of hazardous materials on the Property. However, in accordance with the Agreed Order, the distribution of the chemicals of potential concern (COPC) in the affected media at the Property has not been investigated sufficiently to define the boundaries of the Site under the MTCA.

The purpose of this Work Plan is to address data gaps identified in the *Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington* prepared by Pacific Crest Environmental and dated 2009 (Pacific Crest 2009). In addition, this Work Plan was prepared to indicate that sufficient information is collected during the next phase of remedial investigation in order to develop and evaluate technically feasible cleanup alternatives in accordance with WAC 173-340-360 through 173-340-390. The completed remedial investigation will provide sufficient data to refine the conceptual site model (CSM), which will be used to evaluate potential feasible remediation technologies. The completed RI/FS will provide sufficient information to develop and evaluate cleanup alternatives to facilitate selection of a final cleanup action at the Site in accordance with WAC 173-340-350(8). The Work Plan incorporates comments included in the response letters prepared by the Washington State Department of Ecology (Ecology) between 2005 and 2011 regarding previous remedial investigation activities conducted at the Site by others. Ecology's comments are presented in Appendix A.

1.1 WORK PLAN ORGANIZATION

This Work Plan is organized in the following sections:

- **Section 2.0, Background.** This section provides a description of the Property features and location, a summary of the current and historical uses of the Property, a summary of the current uses of the adjoining properties, and a description of the Property stormwater discharge and hazardous waste management history.
- **Section 3.0, Natural Conditions.** This section provides a description of the Site's environmental setting, including the physiology and topography, local meteorology, hydrogeology, surface water, and the natural resources and ecological receptors.
- **Section 4.0, Previous Investigations.** This section provides a description of the environmental investigations conducted at the Site. Included in this section is a summary of the field work performed and a brief discussion of the findings.
- **Section 5.0, Data Quality and Usability.** This section provides a discussion of the quality of analytical results from previous investigations and the usability of the analytical results.

- **Section 6.0, Conceptual Site Model.** This section provides a summary of the CSM derived primarily from the results of the historical research and subsurface investigations performed at the Site. Included is a discussion of the confirmed and suspected source areas, the chemicals and media of concern, and the potential exposure pathways and receptors.
- **Section 7.0, Data Gaps.** This section describes the data gaps for the Site that will be addressed in the RI/FS.
- **Section 8.0, Project Organization.** This section summarizes the responsibility and authority of organizations and key personnel involved in conducting the RI/FS.
- **Section 9.0, Remedial Investigation Scope of Work.** This section describes the scope of work that will address identified data gaps and complete the RI/FS.
- **Section 10.0, Feasibility Study.** This section presents the outline for the preparation of the FS that will develop and evaluate remedial alternatives for the Site.
- **Section 11.0, Limitations.** This section discusses document limitations.
- **Section 12.0, Bibliography.** This section lists sources used in the preparation of this Work Plan.

2.0 BACKGROUND

Sections 2.1 through 2.10 provide a description of the Property features and location and a summary of the current and historical uses of the Property and adjoining properties.

2.1 SITE LOCATION AND DESCRIPTION

The Site consists of six unpaved or partially paved parcels that are located adjacent to the east side of the Lower Duwamish Waterway (LDW) between Slips 2 and 3 and river mile (RM) 1.7 to RM 2.0 (Figure 2). The Front Street right-of-way (ROW) bisects the northern parcel from the three southern parcels.

The Site location and description are summarized in the table below.

Duwamish Marine Center Site Location and Description	
King County Tax Parcel Nos.	536720-4545, 536720-4565, 536720-3415, 536720-3447, 536720-3635, 536720-4560
Address	3415, 4565: 6365 1st Avenue South 3447, 3635: 16 South Michigan Street 4545: No address available 4560: 6531 1st Avenue South
Property Owner	James D. Gilmur and Ms. Jacqueline H. Revocable Living Trust (JRLT)
Parcel Size	4545: 0.65 acres (28,525 square feet) 4560: 0.49 acres (21, 439 square feet) 3415: 0.49 acre (21,537 square feet) 3447: 0.03 acre (1,225 square feet) 3635: 0.29 acre (12,444 square feet)

Property Owner	JRLT, S&LA Hale Family Limited Partnership, Mr. Kevin Hale, Ms. Kristine Shimmin and Mr. Steven Hale
Duwamish Marine Center Site Location and Description	
Parcel Size	4565: 2.80 acre (122,080 square feet), approximately 0.5 acres (23, 360 square feet) submerged
Structures and Improvements	4545: Vacant 4565: North, Middle, and South docks 4560: Metal Warehouse 3415: Temporary Building, truck scale, and concrete pad 3447: Concrete pad 3635: 1940-vintage building (12,000 square feet)
Zoning	All Parcels: Industrial General 1 - Unlimited 85 (IG1 U/85)
Current Tenants and Property Use	4545: Samson Tug and Barge, Shipping container storage 4565 (Lots 14 through 19):: Samson Tug and Barge, shipping container storage 4565 (Lot 20): Filter Engineering Company, offload bulk materials from barges 3415 (Lots 2 and 3): Samson Tug and Barge, shipping container storage 3447: Duwamish Marine Center, industrial general purpose, equipment wash area 3635: Duwamish Metal Fabricators, metal fabrication

As noted above, the Site is zoned industrial and in addition meets the criteria for an industrial site as defined under WAC-173-340-745. The criteria include the following:

- People do not normally live on the Site and the primary exposure is to adult employees of the businesses located on the Site.
- Access to the Site by the general public is generally not allowed.
- Food is not normally grown or raised on the Site.
- Operations at the Site are characterized by three business activities: Duwamish Metal Fab, Inc., performs contract metal fabrication; Duwamish Marine Center, Inc., loads and unloads barges with a variety of cargo; and Samson Tug and Barge (STB), operates a Seattle to Alaska barging operation that involves temporary storage of equipment, containers, construction materials and lubricants. The Site has temporary storage of chemical and petroleum products and the presence of noise, odors and truck traffic.
- The surface of the land at the Site is predominately unpaved but is partially paved in some area and covered with buildings and other structures such as movable containers and material storage areas. These features may reduce potential exposure to the contaminated soil.

The LDW and a small strip of land, less than 80 feet wide, that defines the defines the west-southwest boundaries of the Property, is owned by the Port of Seattle (Port) and leased by the Duwamish Marine Center, Inc. (DMC; Figure 2). A marina located west-southwest end of the Property is owned by the Port.

Duwamish Marine operates the marina, maintains the facility, collected rents, and manages utilities. Duwamish Marine also leases Front Street from the City of Seattle. DMC is a real estate holding entity.

Adjacent to the Site to the north is Seattle Biodiesel. This property has also been identified as material storage warehouse for Lone Star Northwest. Slip 2 of the LDW is adjacent to the Site on the north and northwest (Figure 2). The north side of Slip 2 is a barge loading area and operations for Glacier Northwest, Inc., a manufacture of cement and gypsum. On the east and adjacent to the Property are two railway franchise strips and First Avenue South (Figure 2). One of the railway strips is owned by a joint coalition of several railroads, the other by the Port (EAI 2000). Across the Duwamish Waterway and west of the Property is Terminal 151, a large container shipping facility and associated barge/ship docking and loading facilities owned by the Port (EAI 2000).

Immediately south of the Site, is a parcel owned by the Seattle Department of Transportation and the location of Michigan Street combined sewer outfall No. 039 (Michigan Street CSO [combined sewer overflow]). The Michigan Street CSO basin covers approximately 1,900 acres and includes residential, commercial, and industrial properties and the King County Airport. The following commercial and industrial facilities have been identified in the Michigan Street CSO basin (SAIC 2009):

- Two hundred and six facilities within the CSO 039 basin have been assigned Ecology Facility/Site ID numbers.
- Twenty two of these facilities are listed on Ecology's Confirmed and Suspected Contaminated Sites List (CSCSL).
- Forty of these facilities have U.S. Environmental Protection Agency (EPA) ID numbers.
- Twenty two of these facilities have NPDES permits.
- Fourteen of these facilities have King County Industrial Waste discharge authorization permits.
- Seventy seven of these facilities are listed on Ecology's Underground Storage Tank/Leaking Underground Storage Tank List.

The Michigan Street CSO has the second highest historical baseline (1981 to 1983) discharge of all the King County CSOs. During the 2005 to 2006 monitoring period, Michigan Street CSO discharged 4.58 million gallons to the LDW. Michigan Street CSO is connected to the same King County line as the East Marginal, Brandon Street, Duwamish, Hanford, and Larder CSO locations, which have all identified sediment contamination associated with the CSO discharges (Figure 2).

2.2 LAND USE HISTORY

Extensive filling and dredging from approximately the early 1900s through 2007 have dramatically affected the shoreline at the Site. As shown on Figure 2, filling activities primarily occurred within Slip 2 with lesser amounts of filling into the channel. A portion of the fill at the Site is believed to be reworked sediment dredge spoils from the LDW (Pacific Crest 2009). In the mid-1980s, uncharacterized dredge spoils from the LDW were temporarily stored in the southwest portion of the Site pending disposal off of the Site (EAI 2000). Given the source of uncharacterized dredge spoils, they likely contained metals, polychlorinated biphenyls (PCBs), and/or carcinogenic-polycyclic aromatic hydrocarbons (cPAHs). One or more of these contaminants have been identified in the soil and groundwater at the Site and off shore of the Site in the intertidal zone and channel of the LDW.

Portions of the Site have reportedly been used for industrial purposes since the mid-1940s. Historical documents have listed a marine railway (1940 to mid-1970s); a tool manufacturing and metal works facility (1950s), a junkyard dealer (1960s to 1970s), and various construction companies (1970s) as occupants of the Property. Historical facility operations include material storage for a pile driving company (1937 to 1970), construction material loading (1975 to 1978), barge loading terminal (1979 to 1984), aggregate material loading (1985 to 1989), construction assembly yard and barge shipping (1990 to 1994), and construction and marine-related material storage (1994 to present) (EAI 2000; Figure 2). In 2000, a 200-gallon AST containing diesel fuel, a 500-gallon AST containing waste oil, and eight 55-gallon drums containing fresh 30-weight lubricating oil were observed at the DMC facility (EAI 2000).

2.3 CURRENT SITE OPERATIONS

The sum total of DMC's business activities consists of providing landlord services, collecting rent and paying bills relative to the Filter Engineering Company, STB tenants, and the marina tenants. The DMC is a wholly owned corporation by James Gilmur. A description of the lease properties is presented below.

2.3.1 Filter Engineering, Parcel 536720-4565

Filter Engineering is a discrete business entity used by James Gilmur to offload bulk materials from barges. Filter Engineering operates in Parcel 536720-4565 of Lot 20 and utilizes the South Dock on the Port lease land for offloading barges Materials offloaded from the South Dock typically include demolition debris and permitted hazardous waste materials. The permit requires Filter Engineering to offload contaminated material into specialized containers that have impenetrable bladders linings. The material is offloaded using a mobile crane that places the containers on waiting trucks (Figure 2).

2.3.2 Samson Tug and Barge, Parcels 536720-4565, 536720-4560, 536720-4545, and 536720-3415

STB operates on the northern portion of the Property Parcel 536720-4565 Lots 14 through 19, Parcel 536720-3415 Lots 1 through 3, Parcels 536720-4560 and 536720-4545, and the east half of Front Street. STB also uses the North Dock for loading and unloading cargo containers for seagoing ships. STB provides bimonthlybarge service and transfer of shipping containers to Alaska from Seattle (Figure 2). STB offices and maintenance facility is located in a warehoused located in Parcel 536720-4560.

STB's primary cargo includes fish, fish products, construction equipment, and vehicles, which are shipped via 20-foot and 40-foot dry containers and 20-foot shipping platforms (Greylock 2009). STB has also stored and/or transported 5,000-gallon International Standards Organization tanks, bulk liquefied petroleum gas tanks, and construction materials and marine-related equipment, including ship/boat parts, electric generators, concrete riprap, pallets, metal debris, vehicles, empty aboveground storage tanks (ASTs), and other heavy equipment (EAI 2000). STB offers trucking services in Seattle as well as connecting carrier agreements to transport cargo around the world. Facility operations include forklift washing and cleaning, diesel storage in an AST with secondary containment, forklift and truck maintenance/repair, buildings, and equipment (SAIC 2009). Maintenance activities including engine maintenance, lubrication, and pressure washing are conducted in the northern portion of the Property (Greylock 2009; Figure 2).

2.3.3 Duwamish Metal Fabricators, Inc., Parcels 536720-3635 and 536720-3447

Duwamish Metal Fab., Inc. (DMF) leases offices for the DMC and the DMF fabrication facility is located on the southern portion of the Property in Parcels 536720-3635 and 536720-3447 (Figure 2). The DMF located in Parcel 536720-3635 consist of an L-shaped slab-on-grade building. The building extends approximately 20 feet east of the Property boundary on to property owned by the Port (Farallon 2004b). DMF operates as a contract metals fabricator, generally for construction and bridge projects. DMF largely confines its activities to metal cutting, welding, bending and drilling. No sandblasting occurs at this facility. Post fabrication industrial painting is contracted to third parties and performed off the Site. DMF also engages in on/off loading activities in conjunction with the dock facilities on the Site. Ancillary activities include fueling operations for machinery and equipment on Site, some vehicle maintenance and repair. A small parts-washing station is located within the interior of southwest portion of the building.

Historically, the southwest portion of the building was used to store and stage equipment, parts, construction materials and supplies for construction of electrical power generators, roads, and buildings in Alaska. All construction activities in Alaska have ceased and some artifacts of that business remain in storage at the Site. DMF uses the southwest-adjoining parcel for access to the Middle Dock (leased from the Port) and South Dock (considered to be located on the Property "under the aegis of the Port of Seattle") (EAI 2000; (Figure 2). An approximately 15 foot by 15 foot concrete pad, used as an equipment wash area, is located in Parcel 536720-3447 that adjoins the southwestern exterior of the building (Farallon 2004b). Parcel 536720-3447 covers approximately 1,225 square feet of land, which is undeveloped (EAI 2000).

2.3.4 Parcel 536720-3415

Parcel 536720-3415 (Lot 4 though Lot 7) covers approximately 21,537 square feet of land and currently contains a large Temporary Building consisting of stacked shipping containers with open side to the northwest (Figure 2).

2.4 FUTURE LAND USE

SoundEarth was not aware of any planned changes to the current land use for the Property at the time this Work Plan was prepared.

2.5 PROPERTY DRAINAGE

A private 10-inch stormwater outfall, referred to as outfall Outfall No. Out1 (Out1; Greylock 2009), is located on the southwest-adjoining the Port property and discharges to LDW (Figure 2). Catch basins CB01 through CB07 drain stormwater from the southern 4 acres of the Property to Out1. A private 5-inch stormwater outfall, discovered in February 2012, referred to as Outfall No. Out 3 (Out3), is located on the southwest-adjoining Port lease property and discharges to LDW (Figure 2). Catch basins CB10 through CB12 drain stormwater from the west side of the Temporary Building and north side of the DMF (Figure 2). According to Mr. Gilmur, the primary function of the outfall is to drain the driveway on the west side of the Temporary Building and a portion of the DMF.A private 6-inch stormwater outfall referred to as outfall Outfall No. Out2 (Out2; Greylock 2009) is located on the north-adjoining parcel 536720-4545 (Figure 2). The parcel is leased by STB. The connection to Out2 is locked and sealed and there is no discharge to Slip 2 from this outfall (Figure 2). Catch basins CB08 and CB09 drain stormwater

from the northern 1 acre of the Site; stormwater from the northern drainage area is pumped to the municipal sanitary sewer (Greylock 2009)

2.6 STORMWATER DISCHARGE

STB and DMC maintain a National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater General Permit (#WAR011484) with Ecology and adhere to a stormwater pollution prevention plan (SWPPP) prepared by Greylock Consulting LLC (Greylock) in 2009. The purpose of the SWPPP is to identify potential sources of pollution that could affect the quality of stormwater discharged from the facility to the LDW. The SWPPP also describes best management practices (BMPs) used to reduce pollutants in stormwater discharges associated with the facility (Greylock 2009).

According to the SWPPP report, materials handled at the Site that could be exposed to stormwater include scrap metal, metal cargo, automobiles, tires, diesel, dredged sediments, steel drums, forklifts, and cranes. The report indicated that potential sources of stormwater pollution are primarily located in the northern portion of the Property. Sources include oil and grease used to lubricate cranes and potential leaks from hydraulic hoses, hydraulic oil lines in the forklifts/top picks used to handle containers in the unpaved container yard, truck traffic, metal containers, access roads for shipping and receiving, and a galvanized metal roof. Temporary storage of materials was listed as a potential source of stormwater pollution for the southern portion of the Property (Greylock 2009).

As part of the NPDES permit, stormwater discharged from the Property to Out1 is monitored by Greylock quarterly. Out3 was recently discovered and sampled in February 2012 (Figure 2). The outfalls will be sampled quarterly. Previous quarterly stormwater analytical results have indicated that concentrations of oil and grease, zinc, copper, and turbidity in stormwater have exceeded the benchmark values stated in the NPDES permit. Benchmark values are intended to provide a measurement of the effectiveness of the SWPPP. Exceeding a benchmark does not directly result in a NPDES permit violation; however, the permit requires facilities to reevaluate their SWPPP and to take prompt corrective action after a benchmark value is exceeded.

In 2009, STB implemented additional BMPs to further reduce pollutants in stormwater discharged from the Property. STB installed hay bales around the on-Property catch basins and retrofitted catch basin inserts; STB regularly removes sediment from catch basins. Quarterly monitoring results from 2009 through 2011 for stormwater quality parameters collected from Out1 are summarized in the table below. Copies of discharge monitoring reports are included in Appendix B.

NPDES Stormwater Discharge Monitoring Results, Outfall No. Out1								
		Water Quality Parameters		Metals[1]				Visual Observa-tion
Sample ID	Date	Turbidity (NTU)	pH	Zinc (µg/L)	Copper (µg/L)	Lead (µg/L)	Fats, Oil & Grease [2] (mg/L)	Oil Sheen
OF-1	Q3-2011	**1,312**	6.5	**713**	**204**	NM	NM	No
OF-1	04/25/11	**763.4**	7.5	**676**	**180**	NM	NM	No
OF-1	02/14/11	**923.4**	8	**362**	**122**	NM	NM	No
NPDES Stormwater Discharge Monitoring Results, Outfall No. Out1								
OUT-1	12/27/10	**>2,000**	8	**4,330**	**1,640**	NM	NM	No
OF-1	09/08/10	**59.8** [3]	8	97.7	**51.3**	NM	NM	No
	05/26/10	No Stormwater Discharge						
Out1-031210	03/12/10	**>1,000**	8.5	**703**	**249**	NM	NM	**Yes**
Out1-101609	10/16/09	**1,427**	7.1	**415**	**135**	110	5.42	NM
Out1	05/06/09	**>3,000**	7.3	**1,730**	NM	NM	**27.3**	NM
Out1-032809	03/28/09	**175**	6.09	**240**	NM	NM	3.79	NM
Out1	2/17/12			**315**	**120**	**NM**	NM	
NPDES Stormwater Discharge Monitoring Results, Outfall No. Out3								
Outfall3	**02/17/12**	**NR**	**NR**	**4,320**	**827**	**486**	**NM**	**NM**
NPDES Benchmark Value	**25**	**6.5 - 8.5**	**117**	**14**	**NE**	**15**	**No Visible Oil sheen**	**NM**

NOTES:

[1]Total Metals by EPA Method 200.8.

[2]Fat oil and grease by EPA 1664.

[3] Measured by EPA Method SM2130B.

Bold = Exceeds Benchmark Value

> = greater than

NPDES = National Pollutant Discharge Elimination System

NTU = nephelometric turbidity unit

µg/L = micrograms per liter

mg/L =milligrams per liter

NM = not measured

NR = Not Reported

EPA = U.S. Environmental Protection Agency

A water compliance report prepared by Ecology and dated March 5, 2003, identified a discharge from a tank of cleaning solution associated with operations at the former Burgess Enterprise located in Parcel 536720-4545. The reported indicated that the tank was plumbed to a pipe that discharged to Slip 2. According to Ecology "components of air cleaning system are soaked in and then rinsed off with a steam/pressure cleaner…. the contents of the tank drained to the riverbank." A test strip indicated that the solution had a pH >10. Ecology considered the waste from the dip tank and the wastewater from the rinsing operation wastewater pollution. Burgess Enterprise operated this area of the Site from 1959 to approximately 2005. According to Mr. Gilmur the air cleaning system, tank, and piping were removed before STB operations.

2.7 SOLID WASTE

No permitted solid waste is generated at the facilities on the Property.

2.8 WASTEWATER TREATMENT AND DISPOSAL

No permitted wastewater is generated at the facilities on the Property.

2.9 HAZARDOUS WASTE MANAGEMENT

DMC (WAD988504999) and STB (WAH000029081) are currently registered with Ecology as facilities that are required to have a Resource Conservation Recovery Act (RCRA) Site ID, but that do not generate and/or manage hazardous waste (XQG generator status). Between 2008 and 2010, STB was registered as a hazardous waste transfer facility under RCRA ID WAH000029081.

During the period of Property use as a barge shipping terminal (1979 to 1984), cargo temporarily stored on the Property included waste regulated under a RCRA Large Quantity Generator (LQG) Permit (RCRA ID WAD988504999). According to the Notification of Dangerous Waste Activities Form 2, filed by Mr. Gilmur in March 1992, the regulated waste was "gas and water with benzene." The waste was off loaded from the barge in closed containers and stored for short periods of time on the Property until transfer to an approved disposal facility. The barge was moved off the Property in the mid-1990s and activities which designated the Property as an LQG were discontinued (Farallon 2002).

3.0 NATURAL CONDITIONS

This section summarizes the natural conditions for the Site and surrounding region.

3.1 PHYSIOGRAPHY/TOPOGRAPHY

3.1.1 Physiography

The Site is located within the Puget Lowland subprovince of the Puget Sound Geomorphic Province. The Puget lowland is characterized by roughly north-south trending ridges. The Puget Lowland ridges and uplands are generally located at elevations ranging from approximately 350 to 450 feet above mean sea level. The north-sound-trending valleys are occupied by lakes (i.e, Lake Sammamish, Lake Washington). This topography is broken up by trending underfit rivers that source in the Cascade Mountain range to the east.

3.1.2 Topography

The Site and vicinity have been significantly modified since the early 1900s from the dredging and channelization of the Duwamish River, bridge and road building, and general industrialization. The lower Duwamish River valley is bordered by glacial highland to the east (Beacon Hill) and west (West Seattle), and Elliot Bay to the north. The Property is relatively flat, sloping moderately to the west toward the shore of the LDW and is located at approximately 10 to 12 feet above mean sea level. The average elevation of the Site is +18 feet Mean Lower Low Water (MLLW) (Greylock 2009).

3.2 METEOROLOGY

Climate in the Seattle area is generally mild and experiences moderate seasonal fluctuations in temperature. Average temperatures ranges in Fahrenheit degrees from the 60s in the summer to the 40s in the winter. The warmest month of the year is August, which has an average maximum temperature of 74.9 degrees Fahrenheit, while the coldest month of the year is January, which has an average minimum temperature of 36.0 degrees Fahrenheit.

The annual average rainfall in the Seattle area is 38.25 inches, with the wettest month of the year being December, during which month the area receives an average rainfall total of 6.06 inches.

3.3 HYDROGEOLOGY

This section provides a discussion of geology and hydrogeology at and near the Site. The subsurface geology at the Site is shown in cross sections whose orientations are shown on Figure 4. The subsurface geology for the Site is shown on Figures 5 through 8. Boring logs for borings advanced at the Site are included in Appendix C.

3.3.1 Subsurface Conditions

The geology of the Puget Lowland is generally characterized by a thick sequence of Quaternary glacial deposits overlying Tertiary bedrock, with local areas of exposed surficial bedrock. The glacial soil is thickest in areas north of the Seattle Fault zone, where glacial soil ranges up to 5,000 feet thick (Galster and Laprade 1991). In general, the glacial stratigraphic sequence of the Puget Lowland consists of generally fine-grained, low-energy, nonglacial and glacial lacustrine and fluvial deposits overlain by glacial advance outwash sand. The advance outwash is overlain by glacial till, which, in turn, is locally overlain by glacial recessional outwash sand and gravel, where present, as well as organic-rich peat, lacustrine, and alluvial deposits. Where exposed, the glacial soil has been modified by mass wasting, stream erosion and deposition, and anthropogenic modifications (Troost et al. 2005).

The Lower Duwamish Valley is characterized by a low-gradient rive and valley bottom bounded by steep uplands to the east and west. The Lower Duwamish Valley is underlain by interbedded Quaternary alluvial silts and sands deposited by the meandering and infilling of the Duwamish River. The alluvial deposits generally consist of loose to medium dense, sands with minor gravel and silt, interbedded with silt-rich deposits.

Observations of historical photograph from 1936 suggest that the eastern portion of the Property, including Lot 1 through Lot 7 and Lot 14 through Lot 20 of Parcels 536720-4560 and 536720-3415, respectively; and Parcels 536720-3635 and 536720-3447 is located on native material representing alluvial deposits within a former meander of the Duwamish River (Figure

3). Slip 2 represents the former expression of the meander. From 1936 through 1982, fill material was added to northwest, west, and southwest portions of the Site (Figure 4). The predominant source of the fill material is likely dredge spoils from previous channel dredging activities in the LDW.

Based on historical and current activities in the area of the Site, the surficial deposits on the eastern portion of the Site are interpreted as "disturbed" alluvial deposits with variable amounts of debris, imported aggregate utilized as structural fill, surficial aggregate, or utility trench backfill (Figures 5 through 8). These deposits extend from ground surface to depths ranging from approximately 5 to 10 feet below ground surface (bgs). Debris-laden soils encountered on the western portion of the Property are interpreted to be Duwamish dredge spoils (Duwamish fill). The Duwamish fill was added to the alluvial deposits on the eastern portion of the Site from 1936 to 1982 and provided additional uplands for the Site (Figure 4). The Duwamish fill generally consists of silty sand with local concrete, metal, wood, dimension lumber, and metal waste that consists of dredge spoils placed between 1936 and 1982 as a part of filling of Slip 2. The dredge spoils extend to depths of up to 14.5 feet bgs. The disturbed alluvial deposits and the Duwamish fill are underlain by undisturbed alluvial deposits consisting primarily of sands with silty sand, and silt that extends to the full depth explored of 31.5 feet bgs. A semi-confining layer at depth of 10 to 20 feet bgs was intercepted in some borings. The semiconfining layer is composed of primarily silt. Based on our current understanding of subsurface conditions at the Site, the semiconfining layer represents a leaky aquitard between a shallow and deep water-bear zones in some area of the Site. The semi-confining layer is shown in Figures 5 through 8.

3.3.2 Groundwater Conditions

Groundwater at the Site is interpreted as occurring in two distinct water-bearing zones: the Shallow Zone and the Deep Zone. Shallow Zone groundwater is unconfined and the Deep Zone groundwater is semiconfined. Shallow Zone groundwater primarily occurs in Duwamish fill, and disturbed and undisturbed alluvial deposits. The Deep Zone groundwater is separated from the Shallow Zone by an aquitard ranging in depth from approximately 10 to 20 feet. The aquitard is composed predominately of silt with some trace sand. The aquitard was intercepted in the borings advanced for installation of monitoring wells MW-1D through MW-4D (Table 1; Figures 5 through 8). Because of the limited number of deep borings, the extent of the aquitard is unknown.

Groundwater in the Shallow and Deep zones is anticipated to be brackish based on the presence of saltwater wedge at depth in the LDW. The LDW is part of the Duwamish River saltwater-wedge estuary, a stratified aquatic system in which the bottom layer of saline water intrudes upriver during periods of low-river flow and high tide. The groundwater at the Site is tidally influenced (Section 3.3.3 of this Work Plan).

The semiconfined conditions of Deep Zone groundwater is based on the presence of downward vertical gradients between shallow monitoring wells MW1 through MW4 and deep monitoring wells MW-1D through MW-4D, and the presence of an aquitard intercepted during the installation of monitoring wells MW-1D through MW-4D (Table 1; Figures 5 through 8). The higher groundwater elevations in shallow wells are a function of recharge from unpaved surface of the Property the Shallow Zone and the differences in the intrinsic permeability of the Shallow and Deep Zone soil. . The Shallow and Deep Zone groundwater may be hydrologically connected in areas of the Site where the aquitard is absent, discontinuous, or leaks. However, the

interpretation in cross-sections of an absence or discontinuous aquitard may also result from a lack of deep borings advanced some areas of the Site (Figures 5 through 8). .

Based on the interpretation presented above, two water-bearing zones are present at the Site; therefore, for purposes of this Work Plan, groundwater monitoring wells MW1 through MW4 are designated as Shallow Zone groundwater monitoring wells. Groundwater monitoring wells MW-1D through MW-4D are designated Deep Zone groundwater monitoring wells.

3.3.2.1 Shallow Zone Groundwater

Shallow Zone monitoring wells MW1 through MW4 were installed to a total depth of approximately 15 feet bgs, and are screened within the upper Duwamish fill and undisturbed native alluvial deposits from approximately 5 to 15 feet bgs. Groundwater levels measured on June 9, 2008 (most recent measurement), ranged from 7.02 feet (MW4) to 10.33 feet (monitoring well MW3), based on a relative datum of 10 feet. The groundwater contours indicated a groundwater flow direction to the west with a gradient of 0.006 feet per foot. Depth to groundwater and groundwater elevations are presented in Table 1. Groundwater monitoring data collected during the 2002 groundwater monitoring event indicate that the hydraulic gradient is steeper at low tide and more gradual at high tide (Farallon 2002). Groundwater elevation contours for the Shallow Zone groundwater in June 2008 are shown on Figure 9.

3.3.2.2 Deep Zone Groundwater

Deep Zone groundwater monitoring wells MW-1D through MW-4D were installed to a total depth of approximately 31.5 feet bgs, and are screened from 15 to 30 feet bgs within the undisturbed alluvial deposits. The groundwater contours indicated a groundwater flow direction to the west with a gradient of 0.007 feet per foot for the Deep Zone. Groundwater levels measured on June 9, 2008, ranged from 9.62 feet (MW-1D) to 12.70 feet (MW-3D) below the top of the monitoring well casings. Depth to groundwater and groundwater elevations are presented in Table 1. Groundwater elevation contours for the Deep Zone groundwater in June 2008 are shown on Figure 10.

3.3.3 Tidal Monitoring

Results from a 72-hour tidal influence study of groundwater levels related to tidal change showed variations in groundwater depths from tidal influence ranging from 6.7 to 11.4 feet in Deep Zone wells MW-1D, MW-2D, and MW-4D during a 15.5-foot tidal change (Table 2). The data suggests that the groundwater levels in monitoring wells located closer to the LDW (MW-3D and MW-4D) show greater variation than MW-1D, which is located more than 250 feet to the east of the LDW and in a hydrological upgradient position relative to the LDW (Pacific Crest 2009). Studies indicated that tidal conditions influenced the wells screened within both the Shallow Zone and Deep Zone groundwater. Current data do not demonstrate seasonal variations of groundwater depths, and it is likely that variation in depths during large tidal changes mask any seasonal changes.

Though not clearly demonstrated by existing groundwater data obtained at the Site, tidal action may cause a continuous oscillation of groundwater within the effective zone of influence, and high tides may cause temporary groundwater flow reversals (Windward 2010). Tidal influence studies conducted for properties located in the LDW have reported that tidal influences were noted in wells located at distances ranging from approximately 300 and 600 feet from the LDW.

During low tide conditions, flow gradients were toward the LDW, and flow gradients were reversed during high tide conditions (Windward 2010).

3.3.4 Discharge

An assessment of groundwater flow rates has not been conducted on the Site. However, groundwater flow rates for other studies of LDW properties have shown ranges from 12 to 190 feet per day (Windward 2010).

3.3.5 Recharge

An assessment of groundwater recharge has not been conducted on the Site. However, due to the mostly unpaved surface across and texture of the surface fill material at the Property, groundwater recharge of the underlying water-bearing zone can be expected.

3.4 SURFACE WATER RUNOFF

The Property is mostly unpaved and experiences heavily traffic. Small portions of the Site areas are covered with ballast rock. During rain events the surface of the Property is muddy with some standing water. Precipitation that is not captured by the drainage collection system is either infiltrated or may act as a sheet flow across the Site, possibly resulting in the release of turbid contaminated surface water runoff with high total dissolved solids content.

It has been documented by others that surface water runoff contributes to the flow of the LDW. The sources of surface water runoff include storm drains, tributary creeks, CSOs, and nonpoint input sources. These sources are expected to be less than 1 percent of the total discharge, even during peak flow events (Windward 2010).

3.5 AREA SURFACE WATER

The Site is located adjacent to the east of the Duwamish River between RM 1.7 and RM 2.0. The Duwamish River originates at the confluence of the Green and Black rivers and flows northwest for approximately 12 miles, splitting at the southern end of Harbor Island to form the East and West waterways, before discharging to Elliott Bay. The LDW consists of the downstream portion of the Duwamish River, and is approximately 5.5 miles in length. Between 2000 and 2006, the annual average downstream flow rate measured at the Auburn gaging station was 33.7 centimeters per second (cm/s) (1,190 cubic feet per second [cfs]). Flow rates are greatest during the winter months due to seasonal precipitation. In winter 2003/2004, current velocities were measured in the center of the navigation channel and in the channel side slope at RM 1.1. Current velocities ranged between 2.5 cm/s and 18 cm/s. A saltwater wedge extends into the fresh water of the LDW from Harbor Island to the head of the navigation channel. During periods of higher freshwater inflow from the Green and Duwamish rivers, the saltwater wedge can extend upstream beyond RM 6.3 (Windward 2010).

3.6 NATURAL RESOURCES AND ECOLOGICAL RECEPTORS

3.6.1 Natural Habitat

The dominant natural habitat types in the LDW are intertidal mudflats, tidal marshes, and subtidal areas. Approximately 98 percent of the tidal marsh and mudflats/shallows and all of tidal wetland historically present in the LDW have been either filled or dredged. Remnant tidal marsh areas account for only 5 acres of the LDW, while mudflats account for only 54 acres (Windward 2010).

Most of the LDW shoreline consists of riprap, pier aprons, or sheet piling. Shoreline armoring is usually present at the top of the intertidal zone, and areas of sloping mud, mudflats, and hard surfaces exist in the lower intertidal zone. The hard surfaces support encrusting organisms such as barnacles and burrowing organisms such as shipworms (Windward 2010).

Remnant intertidal mudflats and shallows and sand/mud substrate exist in the area of the LDW adjacent to the Property and are exposed at low tide. Intertidal mud flats serve as sources of nutrients for primary producers, and provide food and habitat for benthic invertebrates, fish, shorebirds, and aquatic mammals (Windward 2010).

3.6.2 Fish, Birds, and Mammals

The LDW is home to a diverse array of fish, birds, and mammals. Fifty three resident and nonresident fish species were captured in the LDW during sampling events conducted for the LDW RI (Windward 2010). Fish abundance reaches its maximum in late summer to early fall and is generally lowest in winter. According to recent fish surveys, species diversity in the downstream segment (RM 0.0 to RM 2.4) of the LDW was greater than in the upstream segment (RM 2.9 to RM 5.0). Five species of Pacific salmon (coho, Chinook, chum, sockeye, and pink) have been identified in the LDW. These anadromous fish use the estuary for rearing and as a migration corridor. The LDW is an important habitat for outmigrating juvenile salmonids (Windward 2010).

As many as 87 species of birds, including passerine/upland birds, raptors, shorebirds/waders, waterfowl, and seabirds have been identified in the LDW area. Birds use the LDW area at least some part of the year to feed, rest, and reproduce (Windward 2010).

Three species of terrestrial mammals (raccoons, muskrats, and river otters) use the LDW and three marine mammal species (harbor seal, California sea lion, and harbor porpoise) may enter the LDW (Windward 2010).

3.6.3 Threatened and Endangered Species

Fifteen species identified in the LDW area are listed under either the Endangered Species Act or by Washington Department of Fish and Wildlife, as candidate species, threatened species, or species of concern. Species include Chinook salmon, coho salmon, Puget Sound steelhead, river lamprey, bull trout, Pacific herring, Pacific cod, walleye Pollock, rockfish species, bald eagle, peregrine falcon, merlin, common murre, common loon, and western grebe (Windward 2010).

4.0 PREVIOUS INVESTIGATIONS

Subsurface investigations conducted at the Site included sampling and analysis of on-Property soil and groundwater, off-Property riverbank soil, and surface and sediment. The laboratory analytical results are summarized in Tables 3 through 21. Sample locations and laboratory analytical results are shown on Figures 11A through 22. Subsurface conditions encountered during the investigations and analytical results are depicted on cross section Figures 5 through 8. Boring logs are presented in Appendix C.

As directed by Ecology, the laboratory analytical results presented in are compared to the most stringent screening levels for soil, groundwater, and sediment, which are derived from various applicable or relevant and appropriate requirements (ARARs). The screening level tables for soil, groundwater, and sediment are included in Appendix D. Screening levels are used to identify COPCs and to assist in setting data quality objectives associated with the laboratory analytical program. Screening

levels are not the applicable cleanup levels. Cleanup levels will be defined in the forthcoming Cleanup Action Plan for the media of concern at the Site.

Each of the tables (Tables 3 through 21) include the LDW screening criteria; sample concentrations that exceed the most stringent screening levels are shown highlighted in yellow.

4.1 2000 PHASE I ENVIRONMENTAL AUDIT

Environmental Associates, Inc. (EAI) conducted a Phase I Environmental Audit (EA Report), which identified the following conditions of environmental concern for the Property (EAI 2000):

- **The use and storage of fill material from unconfirmed sources on the Property.** The source and environmental quality of fill material used at the Property was not confirmed. Fill material was observed to have been placed on the Property, primarily along the western and on the northern portions of the Property during various events between 1920 and 1982. Dredged sediment from the LDW, and specifically from Slip 2, are suspected as potential sources of fill material used at the Property.
- **The confirmed storage of PCB-contaminated sediment on the Property.** LDW sediments that were sampled and submitted for analysis of PCBs, dredged and then stored on the Property for a short time in the 1980s, were confirmed to be contaminated with PCBs above the MTCA Method A cleanup level for soil (not sediment).
- **The use of the Property for various industrial purposes for approximately 50 years.** Various industrial facilities, including a marine railway and shipyard, storage for a pile driving company, a junkyard, and several construction companies have operated on the Property.

4.2 2000 PRELIMINARY PHASE II SUBSURFACE INVESTIGATION

The Riley Group, Inc. (Riley Group) conducted a Preliminary Phase II Subsurface Investigation on the Site to evaluate whether environmental concerns identified in the EA Report 2000 resulted in the release of COPCs to soil and groundwater. The scope of work for the subsurface investigation included the following work elements. Sampling locations are shown on Figure 4.

- Four soil borings (B1 through B4, [renamed B-1(R) through B-4(R)]) were advanced on the Site to depths ranging between 14.3 and 24 feet bgs in Parcel 536720-4565 (Figure 2). Soil samples were analyzed for diesel-range petroleum hydrocarbons (DRPH), oil-range petroleum hydrocarbons (ORPH), PCBs, and RCRA 8 metals.
- Two groundwater reconnaissance samples were collected from borings B2(R) and B3(R) and submitted for analysis of DRPH, ORPH, and RCRA 8 metals.
- Four test pits (TP-1) through TP-4, [renamed TP-1(R) through TP-4(R)]) were excavated at the Site in Parcel 536720-4565 (Figure 4). Soil samples were analyzed for DRPH, ORPH, PCBs, and RCRA 8 metals.

Results from the subsurface investigation are as follows:

- Soil analytical results indicated that samples collected from borings B-1(R) through B-4(R) and/or test pits TP-1(R) through TP-4(R) contained concentrations and/or laboratory practical quantitation limits (PQLs) of DRPH, ORPH, metals, PCBs, and/or cPAHs exceeding the screening levels for soil on the Site. The soil sample collected from test pit TP-3(R) was analyzed for

Toxicity Characteristic Leaching Procedure (TCLP)-lead; the sample contained a concentration of 12 milligrams per liter (mg/L) of soluble lead; the dangerous waste threshold is 5 mg/L (173-360 WAC) (Tables 3 through 7; Figures 11A, 12A and 12B).

- Analytical results for reconnaissance groundwater samples collected from borings B2(R) and B3(R) indicated that concentrations and/or the PQLs of benzene, DRPH, ORPH, and dissolved metals exceeding the screening levels were detected in groundwater on the Site (Tables 8 through 10; Figures 13 and 14).
- Disturbed and undisturbed alluvial deposits were reportedly encountered from the ground surface to depths ranging between 8 and 21 feet bgs. Groundwater was encountered between 9.2 and 12 feet bgs (Figures 4 through 8).

4.2.1 Potential Source for Contamination

Borings B1(R) and B3(R) and test pit TP-3(R) were advanced in areas of Site where Duwamish fill was used to fill the Site between the years of 1936 to 1982 (Figure 4). The presence of DRPH, ORPH, metals, PCBs, and/or cPAHs in soil samples collected from Duwamish fill suggests that source of COPCs is the Duwamish fill or historical activities associated with the North Dock, or the former junkyard dealer located in Lots 14 and 15 of Parcel 536720-4565. Research presented in the EA Report did not identify historical facility operations in the areas of borings B1(R) and B3(R) that may have led to the release of COPCs. Sediments from the LDW, which were probably used to fill this portion of the Site, have been documented to contain concentrations of PCBs, polycyclic aromatic hydrocarbons (PAHs), metals, and other contaminants in excess of MTCA cleanup guidelines (WAC 173-240). This area of the Site is currently used for temporary contained storage and barge loading.

Boring B-2(R) was advanced in the area of the Site where the subsurface geology is interpreted as disturbed and undisturbed alluvial deposits (Figure 7). The presence of DRPH, ORPH, metals, and PCBs in the soil sample collected the boring suggests that the source of the contamination could be related to historical operations at the former American Pile Driving Company (1937 to 1974) and junkyard dealer (1961), both of which had buildings and/or operations in Lots 14 and 15 of Parcel 536720-4565 (EAI 2000). This area of the Site is currently used for the temporary storage of shipping containers.

TP-2(R) was advanced in Lot 18 of Parcel 536720-4546. Lot 18 is located on a portion of the Site that is interpreted as disturbed and undisturbed alluvial deposits (Figure 6). The presence of metals contamination in the soil sample collected from the test pit suggests source contamination could be related to historical operations. Historical records indicate that the marine railway which operated in this area of Site from the 1940s to the 1970s (EAI 2000) (Figure 2). Activities at the marine railway may have included boat repair, which may account for metals contamination in the soil. In addition, a laboratory report for sampling of dredge spoils dated November 12, 1982, from samples collected in government property southwest of the Middle and South docks, reported the dredge samples contained PCBs concentrations of 1.3 milligrams per kilogram (mg/kg) and 3.7 mg/kg (EA 2000; Figure 2). This area of the Site is currently used for the temporary storage of shipping containers.

4.3 2002 SUBSURFACE INVESTIGATION AND INTERIM REMEDIAL ACTION

Farallon Consulting, LLC (Farallon) conducted a subsurface investigation and performed an interim remedial action at the Site in 2002. The purpose of the investigation was to obtain sufficient information on the subsurface soil and groundwater quality at the Site to evaluate potential risks to human health and environment from COPCs, and to develop a strategy to mitigate those risks to obtain a determination of No Further Action from Ecology. The scope of work for the investigation included the following work elements. Sampling locations are shown on Figure 2.

- Nineteen soil borings (B1 through B19) were advanced to depths ranging between 0 and 12.5 feet bgs. The borings were advanced on Parcels 536720-4565 and 536720-3415 (Figure 4). The borings were advanced to the depth of first encountered groundwater, or until refusal occurred, which ranged from 4 to 12.5 feet bgs.
- Borings B1, B2, B5, B7, B14, and B19 were advanced in what is interpreted as Duwamish fill added to the Site between 1936 and 1966 (Figure 4). Borings B3, B4, B6, B11, B12, B13, B16, B10, B15, B18, and B17 were advanced in what is interpreted as disturbed and undisturbed alluvial deposits.
- Four Shallow Zone monitoring wells MW1 through MW4 were installed to depths ranging between 15 to 16.5 feet bgs. Monitoring wells were screened between 5 and 15 feet bgs in predominately undisturbed alluvial deposits (Figures 4 through 8). Shallow Zone groundwater monitoring well MW2 was screened in Duwamish fill at 5 to 15 feet bgs. The monitoring wells were installed on Parcel 536720-4565.
- Four test pits (TP-B4, TP-B5, TP-B7, and TP-B12) were excavated to 4 feet bgs. Soil samples from TP-B12 were not submitted for analysis of COPCs.
- Test pits TP-B5 and TP-B7 were excavated in Duwamish fill (Figure 4). Test Pits TP-B4 and TP-B12 were excavated in the disturbed alluvial deposits (Figure 4).
- Fifteen soil samples were collected from borings and/or test pits and submitted for analysis of DRPH, ORPH, semivolatile organic compounds (SVOCs), metals, PCBs, and/or cPAHs.

Results from the subsurface investigation are as follows:

- Soil analytical results indicated that samples collected from borings B1 through B19 and monitoring wells MW1 through MW3 contained concentrations and/or the PQLs of DRPH, ORPH, SVOCs, metals, PCBs, and/or cPAHs exceeding the screening levels for soil on the Property (Tables 3 through 7; Figures 11A, 11B, 12A, and 12B).
- Groundwater analytical results indicated that samples collected from Shallow Zone monitoring wells MW1 through MW4 contained concentrations and/or laboratory PQLs of DRPH, ORPH, dissolved and metals, SVOCs, volatile organic compounds (VOCs), PCBs, PAHs and/or cPAHs exceeding the screening levels were detected in groundwater on the Property (Tables 8 through 14; Figures 13 through 15).
- Fill material was reportedly encountered from the ground surface to 16.5 feet bgs, the maximum depth explored during the investigation. The depth to groundwater ranged between 7.94 feet (MW1) and 11.43 feet (MW3) below top of casing (TOC) (Table 1; Figure 9).
- Based on the TCLP lead result for the soil sample collected from TP-3(R) during the 2000 Riley Group investigation, Farallon conducted an interim remedial excavation near the former

junkyard dealer operation on the Property (Figure 2). Approximately 50 cubic yards of lead-contaminated soil was removed from the Property and transported to Chemical Waste Management of the Northwest in Arlington, Oregon for stabilization treatment and disposal. The soil was profiled as a hazardous waste due to the TCLP lead concentrations.

4.3.1 Interim Remedial Action

An interim remedial action was conducted 2002 at the Site to excavate and dispose of lead contaminated soil located near test pit TP-3(R). The concentration of lead in a soil sample collected from the test pit at 5.5 feet bgs contained a concentration of leachable lead that exceeded the TCLP dangerous criteria of 5 mg/L (Chapter 173-303-090; Table 4). The test was located in the northwest corner of Lot 16 of Parcel 536720-4565 (Figure 4) in the suspected location of the former junkyard dealer area. The scope of work for the interim remedial action included the following work elements:

- Excavate contaminated soil over an area of approximately 7 feet wide, 11 feet long by 11.0 to 15 feet deep.
- Collect eight confirmation soil samples and analyze the samples total and TCLP lead. Samples were collected at 3 to 15.5 feet bgs from side walls and the bottom of the excavation (Table 4)
- Dispose of approximate 50 cubic yards of contaminated soil off-Site at Chemical Waste Management of Northwest in Arlington, Oregon.

Results from the interim remedial action are as follows:

- Concentrations of total lead in the all confirmation soil samples exceed the most string screen level for total lead. Three samples exceeded the most stringent screening level for TCLP lead.

An excerpt from the Farallon SSI 2002 report discussing the interim remedial action is presented in Appendix E.

4.3.2 Potential Sources for Contamination

The source of the COPCs identified in soil and/or groundwater samples collected from borings, test pits and/or groundwater monitoring wells advanced outside disturbed and undisturbed alluvial deposits is probably Duwamish fill and/or historical site activities. Historical activities included American Pile Driving Company storage shed/operations and junkyard dealer, both of which had buildings and operations in Lots 14 and 15 and the marine railway, which was formerly located in Lot 19 (Figure 4). LDW sediments added to the Property are documented to contain concentrations of PCBs, PAHs, metals, and other contaminants in excess of MTCA cleanup guidelines (WAC 173-240). In addition, a laboratory report for sampling of dredge spoils dated November 12, 1982, from samples collected in government property southwest of the Middle and South docks, reported the dredge samples contained PCBs at concentrations of 1.3 mg/kg and 3.7 mg/kg (EAI 2000). This area of the Site is currently used for the temporary storage of containers (EAI 2000).

4.4 2004 LIMITED PHASE II SUBSURFACE INVESTIGATION

Farallon conducted two limited subsurface investigations at the Site in 2004. The purpose of the investigations was to evaluate whether COPCs identified at the Site in the Phase I Environmental Site Assessment completed by Farallon in 2003 had impacted soil and/or groundwater quality at the Site. The scope of work for the investigations included the following work elements. Sampling locations are shown on Figure 4.

- Five soil borings (SB-1 through SB-5) advanced to depths ranging between 8 and 12 feet bgs. The borings were advanced at the DMF located in Parcel 536720-3635. The borings were advanced to the depth of first encountered groundwater, or until refusal occurred. For the purposes of this Work Plan, the borings are renamed SB-1S through SB-5S. Boring SB-2 was only advanced 2.5 feet bgs because refusal occurred, sample were not collected from the boring.
- Five soil borings (SB-1, SB-1A, SB-1B, SB-2, and SB-3) advanced to depths ranging between 8 and 12 feet bgs. The borings were advanced in Parcel 536720-4545. The borings were advanced to the depth of first encountered groundwater, or until refusal occurred. Boring SB-1AN was only advanced 2 feet bgs because refusal occurred, sample were not collected from the boring. For the purpose of this Work Plan the borings are renamed SB-1N, SB-1AN, SB-1BN, SB-2N, and SB-3N.
- Soil samples collected from borings SB-3N, SB-3S, and SB-4S were analyzed for DRPH, ORPH, VOCs, metals, and/or PCBs. Samples were collected at depth ranging from 5 to 12 feet bgs.
- Shallow Zone reconnaissance groundwater samples were collected from borings SB-3N and SB-1S. Reconnaissance groundwater samples were analyzed for DRPH, ORPH, SVOC, VOCs, metals, PCBs, and/or PAHs.

Results from the subsurface investigation are as follows:

- Soil analytical results indicated that samples collected from borings SB-1N and SB-3N and SB-1S and SB-4S contained concentrations and/or PQLs of SVOCs, cPAHs, PCBs and/or metals exceeding the screening levels for soil on the Site (Tables 3 through 7; Figures 11A, 11B, 12A, and 12B).
- Analytical results reconnaissance groundwater samples indicated that samples collected from borings SB-3N and SB-1S advanced in the Shallow Zone groundwater contained concentrations and/or the PQLs of ORPH, PCBs, SVOCs, and/or metals exceeding the screening levels (Tables 8 through 14; Figures 13 through 15).
- Borings were advanced in the Duwamish fill at depths ranging from near surface to 12 bgs, the maximum depth explored during the investigations. The depth to groundwater at the time of drilling ranged between 7.5 to 8.0 feet bgs.

4.4.1 Potential Sources for Contamination

The source of the COPCs identified in soil and/or reconnaissance groundwater samples collected from borings advanced at the Parcel 536720-4545 cannot be related to historical operations because the parcel has not been used for industrial operation and has been primarily vacant. The southern portion of the parcel has been used as gravel parking area, and central and northwest portions of the parcel have been leased by Glacier Material for storage of cement water-proofing chemicals, aggregate, an assorted supplies (Farallon 2004a). The source of the

contamination may be associated with Duwamish fill added to this area of the Site between 1936 and 1966.

The source of the COPCs identified in soil and/or reconnaissance groundwater samples collected from borings advanced at the DMF (Parcels 536720-3635 and 536720-3447) may be associated with historical operation or current operations, which in the past has included storage of automobiles, boats, raw materials, electrical equipment, new lube oil, and used lube. The southern portions of the building has been used as office space, a machine shop, and welding area (Farallon 2004b). A small parts-washing station is reported to have been located within the interior of the southwestern portions of the building, and an equipment wash area is located on a concrete pad that adjoins the southwestern exterior of the DMF (Farallon 2004b).

4.5 2008 REMEDIAL INVESTIGATION

Pacific Crest Environmental, LLC (Pacific Crest) conducted a remedial investigation at the Site in 2008. The purpose of the remedial investigation was to address data gaps identified by Ecology in a memorandum dated March 29, 2007 (Ecology 2007). The data gaps identified by Ecology included sampling and testing of the riverbank, offshore sediment sampling, combining groundwater sampling with the optimum groundwater flow from the LDW and sampling in upland soil areas of Site not owned by the Gilmur/Hale Family Trust. The scope of work for the remedial investigation included the following work elements:

- Installing four Deep Zone monitoring wells (MW-1D through MW-4D). The monitoring wells were advanced to 31.5 feet bgs and screened between 15 and 30 feet bgs. Monitoring wells MW-1D, MW-3D, and MW-4D were installed in Lots 15 and 17 and in Front Street of Parcel 536720-4565, respectively. Monitoring wells MW-2D was installed near the North Dock in Parcel 536720-4565 (Figure 4).
- Collecting sediment samples was collected from five locations along the west and southwestern riverbank (RB-1 through RB-5); Pacific Crest did not indicate if the riverbank samples were collected above or below mean higher high water or the datum for the riverbank samples (Figure 4).
- Collecting sediment samples from three on-Property catch basins designated as CB01, CB02, and CB04 (Figure 4).
- Conducting a 72-hour tidal study to determine the influence of tidal fluctuations in the LDW on groundwater at the Site.

The results from the remedial investigation are summarized below:

- Soil analytical results indicated that samples collected from Deep Zone monitoring wells MW-1D through MW-3D contained concentrations and/or PQLs of cPAHs, PCBs, SVOCs, and/or metals exceeding the most stringent screening levels (Tables 3 through 7, and 15; Figures 11A, 11B, 12A, and 12B). Samples analyzed for COPCs were collected at depths ranging from 5 to 8 feet bgs in disturbed and undisturbed alluvial deposits.
- Riverbank locations RB-1 through RB-5 contained concentrations and/or PQLs of cPAHs, PCBs, SVOCs, and/or metals exceeding the most stringent screening levels (Tables 16 through 21; Figures 19 through 21).

- Catch basins CB01, CB02, and CB04 contained concentrations and/or PQLs of DRPH, metals, PCBs, cPAHs, VOCs, and/or SVOCs exceeding the screening levels (Tables 16 through 21; Figures 19 through 21).
- Groundwater analytical results indicated that the samples collected from Shallow Zone monitoring wells contained concentrations and/or PQLs of metals and/or VOCs exceeding the screening levels (Tables 8 through 14; Figures 13 through 15).
- Groundwater analytical results indicated that the samples collected from Deep Zone monitoring wells contained concentrations and/or PQLs of metals, SVOCs, CPAHs and/or VOCs exceeding the screening levels (Tables 8 through 14; Figures 16 through 18).
- Groundwater elevations are tidally influenced by LDW. The measured fluctuations in Deep Zone groundwater monitoring wells ranged from 6.7 feet (MW-1D) to 11.4 feet (MW-2D) (Table 2; Figure 10).

4.5.1 Potential Sources for Contamination

The source of COPCs identified in soil samples collected from borings advanced in conjunction with the installation of Deep Zone monitoring wells MW-1D, MW-3D, and MW-4D in Lots 14, 15, and 17 and in Front Street can probably be related to historical operations. The conclusion is based on the fact soil samples selected for analysis were collected at depths of 5 to 8 feet bgs in what is interpreted as disturbed alluvial deposits. Historical operations identified in Lots 14 and 15 include the American Pile Driving Company and junkyard dealer. Historical operation proximate to Front Street may have included the marine railway. No significant historical operations have been identified in Lot 17 (EAI 2000).

The source of COPCs in riverbank samples can likely be attributed in part to intrinsic contamination in Duwamish fill added to the Property from 1966 and 2007. Additional sources for contamination may have originated in contaminated groundwater discharging through the sediment and/or contaminated surface water runoff flowing over the riverbank.

The source for contamination in the catch basin soil is probably contaminated stormwater and eroded surface soil captured in the catch basins during storm events. In additional, the source of contamination may include accidental release and spills from vehicles operated at the Site.

The source of COPCs in the Deep Zone ground may be attributed to the vertical migration of contaminants from the Shallow Zone and Deep Zone groundwater, intrinsic contamination in the undisturbed alluvial deposits, and/or yet undefined off-Site upgradient sources. Additional sources of contamination may have included contaminated surface water mixing with the Deep Zone groundwater (near shore) during the flooding tide.

4.6 GROUNDWATER MONITORING

Between November 2003 and August 2004, four consecutive quarters of groundwater monitoring were conducted by Farallon for Shallow Zone monitoring well MW3 only. The groundwater samples were submitted for analysis of only DRPH and ORPH. ORPH was detected above the screening level once during one of the four quarters in the well (Tables 8 through 14).

In June 2008, Pacific Crest conducted a groundwater monitoring event for Shallow Zone monitoring wells MW1, MW3, and MW4, and Deep Zone monitoring wells MW-1D through MW-4D. Groundwater samples were submitted for analysis of COPCs. DRPH, SVOCs, cPAHs, naphthalene, and/or metals were

detected above the screening levels in the groundwater samples collected from Shallow Zone well MW3 and Deep Zone wells MW-2D through MW-4D (Tables 8 through 14; Figures 13 through 15). Pacific Crest also conducted a 72-hour tidal influence study, which is discussed in Section 3.3.3 of this Work Plan.

4.7 SEDIMENT INVESTIGATIONS

The Site is located within the LDW, which consists of downstream portions of the Duwamish River, excluding the East and West waterways around Harbor Island, and has served as the City of Seattle's major industrial corridor since 1911 (Figure 1; WWE 2010). In 2001, the LDW was identified as a Superfund site by the EPA due to the presence of contaminated sediments. Results from a remedial investigation conducted at the LDW in early 2000s identified candidate early remediation sites, also known as early action areas (EAAs). The Site was not identified as EAA. Ecology is lead agency for upland source control in the LDW. The EPA is the lead agency for determining the most effective cleanup strategy for the LDW.

Numerous sediment quality investigations have been conducted within the LDW (Table 22). Sampling for the investigations has primarily occurred from RM 0.0, near the southern tip of Harbor Island, to upstream of the Upper Turning Basin to approximately RM 6.0 (WWE 2010). The Site is located within RM 1.7 and 2.0 of the LDW and within Ecology's east source control area. The east source control area includes Glacier Northwest, Inc., Seattle Biodiesel, Samson Tug and Barge, and the Duwamish Marine Center (Figure 2).

Sediment sampling activities offshore of the Site and/or offshore of adjacent properties were conducted from 1995 through 2006 (Table 23; Figure 22). Sampling included both surface and subsurface sediment samples. COPCs identified in sediment samples collected offshore of the Site in the LDW, in Slip 2 adjacent to the Site and offshore the Michigan Street CSO, include PCBs, PAHs, SVOCs, and/or metals (AECOM 2010). COPCs exceeding the most stringent screening levels for sediment are present in LDW and Slip 2 adjacent to the Site at depths ranging from surface to 8 feet below mud line. Laboratory analytical results indicate that concentrations of PAHs, SVOCs, PCBs, and metals exceeding the most stringent screening levels for sediment were detected in sediment samples collected off-shore of the Site (Table 23; Figure 22).

4.7.1 Potential Sources for Contamination

Sources for COPCs in the sediments offshore of the Site may include contaminated surface water runoff, groundwater, discharge from outfalls, and riverbank sediments at the Site. Seattle Biodiesel and Glacier Northwest Inc., located on the southeast and northwest banks of Slip 2, may have also contributed contamination to the sediments in Slip 2. The distribution and extent contaminated sediment offshore of the Site may also have resulted from the deposition of contaminated sediments entrained in the water column by ship scour and erosion LDW sediments upriver of the Site (WEE 2010).

5.0 DATA QUALITY AND USABILITY

SoundEarth reviewed existing laboratory report for the investigations conducted at the Site from 2002 through 2008. Based on a review of technical holding times, accuracy and precision data and laboratory method blanks, the data quality is acceptable for its intended use for the media of concern. Laboratory

reporting limits for some selected analytes exceeded the most string screening level; those results are blue in Tables 3 through 21.

6.0 CONCEPTUAL SITE MODEL

The CSM provides a conceptual understanding of the Site that identify confirmed and suspected sources of hazardous substances, types and concentrations of hazardous substances, potentially affected contaminated media, transport mechanisms, fate of contaminants in the environment, and exposure pathways for potential receptors. In addition, the CSM provides the basis for developing technically feasible cleanup alternatives from which a final cleanup action approach is selected. A CSM is dynamic and may be refined when additional information becomes available during the implementation of the RI/FS and cleanup action.

Sections 6.1 through 6.8 present the components of the preliminary CSM developed for the Site based on the completion of the previous investigations conducted by other consultants. These sections include a discussion of contaminant sources, release mechanisms, transport and exposure pathways, and potential receptors. The current CSM does not include a discussion of the fate and transport of COPCs; that discussion is deferred to the RI Report. Figure 23 provides a visual representation of the information presented below.

6.1 POTENTIAL AND CONFIRMED SOURCES FOR HAZARDOUS SUBSTANCES

A source area is the location of a release of a hazardous substance (e.g., PCBs) that has affected soil, groundwater, surface water and/or sediment at the Site. Potential historical source areas at the Site are shown on Figure 2 and include the following:

- American Pile Driving Company operated in Lots 14 and/or 15 of Parcel 536720-4565 from approximately 1937 to 1974.
- Junkyard dealer that operated in Lots 14 and/or 15 of Parcel 536720-4565 from in the 1960s and 1970s.
- The marine railway that operated in Lot 19 and parts of Lot 20 of Parcel 536720-4565 from the 1940s to the 1970s.
- Duwamish fill added to Site from 1936 to 2007.

Potential current sources areas for contamination include the following:

- The equipment wash area located proximate to the DMF and Temporary Building.
- Temporary Building in Lot 5 of Parcel 536720-3415.

Confirmed sources for contamination include the following:

- Discharge from Out1 to LDW. The outfall drains seven catch basins located on the Property. The outfall is located south of the South Dock. Concentrations of hazardous substances have been documented in the discharge from the outfall (Figure 2).
- Discharge from Out3. The outfall drains a catch basin associated with the Duwamish Metal Fabricators and equipment wash area. Concentrations of hazardous substance have been documented in the discharge from the outfall (Figure 2).

- Sources for COPCs in the sediments offshore of the Site may include contaminated surface water runoff, groundwater, outfall discharge, and riverbank sediments originating at the Site (Figure 22).

Other potential sources of contamination include the following:

- The former Burgess Enterprise air cleaning system and tank plumbed to discharge to the Slip 2 formerly at the present location of STB (Figure 2).
- Deposition of contaminated sediments entrained in the water column by ship scour and erosion LDW sediments from properties located adjacent to and upriver of the Site (Figure 2).
- The Michigan Street CSO basin covers approximately 1,900 acres and includes residential, commercial, and industrial properties and the King County Airport (Figure 2).

6.2 MEDIA OF CONCERN

Soil, sediments, groundwater, and surface water at the Site are contaminated with PCBs, cPAHs, metals, SVOCs, VOCs, ORPH, and/or DRPH and represent the media of concern at the Site. These hazardous substances have been detected above the most stringent screening levels in soil, groundwater, and sediment at the Site.

6.3 CHEMICALS OF POTENTIAL CONCERN

Based on the findings of the investigations conducted at the Site, the primary COPCs are PCBs, metals, cPAHs, SVOCs, VOCs, DRPH, and ORPH.

6.4 NATURE AND EXTENT OF CONTAMINANTS

The COPCs in the media of concern may have resulted from onshore releases associated with current and historical operations and contamination intrinsic to the Duwamish fill. In addition, COPCs in the media of concern may have resulted from stockpiled contaminated sediments at the Site, transport and deposition of contaminated sediments originating from facilities, and outfalls located adjacent to and upriver of the Site.

As shown in Figures 11A through 22, COPCs are present throughout the Site in the media of concern. The distribution of COCPs in the media of concern suggests that there is no definitive source or sources for the release of COPCs. “Hot spot” of COPCs are present at the Site, which may suggest that undocumented releases of hazardous substances have occurred in the areas of the former American Pile Driving Company, the junkyard dealer, the marine railway, the equipment wash area, and/or the Burgess Enterprise. COPCs in sediments offshore of the Site, in LDW and Slip 2, contained similar COPCs than those found in onshore portion of the Site. Based on this conceptual understanding of sources for COPCs at the Site, the nature and extent of contaminants in each media of concern is presented below.

6.5 DISTRIBUTION OF CONTAMINANTS IN SOIL

The results of previous subsurface investigations indicate the presence of PCBs, cPAHs, metals, SVOCs, VOCs, ORPH, and/or DRPH in soil beneath the Site. The highest concentrations of COPCs in soil samples collected from borings and test pits advanced in area of the American Pile Driving Company, the junkyard dealer, and the Duwamish fill. Current activities in these areas of the Site are primarily associated with storage and shipping of cargo.

Concentrations exceeding the most stringent screening levels for PCBs, cPAHs, metals, SVOCs, ORPH, and/or DRPH in soil appeared to be present at near surface to 14.5 feet bgs at the Site (Figures 4 and 5 through 8). PCBs, cPAHs, SVOCs, metals, ORPH, and/or DRPH in soils samples collected at approximately 0 to 10 feet bgs were collected in disturbed alluvial deposits and Duwamish fill (e.g., borings B1, B3, B2, B2(R), B4, B5, B7, B8, MW2D, TP-3(R), and TP-4(R)). These analytes were also present in soil samples collected at 12 to 14.5 feet bgs in the Duwamish fill (e.g., B1(R) and B3(R) (Figures 4, 5, and Figures 15 through 18)). The highest concentrations of COPCs appear to be primarily associated with the former American Pile Driving Company, the junkyard dealer, and Duwamish fill. Metals are present in soil throughout the Site, and except in the area of former junkyard dealer, metals in soil may represent natural and/or area background concentrations for the Duwamish Industrial Corridor.

Based on the TCLP lead result for the soil sample collected from TP-3(R) during the 2000 Riley Group investigation, Farallon conducted an interim remedial excavation in the vicinity of the former junkyard dealer operation on the Property in May of 2002. The excavation included removal contaminated soil associated with test pit TP-3(R), TP-B7, and borings B7 and B8. The excavation was advanced to 15.5 feet bgs (Figure 2). Concentrations of TCLP lead in all but three confirmation soil samples were below the regulatory threshold at the final limits of the excavation (Farallon 2002). Concentrations of total lead exceeded the most stringent screening levels in all confirmation samples. Confirmation samples were not analyzed for PCBs, cPAHs, metals (except for lead), SVOCs, ORPH, and/or DRPH.

6.6 DISTRIBUTION OF CONTAMINANTS IN GROUNDWATER

The results of previous subsurface investigations indicate the presence of PCBs, cPAHs, metals, VOCs, SVOCs, ORPH, and/or DRPH to the Shallow Zone and Deep Zone groundwater beneath the Property. The distribution of contaminates in each zone are discussed below.

6.6.1 Shallow Zone Groundwater

Shallow Zone groundwater monitoring wells MW1, MW2, MW3, and MW4 are primarily screened in undisturbed alluvium and/or Duwamish fill. The highest concentrations of COPCs appear to be generally associated with historical operations at American Pile Driving Company, the junkyard dealer formerly located in Lots 14 and 15, or proximate to the marine railway located on Lot 19 and 20. Additional sources may include the Duwamish fill and/or unidentified off-Site upgradient sources.

The Shallow Zone groundwater is unconfined and is recharged from upgradient and infiltration of surface water from the unpaved portions of the Site. A downward vertical gradient appears to exist between the Shallow and Deep Zone groundwater, but vertical migration of COPCs from the Shallow to the Deep Zone groundwater may be limited by an aquitard, as shown on Figures 5 through 8. Lateral migration of COPC in the Shallow Zone groundwater may also be subject to natural attenuation processes, which reduce the contaminant velocity in the groundwater and degrades some COPCs. The groundwater flow direction in the Shallow Zone is to the northwest and the Shallow Zone groundwater is tidally influenced (Figure 9). At this time, it is not known if Shallow Zone groundwater discharges to the LDW or to underlying sediments.

6.6.2 Deep Zone Groundwater

Deep Zone groundwater monitoring wells MW-1D, MW-2D, MW-3D, and MW-4D are primarily screened in undisturbed alluvial deposits and/or Duwamish fill. As shown in Figures 5 through 8, the Deep Zone groundwater monitoring wells are interpreted as semiconfined based on the

presence of a discontinuous aquitard composed of silt to sandy silt between the Shallow and Deep groundwater zones. The groundwater flow direction in the Deep Zone is to the northwest and the Deep Zone is tidally influenced (Figure 10). COPCs present in the Deep Zone groundwater could result from the surface releases associated with current operations at the Site and/or historical operations at American Pile Driving Company, the junkyard dealer formerly located in Lots 14 and 15, or the marine railway located in Lot 19. Additional sources may include concentrations of COPCs intrinsic to the Duwamish fill, COPCs present in the disturbed alluvial deposits overlying the Deep Zone, or unidentified off-Site upgradient sources.

The Deep Zone groundwater is interpreted as semiconfined and is recharged from upgradient and vertical moment of groundwater from the Shallow and Deep Zone groundwater. A downward vertical gradient appears to exist between the Shallow and Deep zones. Lateral migration of COPC in the Deep Zone groundwater may also be subject to natural attenuation processes, which reduce the contaminant velocity in the groundwater and degrades some COPCs. The groundwater flow direction in Deep Zone is to the northwest and the Deep Zone groundwater is tidally influenced (Figure 10). At this time, it is not known if Deep Zone groundwater discharges to the LDW or to underlying sediments.

It is true that our CSM has some uncertainty when it comes to the presence of two water-bearing zones beneath he Site (limited deep boring in some areas of the Site), but the proposed RI is designed to address some of those uncertainties reading Shallow and Deep Zone groundwater and hydraulic conductivity.

6.7 DISTRIBUTIONS OF CONTAMINANTS IN SEDIMENT

The results of previous subsurface investigations indicate the presence of PCBs, cPAHs, metals, and/or SVOCs to sediment in the LDW occurred as a result of decades of heavy industrial operations within the LDW and on the adjacent upland areas (AECOM 2010). Concentrations of PCBs, cPAHs, metals, and SVOCs in sediment appeared to be located in surface and subsurface sediment samples collected at various depths within the LDW and offshore of the Site (Figure 19).

The distribution of COPCs in the sediment in the LDW offshore Site, suggests that there are likely multiple sources for the contaminants in the sediment. These include private outfalls located upriver and adjacent to the Site, sediment transported from upriver and deposited offshore of the Site, and discharge from the prior operation of the Michigan Street CSO. Other potential sources may include discharge from outfalls, groundwater, surface water runoff, and riverbank sediments at the Site.

The distribution of COPCs in the catch basins sediments may results from contaminated surface water runoff at the Site captured by the catch basins and/or incidental spill proximate to the catch basins. The distribution of COPCs in riverbanks may have resulted from contaminated stormwater runoff cascading over the riverbanks, contaminated groundwater flowing through the riverbanks, current or historical activates proximate to the riverbank, and/or incidental spill proximate to the riverbank.

6.8 EXPOSURE PATHWAYS

The three general types of receptors are potentially at risk from exposure associated with the presence of COPCs at the Site. The receptors include terrestrial (terrestrial birds and water fowl); aquatic organisms (biota, fish, and shellfish); and humans (workers and recreational users, which may include beach play or shell fishing). Human receptors include workers at the STB, DMC, and DMF facilities. It is unlikely that the general public will use the LDW or access the Site, as it is currently defined, because of

the industrial nature of the Site and surrounding area. This section presents the evaluation and conclusions pertaining to the exposure pathways at the Site. The goal of this section is to identify potential exposure scenarios that will assist in the evaluation of potential feasible cleanup alternatives that are protective of terrestrial and aquatic organisms and human health. The CSM highlighting the source areas, potential pathways, and potential receptors for each media of concern is presented on Figure 24 and discussed below.

6.8.1 Soil

Soil with concentrations of COPCs above the most stringent screening levels presents a potential risk to terrestrial and/or human receptors. The potential release mechanism for soil at the Site includes soil to groundwater via leaching, soil erosion to surface water, and airborne dust from soil erosion (Figure 24). The potential exposure pathways for soil that could be complete are as follows:

- **Dermal contact and ingestion (direct contact) of contaminated soil**. The release mechanisms for this exposure pathway are surface soil, leaching of soil to groundwater, and soil to surface water via erosion. This exposure pathway could be complete for employees and environmental field personal (workers) working at the Site and terrestrial and aquatic organisms residing and/or feeding at the Site. This exposure pathway is incomplete for recreational users because of the industrial activities at the Site and the LDW make this receptor unlikely.
- **Inhalation of airborne soil.**: The release mechanism for this exposure pathway is erosion of surface soil and inhalation air boring soil particles. This exposure pathway could be complete for workers and terrestrial. Based on current CSM for the Site, this exposure pathway is considered incomplete fish and shellfish consumption and biota because it unlikely that a substantial portion of airborne dust will reaching these receptors. This exposure pathway is incomplete for recreational users because of the industrial activities at the Site and the LDW make this receptor unlikely.

6.8.2 Groundwater

Based on the current CSM of the Site, groundwater exists in Shallow and Deep zones beneath the Site. The Shallow Zone groundwater is unconfined and the Deep Zone groundwater is semiconfined. Groundwater at the Site is tidally influenced, indicating that flow reversal may occur during periods of high tide. Groundwater containing concentrations of COPCs above the most screening levels in the Shallow and Deep Zone groundwater present a potential risk to aquatic and terrestrial organism and/or worker (Figure 24). The potential release mechanisms for groundwater include discharge to surface water and sediments in the LDW and vapor migrating from groundwater to the outdoor ambient air. The potential exposure pathways for groundwater and the potential receptors include the following:

- **Direct contact with contaminated groundwater.** This exposure pathway could be complete for workers and biota and aquatic organism The exposure pathway is incomplete for terrestrial organisms because these receptors do not have contact to groundwater. This exposure pathway is incomplete for recreational users because of the industrial activities at the Site and the LDW make this receptor unlikely.

- **Inhalation of contaminated volatile organics.** This exposure pathway could be complete for worker. The exposure pathway is incomplete for all other receptors.
- **Direct contact with contaminated surface water LDW**. The exposure could be complete for workers and terrestrial and aquatic organism. This exposure pathway is incomplete for recreational users because of the industrial activities at the Site and the LDW make this receptor unlikely.

6.8.3 Sediment

Based on the current CSM for the Site, contaminated sediments are present offshore of the Site in LDW and the riverbank and in catch basins at the Site. Sediments containing concentrations of COPCs above screening levels presents a potential for aquatic and terrestrial organism, workers, and recreational users (Figure 24). The potential release mechanisms for sediments include the discharge outfalls on and off the Site, erosion of riverbank sediment to the LDW, transient migration of sediment from off the Site, and the release of airborne dust from the erosion of the riverbank. The potential exposure pathways for sediment and the potential receptors include the following:

- **Direct contact with contaminated riverbank, catch basin, and LDW sediments.** The exposure pathway could be complete for workers and terrestrial and aquatic organisms. The exposure pathway could be complete for recreational users; however, because of the industrial activities at the Site and the LDW, this exposure pathway is incomplete.
- **Inhalation of contaminated airborne dust riverbank sediments.** The exposure pathway could be complete for workers. The exposure pathway could be complete for recreation users; however, because of the industrial activities at the Site and the LDW, this exposure pathway is incomplete.

6.8.4 Surface Water

Based on the current CSM for the Site, potential release mechanisms for surface water at the Site include surface water runoff from the Site by sheet flow and discharge from outfalls originating at the Site (Figure 24). As discussed in Section 2.4, concentrations of COPCs above the NPDES benchmark values have been detected in stormwater samples collected from outfalls Out1 and Out3, indicating that contamination of surface water via stormwater may be occurring. The potential exposure pathways for surface water and the potential receptors include the following:

- **Direct contact with contaminated surface water.** The exposure pathway could be complete for workers and terrestrial and aquatic organisms. The exposure pathway could be complete for recreation users; however, because of the industrial activities at the Site and the LDW, this exposure pathway is incomplete.

7.0 DATA GAPS

The RI will provide sufficient information to meet the requirements under the MTCA and the Agreed Order. Data collected during the RI will provide sufficient information to develop remedial alternatives for the Site. The following Sections 7.1 through 7.5 summarize data gaps identified during SoundEarth's

review of previous subsurface investigations conducted by other consultants at the Site and in Ecology's comments (Appendix A). A summary of the data gaps is presented in Table 24.

7.1 SOIL

Near-surface and subsurface soil conditions for the Site have been assessed by way of seven test pit excavations and 32 borings. Analytical results have identified concentrations of total petroleum hydrocarbons, cPAHs, SVOCs, and PCBs that exceed the most stringent screening levels in soil primarily located in Lots 14 and 15 of Parcel 536720-4565 and the adjacent Duwamish fill, which is the area of the Site where the American Pile Driving Company and junkyard dealer formerly operated (Figures 5 through 8, 11A, 11B, 12A, and 12B). Concentrations of PCBs exceeding the stringent screening level primary COPC were identified in Lots 3 through 6 in Parcel 536720-3415 at the current location of the Temporary Building. Concentrations of select metals exceeded the most stringent levels throughout the Site in disturbed and undisturbed alluvial deposits and Duwamish fill. Except for the area of the former junkyard dealer, there does not appear to be a definitive source for metals in soil at the Site. Concentrations of metals in the soil probably represent natural and or area background concentrations in the Duwamish Industrial Corridor. COPCs with concentrations exceeding the most stringent screen level are primarily present from near surface to 15 feet bgs.

Data gaps have been identified based on the location of potential source areas, the current conceptual site model for the Site, and the need for additional information to meet the goals and objective of the RI/FS. Data gaps identified include the following:

- The nature and extent of COPCs in the area of the former American Pile Driving Company and junkyard dealer in the area of the former marine railway.
- The nature and extent of COPCs at the former Burgess Enterprise and the equipment wash area located proximate to the DMF. These areas of the Site have not been fully characterized and/or previous investigated.
- The extent of the aquitard separating the Shallow and Deep Zone groundwater beneath the Site.

The scope of work to address these data gaps is discussed in Section 9.0 below.

7.2 GROUNDWATER

Shallow Zone and Deep Zone groundwater conditions have been assessed at the Site using four Shallow Zone and four Deep Zone groundwater monitoring wells (Figures 13 through 18). Both Shallow and Deep zone monitoring wells have been previously sampled for GRPH, DRPH, ORPH, VOCs, SVOCs (including cPAHs), PCBs, and total and dissolved metals. Analytical results indicate the highest concentrations of DRPH, OPRH, VOCs, SVOCs, and PCBs in Shallow Zone and/or Deep Zone groundwater located in Lots 14 and 15 of Parcel 536720-4565 and the adjacent Duwamish fill, which is the area of the Site where the American Pile Driving Company and junkyard dealer formerly operated (Figures 5 through 8, 11A, 11B, 12A, and 12B). Metals in groundwater exceeding the most stringent screening levels are primarily present in the Shallow Zone groundwater. Except for the area of the former junkyard dealer, there does not appear to be a definitive source for metals in soil at the Site. Concentrations of metals in the Shallow and/or Deep zone groundwater probably represent natural and or area background concentrations in the Duwamish Industrial Corridor.

Data gaps for groundwater have been identified based on the location of potential source areas for contamination, the current conceptual site model for the Site, and need for additional information to meet the goals and objective of the RI/FS. Data gaps identified include the following:

- The nature and extent of contamination in Shallow Zone groundwater in the area of the former American Pile Driving Company, the former junkyard dealer, and the former marine railway.
- The nature and extent of the contamination in Shallow Zone groundwater near the Burgess Enterprise, the equipment wash area associated with the DMF, and the Temporary Building (Figure 2). Shallow Zone groundwater in these areas of the Site has not been fully characterized or previously investigated.
- The impact to Shallow and Deep Zone groundwater at the Site from potential upgradient source areas.

The scope of work to address these data gaps is included in Section 9.0 below.

7.3 CATCH BASIN SEDIMENTS

Previous work completed by others included sampling sediment from three on-Site catch basins (previously designated CB01, CB02, and CB04) that reportedly served the stormwater drainage system, which outfalls into the LDW by way of Out1 (Figure 4). Catch basin sediments were analyzed for DRPH, ORPH, SVOCs (including PAHs), VOCs, PCBs, and metals. Sediment samples were not collected from stormwater catch basins CB03, and CB05 through CB09 that also serve the system, and therefore represent data gaps for the Site. In addition, sediment samples have not been collected from the catch basin that discharges to outfall Out3. The scope of work to address these data gaps is included in Section 9.0 below.

7.4 RIVERBANK SEDIMENTS

The previous five riverbank samples (RB-1 through RB-5) were collected by others along the western and northern portions of the Site and analyzed for DRPH, ORPH, SVOCs, VOCs, PCBs, and metals. Results from this previous sampling indicated that COPCs were present in the riverbank sediment (Figure 4). However, there is an absence documentation regarding as to where and how the riverbank samples were collected relative to establish tidal datums. Additional sampling is required to confirm the concentrations of COPCs previously identified in the riverbank samples. The scope of work to address these data gaps is included in Section 9.0 below.

7.5 SEEPS

Seep samples were not collected during previous samples events; and therefore, represent a data gap regarding the potential impact of contaminated groundwater on the LDW. The scope of work to address these data gaps is included in Section 9.0 below.

7.6 OFF-SHORE SEDIMENT

The previous investigations of sediment quality indicate that COPCs are present in the sediment in the channel and the intertidal zone of LDW offshore of the Property (SAIC 2009). The current nature and extent of COPCs in the sediment suggests that there are multiple sources for the contamination in the sediment. Theses source may include discharge from private and municipal outfalls and upriver and

adjacent properties. The impact of current and past operations on sediment quality offshore of the Site has not been evaluated. The scope of work to address these data gaps is included in Section 9.0 below.

8.0 PROJECT ORGANIZATION

This section summarizes the responsibility and authority of organizations and key personnel involved in conducting the RI/FS.

- **John R. Funderburk, MSPH.** SoundEarth principal responsible for providing general project oversight and final review of all project deliverables.
- **Thomas Cammarata, LG, LHG.** SoundEarth senior environmental geochemist will be the project manager responsible for completion of the RI/FS. He will have overall responsibility for managing the work, compiling and analyzing the Site investigation data, and coordinating with Ecology. He will also coordinate laboratory activities and review the analytical data for quality assurance/quality control purposes. He will also provide input on fate and transport mechanisms for COPCs at the Site. Mr. Cammarata will also be responsible for the completion of project deliverables, including the Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), and RI/FS Report.
- **Terry Montoya, PE.** SoundEarth principal engineer responsible for providing engineering input and insight into completion of the RI/FS.
- **Charles C. Cacek, LEG, MSc.** SoundEarth associate geologist responsible for coordinating/completing the field sampling, developing geologic logs, and delivering samples to the laboratory. He will also be responsible for preparing and implementing the Health and Safety Plan.
- **Cascade Drilling** will drill and install monitoring wells and complete soil borings.
- **Friedman & Bruya Inc.** will complete the laboratory chemical analysis for soil, groundwater, and surface water samples.

9.0 REMEDIAL INVESTIGATION SCOPE OF WORK

This section describes the scope of work that will address identified data gaps and complete the RI/FS. Sampling locations for the media of concern, which include soil, riverbank, sediment, groundwater, seep, and catch basin are summarized below and shown on Figures 25 and 26. Table 24 summaries SouthEarth's proposed work program for the media and rationale for additional sampling.

9.1 RIVERBANK, CATCH BASIN, AND INTERTIDAL WORK PROGRAM

The riverbank, catch basin, and intertidal sediment field program will include a Site reconnaissance to confirm access to the proposed sampling locations. Figure 25 shows the locations of proposed riverbank and catch basin samples and Figure 26 shows the proposed location and intertidal sediment-core samples in the LDW. Following the Site reconnaissance, SoundEarth will collect samples from the riverbank, catch basins, intertidal sediments, and, if present, seeps along the riverbank. Samples will be analyzed for COPCs using applicable Ecology and EPA analytical methods. A general description of the field program is presented below. A detailed description of sample procedures, sampling frequency, and chemical analyses to be performed will be presented in the SAP and QAPP to be prepared under separate cover.

9.1.1 Site Reconnaissance

SoundEarth will conduct a Site reconnaissance during daylight and at low tide to document the surface conditions along the shoreline and intertidal zone, and to confirm proposed riverbank soil, sediment, and potential seep sampling locations. The Site reconnaissance will include the following work elements:

- Prepare detailed mapping of the shoreline, which will include identifying permanent structures and features such as docks, concrete paving, and debris. The characteristics of each feature will be described, photographed, and located using a Global Positioning System and coordinates of each structure and feature will be recorded. The locations of proposed sediment and riverbanks sample shown on Figure 25 will be confirmed.
- Prepare a technical memorandum before implementing the sampling program that summarizes the observations from the Site reconnaissance and presents the final riverbank, seep, and sediment sampling locations and submitting the technical memorandum to Ecology for review and approval of final sampling locations.

9.1.2 Riverbank Sampling

Six riverbank samples identified as RB-6 through RB-11 will be collected and numbered sequentially after the last riverbank sample collected by Pacific Crest in 2008 (i.e., RB-5) (Figure 25). The purpose of the riverbank samples is to confirm the concentrations of COPCs in the riverbank sediments. Confirmation is required because of the absence documentation regarding where riverbank samples were collected relative to established tidal datums. Results for the riverbank samples will assist in the evaluation of the potential impacts of uplands contamination on the offshore environment and potential impact to human health and environment through exposure pathways discussed in Section of 6.8. The sampling and laboratory methodology for collecting the riverbank samples will be presented in the SAP and QAPP to be prepared under separate cover.

9.1.3 Seep Sampling

The number and location of seep samples will be determined based on the findings from the Site reconnaissance. Because SoundEarth is currently not aware of active seeps along the riverbank, no preliminary sampling locations are shown on Figure 25. The purposes of the seep samples are to evaluate whether there is a complete exposure pathway from the groundwater discharge to the surface water and the sediment, and to further define the boundaries of the Site. The sampling and laboratory methodology for collecting the proposed seep samples will be presented in the SAP and QAPP to be prepared under separate cover.

9.1.4 Sediment Sampling

Six sediment cores (SED1 through SED6) advanced to 4 feet below mud line in the intertidal zone offshore of the Site and sediment samples will be collected to evaluate the potential impact to sediment quality offshore from the former nearby Michigan Street CSO; discharge from groundwater, riverbank erosion, discharge from outfalls, and stormwater runoff (Figure 26) . Results for the sediment quality evaluation will also be used to evaluate potential impact to human health and environment through exposure pathways discussed in Section 6.8 and further refine the boundaries of the Site. The sampling and laboratory methodology for collecting the

proposed sediment samples will be presented in the SAP and QAPP to be prepared under separate cover. The proposed sediment sampling locations are shown on Figure 26.

9.1.5 Catch Basin Sampling

Stormwater catch basins CB01 through CB07 reportedly convey stormwater runoff to outfall Out1. The catch basin adjacent to the west side of the DMF conveys stormwater to outfall Out3. Because outfalls can serve as primary contaminant sources for LDW sediment impacts, SoundEarth proposes to sample sediment from each catch basin and analyze for COPCs. Catch basins CB08 and CB09 will also be sampled. It is assumed that these catch basins drain stormwater from Parcels 536720-4565 and 536720-4560. Water from catch basin CB08 and CB09 is pumped to the municipal sanitary sewer (Greylock 2009). Effluent samples will be collected during storm event at low tide from outfalls Out1 and Out3 and analyzed for COPCs, which have been identified in the upland soil, groundwater, and catch basins by others.

9.2 UPLAND WORK PROGRAM

The upland investigation will include a detailed site reconnaissance, advancing soil borings, collecting soil samples for chemical analysis of COPCs, installing groundwater monitoring wells, collecting groundwater samples from existing and newly installed groundwater monitoring wells, and analyzing the groundwater samples for COPCs. The purpose of the uplands investigation is to define the lateral and vertical extent of the COPCs in soil and groundwater in potential historical and current source area at the Site. Furthermore, the results from the upland investigation will be used to evaluate potential impact to human health and environment through exposure pathways discussed in Section 6.8. A general description of uplands investigation is described below.

9.2.1 Site Reconnaissance

A site reconnaissance will be performed on the upland portion of the Site. The objectives of this work are to:

- Confirm the locations of newly proposed borings and monitoring wells relative to current operations at the Property and the location of subsurface utilities.
- Observe the on-Property drainage system and Outfall No. 2021/Out1 to confirm which portions of the uplands drain to the outfall and evaluate whether the discharge from the outfall represents an exposure pathway for the offshore environment.
- Accurately locate existing groundwater monitoring wells at the Site and evaluate the integrity and the continued usability of the monitoring wells as resource protection wells for evaluating groundwater quality at the Site.

9.2.2 Upland Drilling Program

As discussed in Section 7.0, Data Gaps, of this Work Plan, additional soil analytical data will be required to evaluate the nature and extent of COPCs previously identified in upland soils and in the Shallow and Deep Zone groundwater.

9.2.2.1 Soil Sampling

As discussed in Section 7.0, Data Gaps, of this Work Plan, COPCs are present throughout the Site. The sources for soil the contamination may be associated with historical operations,

current operations, or intrinsic to the Duwamish fill. To address these data gaps in soil the following work program will be implemented. Sampling locations are shown on Figure 25:

- **Borings SB01 and SB02 advanced in Parcel 536720-4565 Lot 19.** The purpose of these borings is to investigate the potential impact from the potential release of COPCs to soil and groundwater from the former marine railway and to identify potential interim removal action areas before implementation of the final remedy for the Site.
- **Borings SB03, SB04, SB05, and SB06 advanced in Parcel 536720-4565 Lots 14 and 15.** The purpose of these borings is to further characterize the nature and extent of COPCs in soil and/or groundwater in this area of the Site and to identify potential interim removal action areas before implementation of the final remedy for the Site.
- **Borings SB07 and SB08 advanced in Parcel 536720-3447**. The purpose of these borings is to further characterize the nature and extent of COPCs soil and/or groundwater in this area of the Site and to identify potential interim removal action areas before implementation of the final remedy for the Site.
- **Borings SB09 advanced in Parcel 536720-3415 Lot 5.** The purpose of this borings is to install a Shallow Zone groundwater monitoring well to evaluate groundwater quality in this area of the Site. Previous borings advanced in this area of the Site identified COPCs in soil; however, impact to groundwater was not assessed.
- **Borings SB10, SB11, SB12, and SB15 advanced in 1st Avenue ROW.** The purpose of these borings is to evaluate the impact of upgradient sources on groundwater quality at the Site. These borings will be converted to monitoring wells.
- **Borings SB13 and SB14 will be advanced in Parcel 536720-4560.** The purpose of these borings is to further characterize the nature and extent of COPCs in soil and groundwater in this area of Site.
- **Boring SB16 will be advanced in Parcel 53670-4560.** The purpose of the boring is to intercept the aquitard that is believed to be present between the Shallow and Deep Zone in this area of the Site.

Borings SB07, and SB13, SB10, and SB15 will be advanced to 20 feet bgs and converted to Shallow Zone groundwater monitoring wells (MW5, MW6, MW7, and MW8, MW9, and MW10, respectively). Borings SB11 and SB12 will be advanced to 30 feet bgs for the installation of two Deep Zone groundwater monitoring wells (MW-5D and MW-6D, respectively). Shallow Zone groundwater monitoring wells will be installed in borings SB06 and SB09. These borings will be initially advance to 30 feet bgs in attempt to intercept the aquitard that is believed to be present between the Shallow and Deep Zones. Borings SB03 and SB05, and SB16 will be advance to 30 feet bgs in an attempt to intercept the aquitard that is believed to be present between the Shallow and Deep Zone.

The sampling and laboratory methodology for advancing the soil borings, collecting soil, and chemical analyses to be performed will be presented in SAP and QAPP to be prepared under separate cover. A description of each boring and rational are described below. The proposed boring locations are shown on Figure 25.

9.2.2.2 Groundwater Monitoring and Sampling

Four additional Deep Zone groundwater monitoring wells, designated MW-5D through MW-8D, will be installed to assess conditions in the Deep Zone at the Site. Five Shallow Zone groundwater monitoring wells will be installed. The purpose of the new groundwater monitoring wells is to evaluate the impact of current and historical operation on Shallow and Deep Zone groundwater quality to determine the hydrological connection between the two water-bearing zones, and to evaluate the potential impact upgradient source areas on groundwater quality at the Site. To address these data gaps in groundwater, the following work program will be implemented; the proposed monitoring well locations are shown on Figure 25:

- Shallow Zone monitoring well MW5 (boring SB06) installed in Parcel 536720-4565 Lot 19. The purpose of these borings will be to investigate potential impact from the potential release of COPCs groundwater from the former marine railway.
- Shallow monitoring well MW6 (boring SB07) installed in Parcel 536720-3447. The purpose of this monitoring well will be to further evaluate groundwater quality in this area of the Site.
- Shallow Zone monitoring well MW7 (boring SB09) installed in Parcel 536720-3415 Lot 5. The purpose of this monitoring well will be to further evaluate groundwater quality in this area of the Site.
- Shallow Zone monitoring well MW8 (boring SB13) installed in Parcel 536720-4560. The purpose of this monitoring well will be to further evaluate groundwater quality in this area of the Site.
- Shallow Zone groundwater monitoring wells MW9 and MW10 (borings SB10 and SB15). The purpose of this monitoring well will be to further evaluate groundwater quality in this area of the Site.
- Deep Zone groundwater monitoring wells MW-5D (boring SB11) and MW-6D (boring SB12) installed in 1st Avenue ROW. The purpose of these monitoring wells will be to evaluate the impact of upgradient sources on groundwater quality at the Site.

Groundwater samples will be collected from the new and existing Deep Zone groundwater monitoring wells. The sampling and laboratory methodology for installing groundwater monitoring wells, sampling the monitoring wells, and the chemical analyses to be performed will be presented in the SAP and QAPP, to be prepared under separate cover.

9.2.3 Stormwater Sampling

Stormwater sheet flow will be evaluated during storm events to determine if surface water runoff is impacting the riverbank sediments and LDW. If stormwater sheet flow is present at the Site, SoundEarth will collect two water samples of the flow and analyze the samples for the COPCs. The sampling and laboratory methodology for sampling the catch basins and the chemical analyses to be performed will be presented in the SAP and QAPP, to be prepared under separate cover.

10.0 FEASIBILITY STUDY

The purpose of the FS will be to develop and evaluate remedial alternatives for the Site and to facilitate selection of a final cleanup remedy for the Site in accordance with WAC 173-340-350(8) and the Agreed Order. The FS typically includes an extensive development, screening, and evaluation process for numerous remedial alternatives. The FS section of the RI/FS report will incorporate applicable results from the RI, the remediation goals and objectives, present media and chemical specific applicable or relevant and appropriate requirements (ARARs), detailed analysis of cleanup alternatives, provide a comparative analysis cleanup alternatives based on disproportion cost-to-benefit analysis, and select a preferred cleanup remedy for the Site.

10.1 SCREENING OF ALTERNATIVES

For the media of concern containing concentrations of COPC exceeding the preliminary screening levels at the points of compliance, an initial screen of alternatives will be conducted to reduce the number of alternatives for final detailed evaluation in accordance with WAC 173-340-350 (8). A reasonable number of cleanup alternatives will be evaluated that consider the characteristics and complexity of the Site, including current Site conditions and physical constraints. The cleanup alternatives will be screened in accordance with the minimum requirements under WAC 173-340-360 in order to rule out cleanup alternatives that do not to require more detailed analysis.

10.2 EVALUATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The screening and final selection of cleanup alternatives for the Site, the selection of cleanup levels for the media of concern, and the final cleanup action for the Site will be evaluated to comply with applicable state and federal laws in accordance with WAC 173-340-710. The relevant and appropriate requirements will include those cleanup standards, standard controls, and other environmental requirements, criteria, or limitations in accordance with state and federal laws. ARARs will be evaluated in accordance with WAC-173-710(4). Preliminary ARARs for the Site include the following:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) EPA Regional Screening Level Potable Groundwater Protection Saturated Soil
- CERCLA EPA Regional Screening Level Potable Groundwater Protection Saturated Soil
- EPA Lower Duwamish Boeing Plant 2 Total Maximum Contaminant Load Groundwater Protection
- Federal Clean Water Act 304–Human Health and Aquatic Life–Marine (Acute and Chronic)
- National Toxics Rule, 40 CFR 131–Human Health and Aquatic Life–Marine (Acute and Chronic)
- WAC 173-201A–Aquatic Life–Marine (Acute and Chronic)
- WAC 173-340–Washington State Model Toxics Control Act
- WAC 246-290–Washington State Public Water Supplies
- WAC 173-360–Washington State Dangerous Waste Regulation
- WAC 173-204–Sediment Management Standards

10.3 REMEDIAL AND CLEANUP LEVELS

The FS will consider remedial levels to define a mitigation or cleanup action component to be used for a media of concern in a particular area of the Site. Cleanup levels, selected in consultation with Ecology, for the media of concern, will be evaluated for both standard and conditional points of compliance.

10.4 DISPROPORTIONATE COST ANALYSIS

The FS will include a disproportionate cost analysis that will compare the costs and benefits of cleanup alternatives and selecting the alternative with incremental costs that are not disproportionate to the incremental benefits. Costs will be considered disproportionate to benefits if the incremental cost of the alternative over that of a lower-cost alternative exceeds the incremental degree of benefits achieved by the alternative over that of the other lower-cost alternative.

10.5 REMEDIAL ACTION RECOMMENDATIONS

The FS will include one or more permanent cleanup action alternatives as defined in WAC 173-340-200. The selected cleanup action will meet remediation objectives for the Site and will serve as a framework against which other alternatives shall be evaluated to determine whether a selected cleanup action alternative is permanent to the maximum extent practicable.

11.0 LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with SoundEarth's agreement with the client. This report is solely for the use and information of the client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. SoundEarth is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. SoundEarth does not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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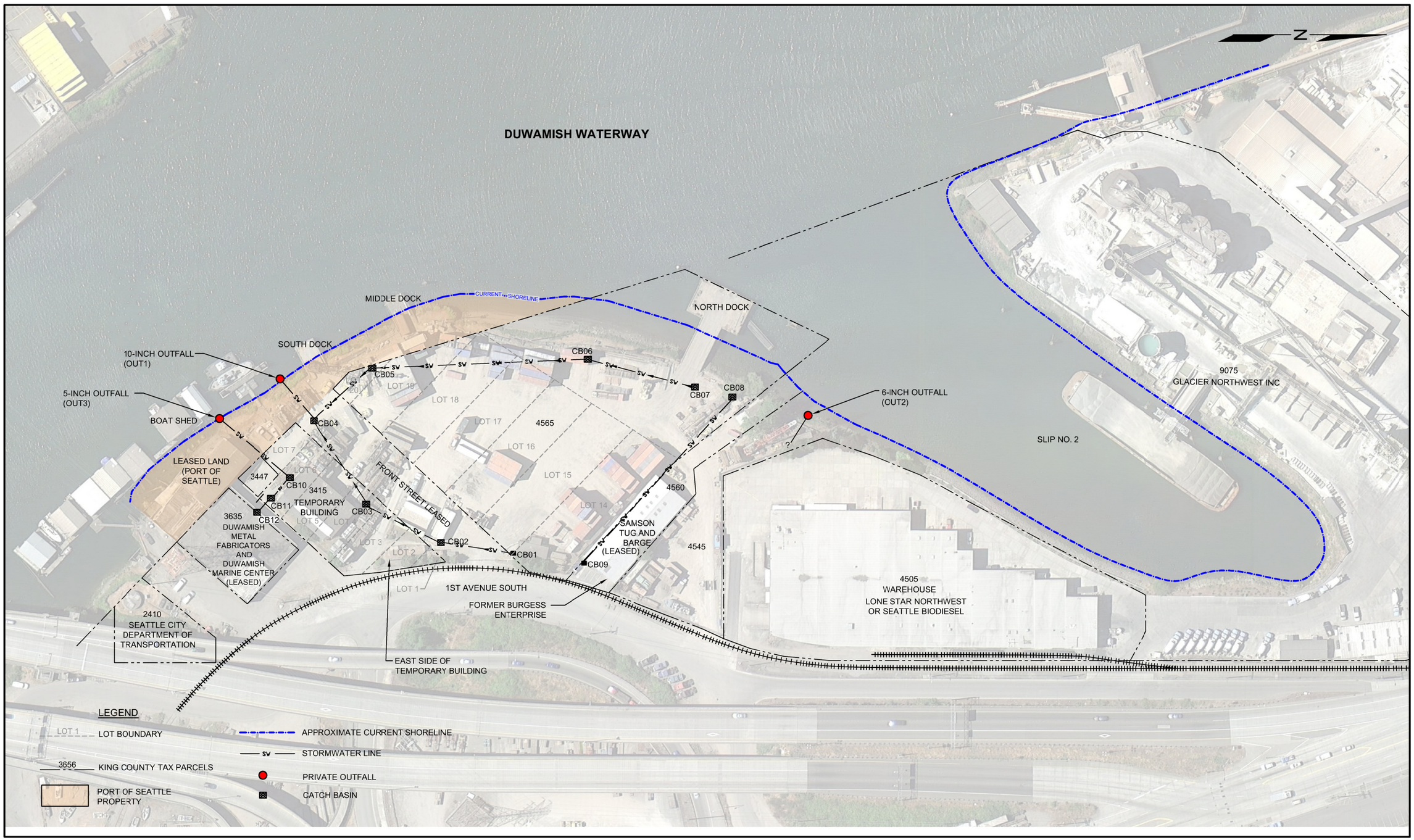
FIGURES

5/22/2012



SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE:	04/24/12
DRAWN BY:	BLR
CHECKED BY:	TC
CAD FILE:	0826-001_2011RI_VIC

PROJECT NAME:	DUWAMISH MARINE CENTER
PROJECT NUMBER:	0826-001-01
STREET ADDRESS:	6365 FIRST AVENUE SOUTH
CITY, STATE:	SEATTLE, WASHINGTON

REGION:

0 30 60 120 240
APPROXIMATE SCALE IN FEET

FIGURE 1
SITE VICINITY MAP

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI VIC BLR.DWG

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5/9/2013

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DUWAMISH WATERWAY

FILTER ENGINEERING

SUSPECTED LOCATION OF MARINE RAILWAY (1940 TO 1970)

MIDDLE DOCK

CURRENT SHORELINE

2007

1966

1936

SOUTH DOCK

NORTH DOCK

SUSPECTED LOCATION OF AMERICAN PILE DRIVING COMPANY (1936 TO 1974) AND JUNKYARD (1960s TO 1970s)

10-INCH OUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

BOAT SHED

CB04

CB05

CB06

CB07

CB08

6-INCH OUTFALL (CUT2)

9075
GLACIER NORTHWEST INC

SLIP NO. 2

LOT 18

LOT 17

LOT 16

LOT 15

LOT 14

LOT 7

LOT 6

LOT 5

LOT 3

LOT 2

LOT 1

4565

4560

4545

3447

3415

3635

LEASED LAND (PORT OF SEATTLE)

CB10

CB11

CB12

TEMPORARY BUILDING

CB03

FRONT STREET LEASED

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER (LEASED)

EQUIPMENT WASH AREA

CB02

CB01

CB09

SAMSON TUG AND BARGE (LEASED)

1924/1936

1ST AVENUE SOUTH

FORMER BURGESS ENTERPRISE

4505
WAREHOUSE
LONE STAR NORTHWEST
OR SEATTLE BIODIESEL

2410
SEATTLE CITY DEPARTMENT OF TRANSPORTATION

EAST SIDE OF TEMPORARY BUILDING

LEGEND

- LOT 1 — LOT BOUNDARY
- SITE BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- PORT OF SEATTLE PROPERTY
- SUSPECTED SOURCE AREA
- APPROXIMATE CURRENT SHORELINE
- APPROXIMATE SHORELINE 2007
- APPROXIMATE SHORELINE 1966
- APPROXIMATE SHORELINE 1936
- SV — STORMWATER LINE
- SHORELINE 1966 AND 2007 OVERLAPPING
- PRIVATE OUTFALL
- CATCH BASIN

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CAD FILE: 0826-001_2011RI_FIG02

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 30 60 120 240
APPROXIMATE SCALE IN FEET

FIGURE 2

SITE VICINITY MAP SHOWING HISTORICAL AND CURRENT OPERATIONS AND DUWAMISH FILL EVENTS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG02 BLR.JQC.DWG

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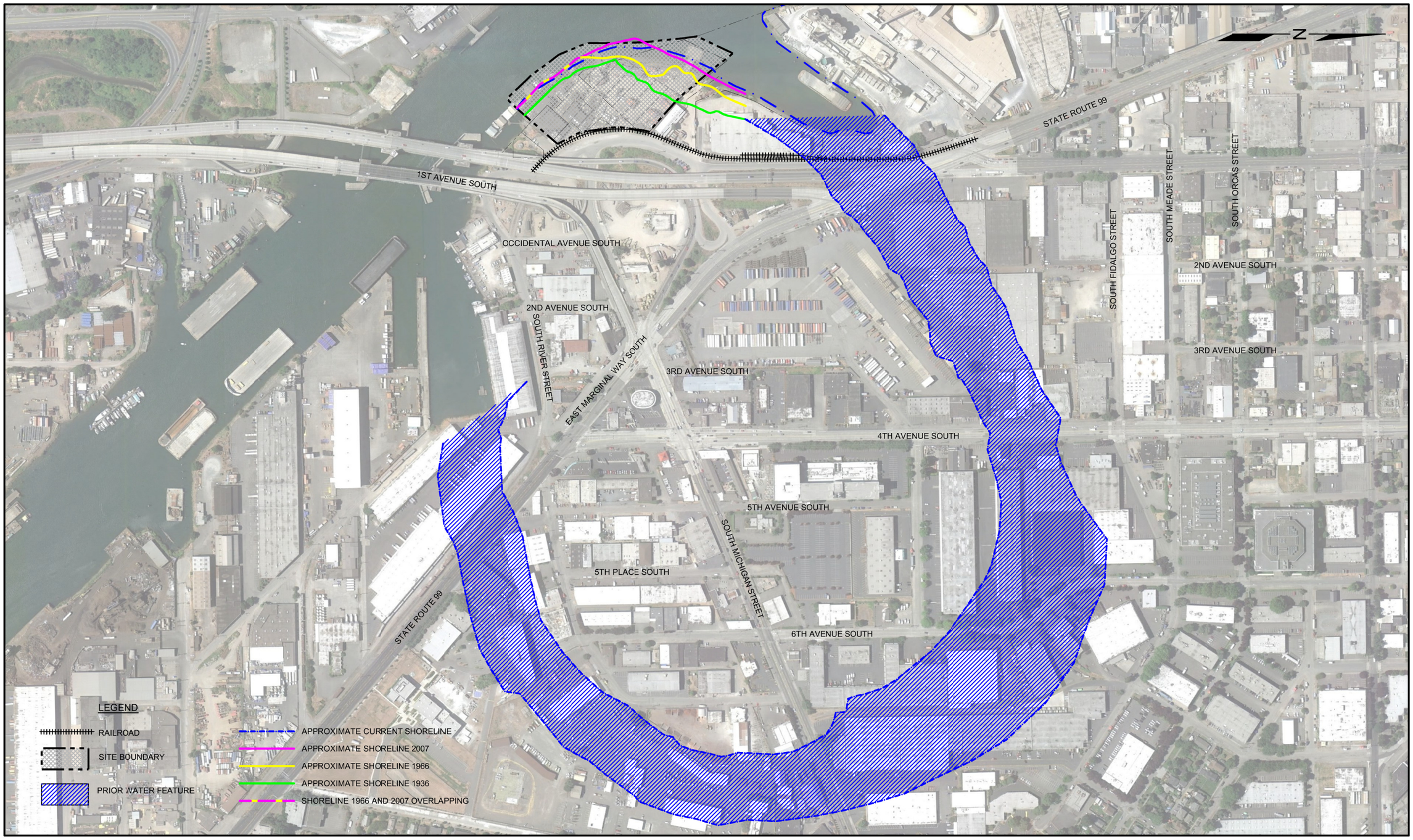

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 100 200 400 800
APPROXIMATE SCALE IN FEET

FIGURE 3
MAP SHOWING FORMER DUWAMISH RIVER MEANDER

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG03_BLRJQC.DWG

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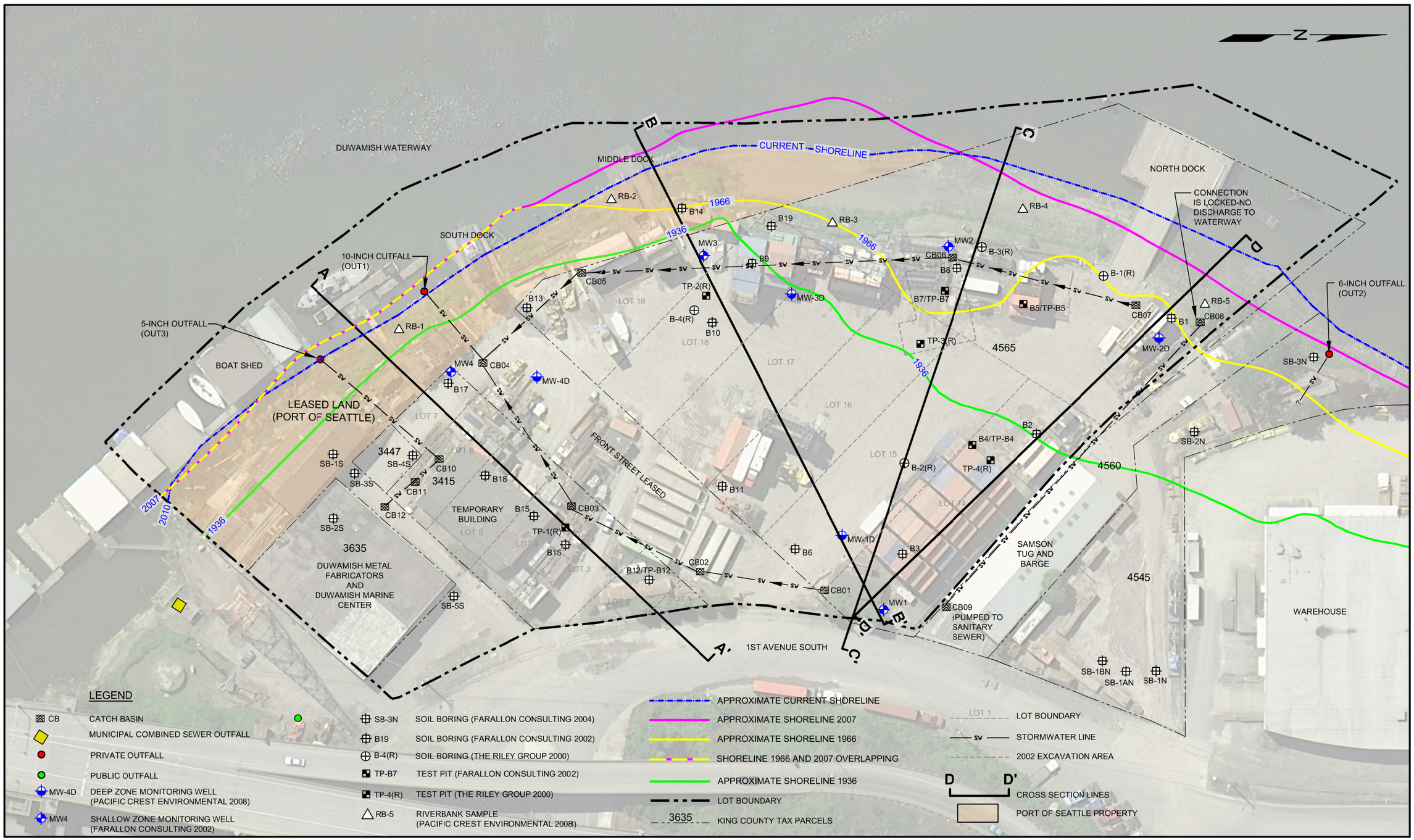

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CAD FILE: 0826-001_2011_FIG04

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 4
EXPLORATION LOCATION MAP
SHOWING CROSS SECTIONS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG04 BLRJQC.DWG

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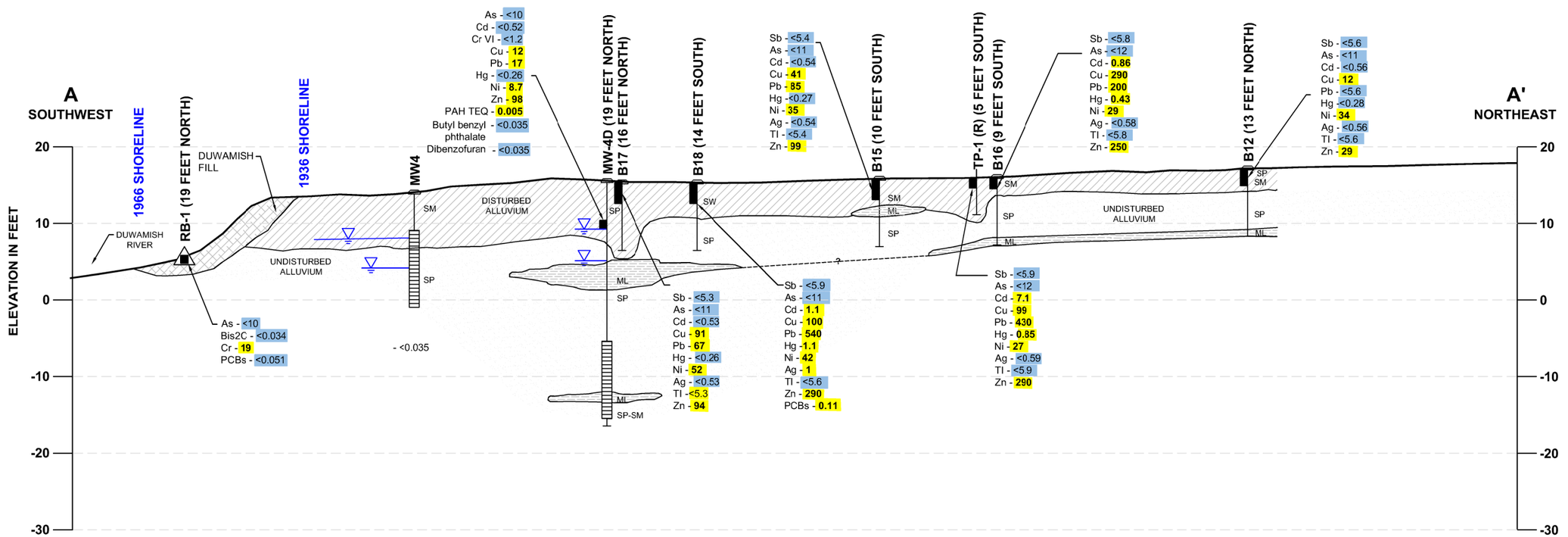

LEGEND

SM
SILTY SANDS, SAND - CLAY MIXTURES

SP
POORLY GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES

SW
WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

ML
INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS

SEMICONFINED LAYER

DISTURBED ALLUVIUM

UNDISTURBED ALLUVIUM

DUWAMISH FILL

GROUNDWATER LEVEL SHOWING HIGHEST AND LOWEST RECORDED LEVELS

ELEVATION BASED UPON ARBITRARY DATUM OF 15.00 FEET

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

MONITORING WELL

As - <10
Cd - <0.52
SOIL SAMPLE LOCATION, CHEMICAL OF POTENTIAL CONCERN, AND CONCENTRATION

RIVERBANK SOIL SAMPLE LOCATION

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

(10 FEET SOUTH)	EXPLORATION LOCATED 10 FEET SOUTH OF CROSS SECTION LINE A - A' DEPICTED ON FIGURE 4
As	ARSENIC
Ag	SILVER
Bis2C	BIS(2-CHLOROETHYOXY) METHANE
Cd	CADMIUM
Cr	CHROMIUM
Cr VI	CHROMIUM (VI)
Cu	COPPER
Hg	MERCURY
Ni	NICKEL
PAH	POLYNUCLEAR AROMATIC HYDROCARBONS
Pb	LEAD
PCBs	POLYCHLORINATED BIPHENYLS
Sb	ANTIMONY
Tl	THALLIUM
TEQ	TOXICITY EQUIVALENCY QUOTIENT
Zn	ZINC

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PROJECT NUMBER: 0826-001-02
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CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE HORIZONATAL SCALE IN FEET
2X VERTICAL EXAGGERATION

FIGURE 5
CROSS SECTION A - A'
WITH SOIL ANALYTICAL RESULTS

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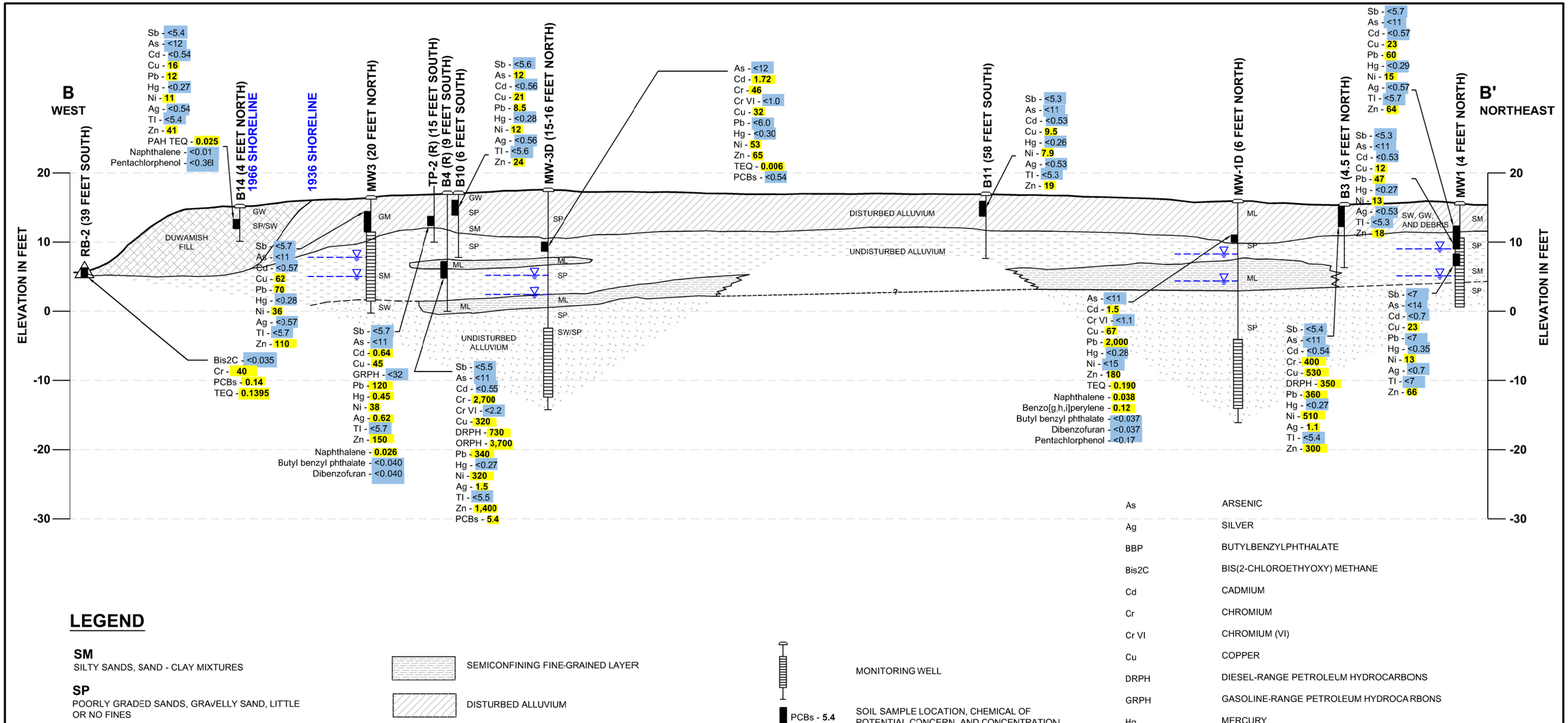

LEGEND

SM
SILTY SANDS, SAND - CLAY MIXTURES

SP
POORLY GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES

SW
WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

ML
INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS

GW
WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES

GM
SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES

SEMICONFINING FINE-GRAINED LAYER

DISTURBED ALLUVIUM

UNDISTURBED ALLUVIUM

DUWAMISH FILL

GROUNDWATER LEVEL SHOWING HIGHEST AND LOWEST RECORDED LEVELS

ELEVATION BASED UPON ARBITRARY DATUM OF 15.00 FEET

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

MONITORING WELL

PCBs - 5.4 — SOIL SAMPLE LOCATION, CHEMICAL OF POTENTIAL CONCERN, AND CONCENTRATION

RIVERBANK SOIL SAMPLE LOCATION

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< — ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

(3 FEET NORTH) — EXPLORATION LOCATED 3 FEET NORTH OF CROSS SECTION LINE B - B' DEPICTED ON FIGURE 4

As	ARSENIC
Ag	SILVER
BBP	BUTYLBENZYLPHTHALATE
Bis2C	BIS(2-CHLOROETHYOXY) METHANE
Cd	CADMIUM
Cr	CHROMIUM
Cr VI	CHROMIUM (VI)
Cu	COPPER
DRPH	DIESEL-RANGE PETROLEUM HYDROCARBONS
GRPH	GASOLINE-RANGE PETROLEUM HYDROCARBONS
Hg	MERCURY
Ni	NICKEL
ORPH	OIL-RANGE PETROLEUM HYDROCARBONS
PAH	POLYNUCLEAR AROMATIC HYDROCARBONS
Pb	LEAD
PCBs	POLYCHLORINATED BIPHENYLS
Sb	ANTIMONY
Tl	THALLIUM
TEQ	TOXICITY EQUIVALENCY QUOTIENT
Zn	ZINC

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CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE HORIZONATAL SCALE IN FEET
2X VERTICAL EXAGGERATION

FIGURE 6
CROSS SECTION B - B'
WITH SOIL ANALYTICAL RESULTS

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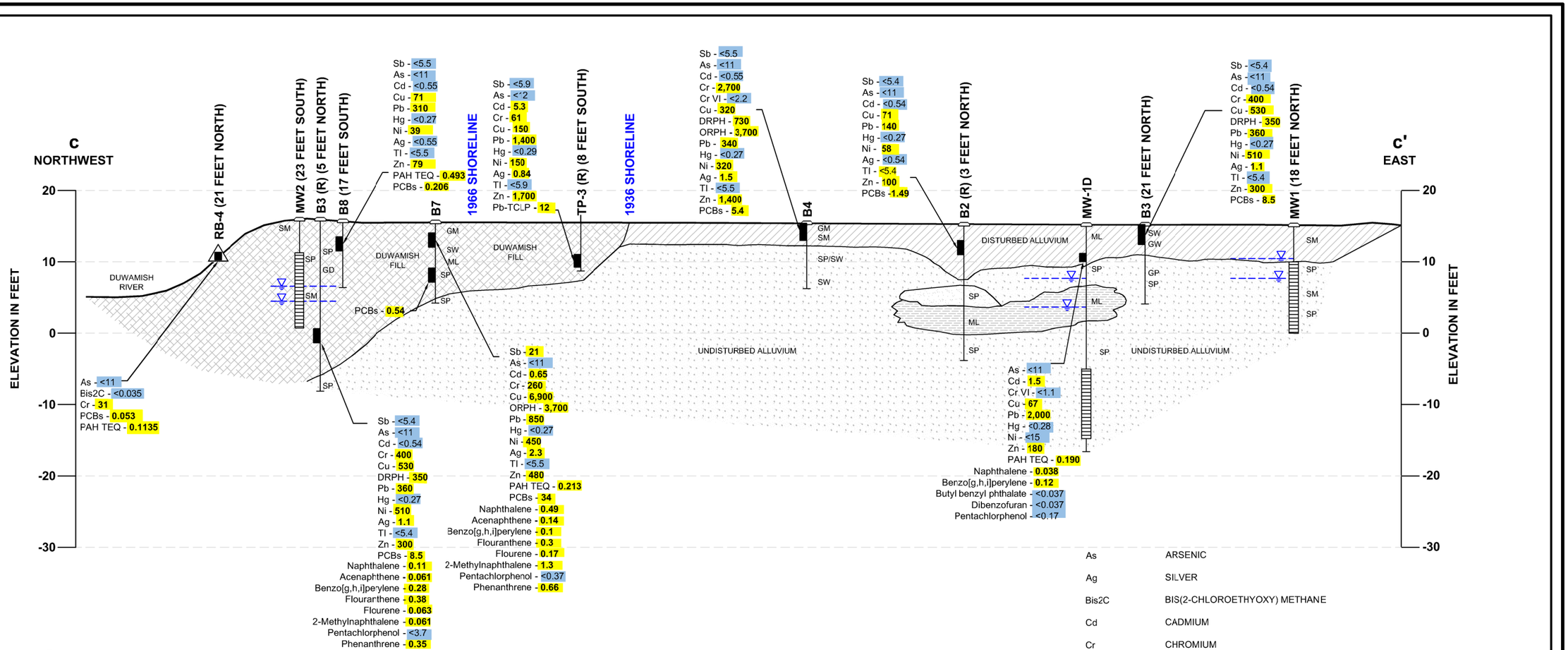

LEGEND

SM
SILTY SANDS, SAND - CLAY MIXTURES

SP
POORLY GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES

SW
WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

ML
INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS

GM
SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES

SEMICONFINED LAYER

DISTURBED ALLUVIUM

UNDISTURBED ALLUVIUM

DUWAMISH FILL

GROUNDWATER LEVEL SHOWING HIGHEST AND LOWEST RECORDED LEVELS

ELEVATION BASED UPON ARBITRARY DATA OF 15.00 FEET

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

MONITORING WELL

PCBs - **1.49** — SOIL SAMPLE LOCATION, CHEMICAL OF POTENTIAL CONCERN, AND CONCENTRATION

RIVERBANK SOIL SAMPLE LOCATION

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< — ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

(21 FEET NORTH) — EXPLORATION LOCATED 21 FEET NORTH OF CROSS SECTION LINE C - C' DEPICTED ON FIGURE 4

As	ARSENIC
Ag	SILVER
Bis2C	BIS(2-CHLOROETHOXY) METHANE
Cd	CADMIUM
Cr	CHROMIUM
Cr VI	CHROMIUM (VI)
Cu	COPPER
DRPH	DIESEL-RANGE PETROLEUM HYDROCARBONS
Hg	MERCURY
Ni	NICKEL
ORPH	OIL-RANGE PETROLEUM HYDROCARBONS
PAH	POLYNUCLEAR AROMATIC HYDROCARBONS
Pb	LEAD
PCBs	POLYCHLORINATED BIPHENYLS
Sb	TOXICS CHARACTERISTIC LEACHING PROCEDURE
TCLP	ANTIMONY
TEQ	TOXICITY EQUIVALENCY QUOTIENT
Tl	THALLIUM
Zn	ZINC

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PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE HORIZONATAL SCALE IN FEET
2X VERTICAL EXAGGERATION

FIGURE 7
CROSS SECTION C - C'
WITH SOIL ANALYTICAL RESULTS

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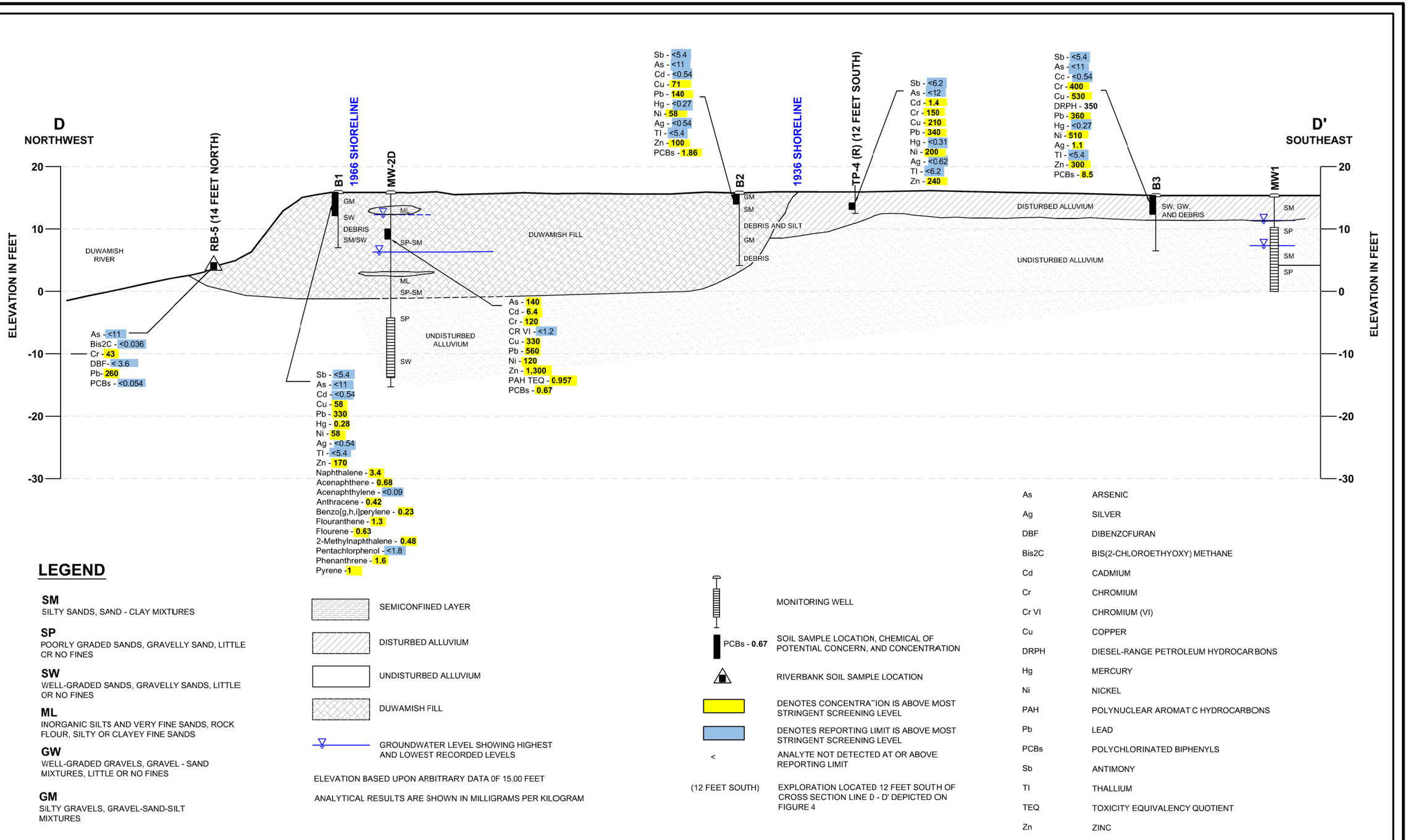

LEGEND

SM
SILTY SANDS, SAND - CLAY MIXTURES

SP
POORLY GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES

SW
WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

ML
INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS

GW
WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES

GM
SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES

SEMICONFINED LAYER

DISTURBED ALLUVIUM

UNDISTURBED ALLUVIUM

DUWAMISH FILL

GROUNDWATER LEVEL SHOWING HIGHEST AND LOWEST RECORDED LEVELS

ELEVATION BASED UPON ARBITRARY DATA 0F 15.00 FEET

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

MONITORING WELL

PCBs - 0.67 — SOIL SAMPLE LOCATION, CHEMICAL OF POTENTIAL CONCERN, AND CONCENTRATION

RIVERBANK SOIL SAMPLE LOCATION

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< — ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

(12 FEET SOUTH) — EXPLORATION LOCATED 12 FEET SOUTH OF CROSS SECTION LINE D - D' DEPICTED ON FIGURE 4

As	ARSENIC
Ag	SILVER
DBF	DIBENZOFURAN
Bis2C	BIS(2-CHLOROETHYOXY) METHANE
Cd	CADMIUM
Cr	CHROMIUM
Cr VI	CHROMIUM (VI)
Cu	COPPER
DRPH	DIESEL-RANGE PETROLEUM HYDROCARBONS
Hg	MERCURY
Ni	NICKEL
PAH	POLYNUCLEAR AROMATIC HYDROCARBONS
Pb	LEAD
PCBs	POLYCHLORINATED BIPHENYLS
Sb	ANTIMONY
Tl	THALLIUM
TEQ	TOXICITY EQUIVALENCY QUOTIENT
Zn	ZINC

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STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE HORIZONATAL SCALE IN FEET
2X VERTICAL EXAGGERATION

FIGURE 8
CROSS SECTION D - D'
WITH SOIL ANALYTICAL RESULTS

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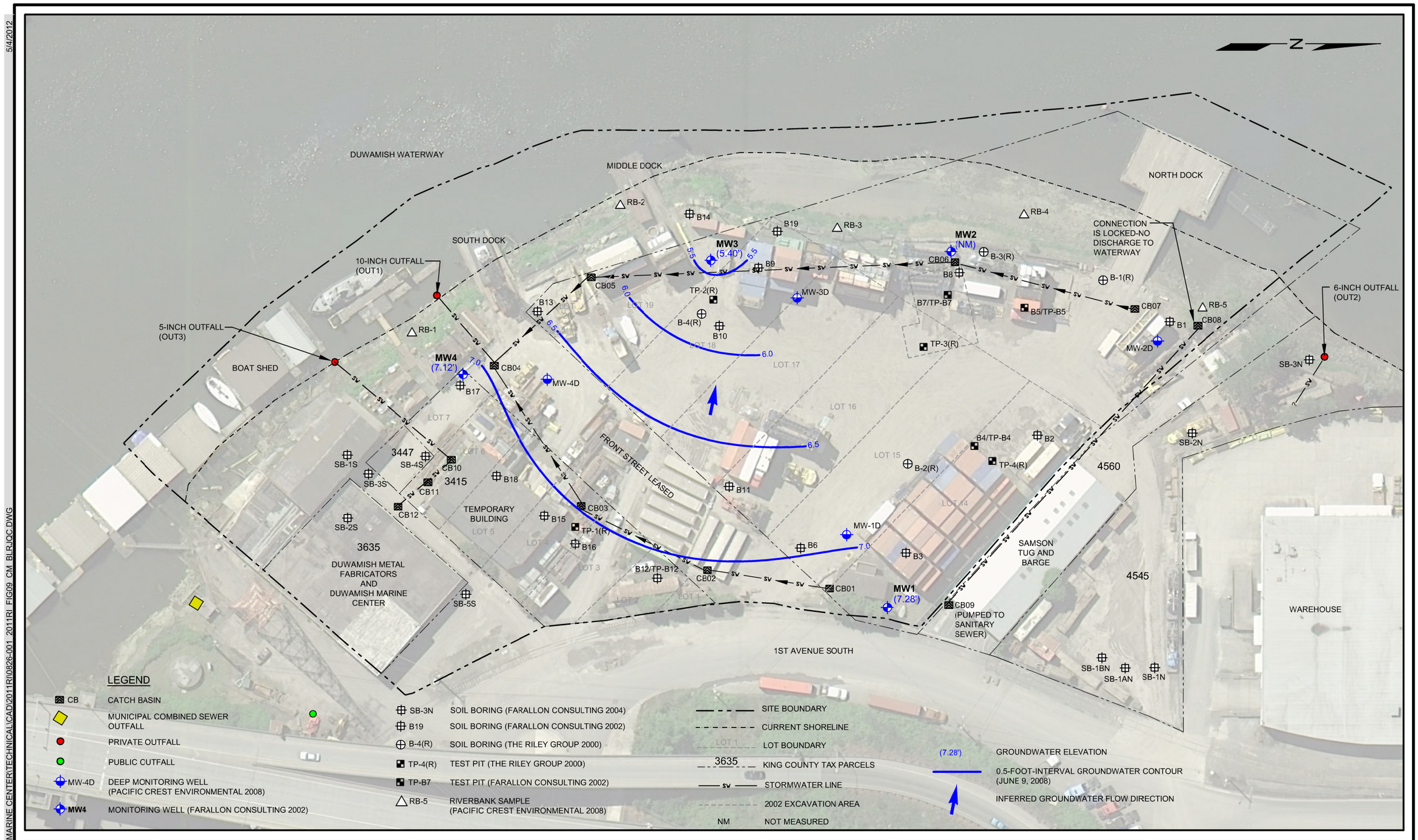

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PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 9
SHALLOW ZONE GROUNDWATER POTENTIOMETRIC SURFACE
(JUNE 9, 2008)

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG09_CM_BLRJQC.DWG
5/4/2012

5/14/2012

N

DUWAMISH WATERWAY

MIDDLE DOCK

NORTH DOCK

SOUTH DOCK

CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY

10-INCH CUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

BOAT SHED

FRONT STREET LEASED

TEMPORARY BUILDING

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER

SAMSON TUG AND BARGE

WAREHOUSE

1ST AVENUE SOUTH

3447

3415

3635

4560

4545

LOT 19

LOT 18

LOT 17

LOT 16

LOT 15

LOT 14

LOT 8

LOT 7

LOT 5

LOT 4

LOT 3

LOT 2

LOT 1

MW-3D (4.84')

MW-4D (5.87')

MW-2D (5.53')

MW-1D (6.27')

MW1

MW2

MW3

MW4

CB01

CB02

CB03

CB04

CB05

CB06

CB07

CB08

CB09 (PUMPED TO SANITARY SEWER)

CB10

CB11

CB12

RB-1

RB-2

RB-3

RB-4

RB-5

B1

B2

B3

B4/TP-B4

B5/TP-B5

B6

B7/TP-B7

B8

B9

B10

B11

B12/TP-B12

B13

B14

B15

B16

B17

B18

B19

B-1(R)

B-2(R)

B-3(R)

B-4(R)

TP-1(R)

TP-2(R)

TP-3(R)

TP-4(R)

SB-1S

SB-1N

SB-1AN

SB-1BN

SB-2S

SB-2N

SB-3S

SB-3N

SB-4S

SB-5S

5.5

6.0

5.0

SV

LEGEND

CB	CATCH BASIN
	MUNICIPAL COMBINED SEWER OUTFALL
	PRIVATE OUTFALL
	PUBLIC CUTFALL
MW-4D	DEEP MONITORING WELL (PACIFIC CREST ENVIRONMENTAL, 2008)
MW4	MONITORING WELL (FARALLON CONSULTING, 2002)
SB-3N	SOIL BORING (FARALLON CONSULTING 2004)
B19	SOIL BORING (FARALLON CONSULTING 2002)
B-4(R)	SOIL BORING (THE RILEY GROUP 2000)
TP-4(R)	TEST PIT (THE RILEY GROUP 2000)
TP-B7	TEST PIT (FARALLON CONSULTING 2002)
RB-5	RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
	SITE BOUNDARY
	CURRENT SHORELINE
LOT 1	LOT BOUNDARY
3635	KING COUNTY TAX PARCELS
SV	STORMWATER LINE
	2002 EXCAVATION AREA
(6.27')	GROUNDWATER ELEVATION
	0.5-FOOT INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)
	INFERRED GROUNDWATER FLOW DIRECTION

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 10
DEEP ZONE GROUNDWATER POTENTIOMETRIC SURFACE (JUNE 9, 2008)

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Location ID	Sample Date	Sample Depth	DRPH	ORPH	PCBs
B3(R)	8/3/2000	12.5-14	5,100	21,000	9.8

Location ID	Sample Date	Sample Depth	DRPH	ORPH	PCBs
B5	3/13/2002	3-4	4,800	10,000	8.29

Location ID	Sample Date	Sample Depth	TEQ	PCBs
B8	3/13/2002	2-3	0.493	0.206

Location ID	Sample Date	Sample Depth	TEQ	PCBs
B19	3/13/2002	1.5-3	0.061	0.14

Location ID	Sample Date	Sample Depth	TEQ	PCBs
B14	3/13/2002	2-3	0.025	

Location ID	Sample Date	Sample Depth	TEQ	PCBs
MW-3D	5/30/2008	8	0.006	<0.54

Location ID	Sample Date	Sample Depth	GRPH
TP-2(R)	7/17/2000	5.5	<32

Location ID	Sample Date	Sample Depth	TEQ	PCBs
B1	3/13/2002	0-3	0.529	5.9

Location ID	Sample Date	Sample Depth	DRPH	TEQ	PCBs
B1(R)	8/3/2000	14-14.5	210	1.405	0.15

Location ID	Sample Date	Sample Depth	PCBs
B18	3/14/2002	0-3	0.11

Location ID	Sample Date	Sample Depth	ORPH	TEQ	PCBs
B7	3/13/2002	2-4	3,700	0.213	34
		6-7.5	540	NA	0.54

Location ID	Sample Date	Sample Depth	TEQ	PCBs
MW-2D	6/2/2008	6.0-6.5	0.957	0.67

Location ID	Sample Date	Sample Depth	PCBs
TP-3(R)	7/17/2000	5.5	2.3

Location ID	Sample Date	Sample Depth	TEQ
SB-3N	1/8/2004	8-12	0.008

Location ID	Sample Date	Sample Depth	TEQ	PCBs
MW-4D	5/30/2008	6.0-6.5	0.005	

Location ID	Sample Date	Sample Depth	GRPH	PCBs
TP-4(R)	7/17/2000	2	<31	2.13

Location ID	Sample Date	Sample Depth	PCBs
B2	3/13/2002	0-3	1.86

Location ID	Sample Date	Sample Depth	DRPH	ORPH	PCBs
B4	3/13/2002	0-3	730	3,700	5.4

Location ID	Sample Date	Sample Depth	DRPH	PCBs
B2(R)	8/3/2000	2.5-4.0	460	1.49

Location ID	Sample Date	Sample Depth	PCBs
B16	3/14/2002	0-1.5	0.4

Location ID	Sample Date	Sample Depth	TEQ
MW-1D	6/2/2008	5.0-6.0	0.190

Location ID	Sample Date	Sample Depth	DRPH	PCBs
B3	3/13/2002	0-3	350	8.5

MIDDLE DOCK
SOUTH DOCK
BOAT SHED
TEMPORARY BUILDING
DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER
1ST AVENUE SOUTH
WAREHOUSE
CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY
10-INCH CUTFALL (OUT1)
5-INCH OUTFALL (OUT3)
6-INCH OUTFALL (OUT2)
LOT 19
LOT 16
LOT 15
LOT 14
LOT 5
LOT 4
LOT 3
LOT 2
LOT 1
3447
3415
3635

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- 3635 — KING COUNTY TAX PARCELS
- LOT 1 — LOT BOUNDARY
- SITE BOUNDARY
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA

DRPH	DIESEL-RANGE PETROLEUM HYDROCARBONS
GRPH	GASOLINE-RANGE PETROLEUM HYDROCARBONS
NA	NOT AVAILABLE
ORPH	OIL-RANGE PETROLEUM HYDROCARBONS
TEQ	TOXICITY EQUIVALENCY QUOTIENT FACTORS FOR CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS
PCBs	POLYCHLORINATED BIPHENYLS
mg/kg	MILLIGRAMS PER KILOGRAM

ALL DEPTHS SHOWN IN FEET BELOW GROUND SURFACE

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

Location ID	Sample Date	Sample Depth (feet)	DRPH	GRPH	ORPH	Total PCBs
Most Stringent Screening Level			200	30	2,000	0.1

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DATE: 05/04/12
DRAWN BY: BLR/JQC
CHECKED BY: CCC
CAD FILE: 0826-001_2011RI_FIG11A_SD

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 11A
SOIL ANALYTICAL RESULTS FOR DRPH, GRPH, ORPH, TEQ, AND TOTAL PCBs

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG11A_SD_BLR.JQC.DWG

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5/8/2012

Location ID	Sample Date	Sample Depth	Naphtha lene	Acenaph thene	Acenaph thylene	Anthra cene	Benzo[g,h,i] perylene	Flouran thene	Flourene	2-Methylna phthalene	Pentachlo rophenol	Phenan threne	Pyrene
B1	3/13/2002	0-3	**3.4**	**0.68**	<0.09	**0.42**	**0.23**	**1.3**	**0.63**	**0.48**	<1.8	**1.6**	**1**

Location ID	Sample Date	Sample Depth	Naphtha lene	Acenaph thene	Benzo[g,h,i] perylene	Butyl benzylphtalate	Carbazole	Dibenzo furan	Flouran thene	Flourene	Pentachlo rophenol	Phenan threne	Pyrene
MW-2D	6/2/2008	6.0-6.5	**0.079**	**0.07**	**0.42**	**0.099**	**0.089**	**0.042**	**1.1**	**0.071**	<0.2	**0.56**	**0.95**

Location ID	Sample Date	Sample Depth	Naphtha lene	Acenaph thene	Anthra cene	Benzo[g,h,i] perylene	Flouran thene	Flourene	2-Methylna phthalene	Pentachlo rophenol	Phenan threne	Pyrene
B1(R)	8/3/2000	14-14.5	**0.8**	**3**	**2.4**	**0.32**	**12**	**4.3**	**0.21**	<2.8	**14**	**8.2**

Location ID	Sample Date	Sample Depth	Naphtha lene	Acenaph thene	Benzo[g,h,i] perylene	Flouran thene	Flourene	2-Methylna phthalene	Pentachlo rophenol	Phenan threne
B7	3/13/2002	2-4	**0.49**	**0.14**	**0.1**	**0.3**	**0.17**	**1.3**	<0.37	**0.66**

Location ID	Sample Date	Sample Depth	Naphtha lene	Pentachlo rophenol
B14	3/13/2002	2-3	<0.01	<0.36

Location ID	Sample Date	Sample Depth	Naphtha lene	2-Methylna phthalene	Pentachlo rophenol
B19	3/13/2002	1.5-3	**0.06**	**0.14**	<1.7

Location ID	Sample Date	Sample Depth	Naphtha lene	Butyl benzylphtalate	Dibenzo furan
MW-3D	5/30/2008	7.5-8.0	**0.026**	<0.040	<0.040

Location ID	Sample Date	Sample Depth	Naphtha lene	Acenaph thene	Benzo[g,h,i] perylene	Flouran thene	Flourene	2-Methylna phthalene	Pentachlo rophenol	Phenan threne
B8	3/13/2002	2-3	**0.11**	**0.051**	**0.28**	**0.38**	**0.063**	**0.061**	<3.7	**0.35**

Location ID	Sample Date	Sample Depth	Naphtha lene	Acenaph thene	Acenaph thylene	Pentachlo rophenol
SB-3N	1/8/2004	8-12	<0.10	<0.10	<0.10	<4.8

Location ID	Sample Date	Sample Depth	Butyl benzylphtalate	Dibenzo furan
MW-4D	5/30/2008	6.0-6.5	<0.035	<0.035

Location ID	Sample Date	Sample Depth	Naphtha lene	Benzo[g,h,i] perylene	Butyl benzylphtalate	Dibenzo furan	Flouran thene	Flourene	Pentachlo rophenol	Phenan threne
MW-1D	6/2/2008	5.0-6.0	**0.038**	**0.12**	<0.037	<0.037	**0.17**	<0.17	**0.11**

DUWAMISH WATERWAY

MIDDLE DOCK

NORTH DOCK

CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY

10-INCH CUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

BOAT SHED

TEMPORARY BUILDING

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER

SAMSON TUG AND BARGE

WAREHOUSE

1ST AVENUE SOUTH

LOT 19 LOT 18 LOT 7 LOT 6 LOT 5 LOT 4 LOT 3 LOT 2 LOT 1

3447 3415 3635 4560 4545

RB-1 RB-2 RB-3 RB-4 RB-5

MW1 MW2 MW3 MW4 MW-1D MW-2D MW-3D MW-4D

CB01 CB02 CB03 CB04 CB05 CB06 CB07 CB08 CB09 (PUMPED TO SANITARY SEWER) CB10 CB11 CB12

B1 B2 B3 B4/TP-B4 B5/TP-B5 B6 B7/TP-B7 B8 B9 B10 B11 B12/TP-B12 B13 B14 B15 B16 B17 B18 B19 B-1(R) B-2(R) B-3(R) B-4(R) TP-1(R) TP-2(R) TP-3(R) TP-4(R) SB1 SB-1AN SB-1BN SB-1N SB-2N SB-2S SB-3N SB-3S SB-4S SB-5S

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- 3635 — KING COUNTY TAX PARCELS
- LOT 1 — LOT BOUNDARY
- SITE BOUNDARY
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

ALL DEPTHS SHOWN IN FEET BELOW GROUND SURFACE

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

Location ID	Sample Date	Sample Depth (feet)	Naphtha lene	Acenaph thene	Acenaph thylene	Anthra cene	Benzo[g,h,i] perylene	Butyl benzylphtalate	Carbazole	Dibenzo furan	Flouran thene	Flourene	2-Methylna phthalene	Pentachlo rophenol	Phenan threne	Pyrene
Most Stringent Screening Level			0.002	0.017	0.069	0.223	0.031	0.03	0.06	0.02	0.161	0.024	0.043	0.1	0.101	0.683

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DATE: 05/04/12
DRAWN BY: BLR/JQC
CHECKED BY: CCC
CAD FILE: 0826-001_2011RI_FIG11B_SD

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 11B
SOIL ANALYTICAL RESULTS FOR SVOCs

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG11B_SD_BLRJQC.DWG

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5/9/2013

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B14	3/13/2002	2-3	<5.4	<11	<0.54	16	12	<0.27	11	<0.54	<5.4	41

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B-4(R)	8/3/2000	10-11.5	<7.5	<15	<0.75	26	24	<0.37	3.2	<0.75	<7.5	42

Location ID	Sample Date	Sample Depth	As	Cd	Cr VI	Cu	Pb	Hg	Ni	Zn
MW-4D	5/30/2008	6.5	<10	<0.52	<1.2	12	17	<0.26	8.7	98

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B13	3/13/2002	0-3	37	<11	<0.56	85	140	<0.28	37	<0.56	<5.6	230

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B17	3/14/2002	0-3	<5.3	<11	<0.53	91	67	<0.26	52	<0.53	<5.3	94

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B18	3/14/2002	0-3	<5.6	<11	1.1	100	540	1.1	42	1	<5.6	290

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Se	Ag	Tl	Zn
SB-4S	1/9/2004	6-8	<7.9	<16	<0.79	28	<7.9	<0.40	11	<16	<0.79	<7.9	30

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Se	Ag	Tl	Zn
SB-3S	1/9/2004	6-8	<6.4	<13	<0.64	6.6	<6.4	<0.32	5.9	<13	<0.64	<6.4	23

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
MW3	3/18/2002	2.5-4	<5.7	<11	<0.57	62	70	<0.28	36	<0.57	<5.7	110

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B10	3/13/2002	1-3	<5.6	12	<0.56	21	8.5	<0.28	12	<0.56	<5.6	24

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B15	3/14/2002	0-3	<5.4	<11	<0.54	41	85	<0.27	35	<0.54	<5.4	99

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
TP-1(R)	7/17/2000	1.5	<5.9	<12	7.1	99	430	0.85	27	<0.59	<5.9	290

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B11	3/14/2002	0-3	<5.3	<11	<0.53	9.5	<0.26	7.9	<0.53	<5.3	19

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B12	3/14/2002	0-1	<5.6	<11	<0.56	12	<5.6	<0.28	34	<0.56	<5.6	29

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B16	3/14/2002	0-1.5	<5.8	<12	0.86	290	200	0.43	29	<0.58	<5.8	250

Location ID	Sample Date	Sample Depth (feet)	Sb	As	Cd	Cr	Cu	Pb	Ni	Ag	Tl	Zn	Hg
Most Stringent Screening Level			0.25	0.0005	0.0017	42.00	0.053	25.00	0.33	0.016	0.017	5.05	0.0006

DUWAMISH WATERWAY

MIDDLE DOCK

NORTH DOCK

SOUTH DOCK

CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY

10-INCH OUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

BOAT SHED

TEMPORARY BUILDING

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER

SAMSON TUG AND BARGE

WAREHOUSE

FRONT STREET VEASED

LOT 19

LOT 18

LOT 15

LOT 14

LOT 7

LOT 5

LOT 4

LOT 3

LOT 1

3635

3447

3415

4565

4545

RB-1 RB-2 RB-3 RB-4 RB-5

B1 B2 B3 B4/TP-B4 B5/TP-B5 B6 B7/TP-B7 B8 B9 B10 B11 B12/TP-B12 B13 B14 B15 B16 B17 B18 B19

B-1(R) B-2(R) B-3(R) B-4(R) TP-2(R) TP-3(R) TP-4(R)

MW1 MW2 MW3 MW4 MW-1D MW-2D MW-3D MW-4D

CB01 CB02 CB03 CB04 CB05 CB06 CB07 CB08 CB09 (PUMPED TO SANITARY SEWER) CB10 CB11 CB12

SB-1N SB-1AN SB-1BN SB-1S SB-2N SB-2S SB-3N SB-3S SB-4S SB-5S

TP-1(R) B4/TP-B4 B5/TP-B5 B7/TP-B7 B12/TP-B12

SV

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- SITE BOUNDARY
- CURRENT SHORELINE
- SV — STORMWATER LINE
- 2002 EXCAVATION AREA
- LOT 1 — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS

Ag	SILVER	Ni	NICKEL
As	ARSENIC	Pb	LEAD
Cd	CADMIUM	Sb	ANTIMONY
Cu	COPPER	Tl	THALLIUM
Cr	CHROMIUM	Zn	ZINC
Hg	MERCURY		

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

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DATE: 05/07/12
DRAWN BY: BLR
CHECKED BY: CCC
CAD FILE: 0826-001_2011RI_FIG12A_SD

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 12A
SOIL ANALYTICAL RESULTS FOR METALS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG12A SD BLR.IQC.DWG

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5/8/2012

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG12B_SD_BLR\JQC.DWG

N

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
MW2	3/18/2002	2-4	<6.3	<13	<0.63	36	210	<0.31	45	<0.63	<6.3	83

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B19	3/13/2002	1.5-3	<5.2	<10	<0.52	43	70	<0.26	11	<0.52	<5.2	83

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B9	3/13/2002	1.5-2	<5.4	<11	<0.54	14	9.9	<0.27	8.2	<0.54	<5.4	26

Location ID	Sample Date	Sample Depth	As	Cd	Cr	Cr VI	Cu	Pb	Hg	Ni	Zn
MW-3D	5/30/2008	8	<12	1.72	46	<1.0	32	<6.0	<0.30	53	65

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
TP-2(R)	7/17/2000	4.5	<5.7	<11	0.64	45	120	0.45	38	0.62	<5.7	150

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B7	3/13/2002	2-4	21	<11	0.65	260	6,900	850	<0.27	450	2.3	<5.5	480

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Tl	Zn	Pb-TCLP
TP-3(R)	7/17/2000	5.5	<5.9	<12	5.3	61	150	1,400	<0.29	150	0.84	<5.9	1,700	12

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cr VI	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B4	3/13/2002	0-3	<5.5	<11	<0.55	2,700	<2.2	320	340	<0.27	320	1.5	<5.5	1,400

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B8	3/13/2002	2-3	<5.5	<11	<0.55	71	310	<0.27	39	<0.55	<5.5	79

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B-3(R)	8/3/2000	12.5-14	<47	<11	43	80	7,400	12,000	1.5	200	4.6	6.2	31,000

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B-1(R)	8/3/2000	14-14.5	<5.7	<11	1.1	91	70	<0.28	42	<0.57	<5.7	2,100

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B1	3/13/2002	0-3	<5.4	<11	<0.54	58	330	0.28	58	<0.54	<5.4	170

Location ID	Sample Date	Sample Depth	As	Cd	Cr	Cr VI	Cu	Pb	Ni	Zn
MW-2D	6/2/2008	6.0-6.5	140	6.4	120	<1.2	330	560	120	1,300

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Tl	Zn
SB-3N	1/8/2004	8-12	<6.8	<14	<0.68	48	45	<6.8	<0.34	<3.4	<14	<0.68	<6.8	<3.4

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B2	3/13/2002	0-3	<5.4	<11	<0.54	71	140	<0.27	58	<0.54	<5.4	100

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
TP-4(R)	7/17/2000	2	<6.2	<12	1.4	150	210	340	<0.31	200	<0.62	<6.2	240

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B-2(R)	8/3/2000	2.5-4.0	<5.4	<11	<0.54	110	190	170	<0.27	140	<0.54	<5.4	150

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B3	3/13/2002	0-3	<5.4	<11	<0.54	400	530	360	<0.27	510	1.1	<5.4	300

Location ID	Sample Date	Sample Depth	As	Cd	Cr VI	Cu	Pb	Hg	Ni	Zn
MW-1D	6/2/2008	5.0-6.0	<11	1.5	<1.1	67	2,000	<0.28	<15	180

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
MW1	3/18/2002	3-4.5	<5.7	<11	<0.57	23	60	<0.29	15	<0.57	<5.7	64
		5-6.5	<5.3	<11	<0.53	12	47	<0.27	13	<0.53	<5.3	18
		7.5-9	<7	<14	<0.7	23	<7	<0.35	13	<0.7	<7	66

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cu	Pb	Hg	Ni	Ag	Tl	Zn
B6	3/13/2002	0-3	<5.5	<11	<0.55	15	67	<0.27	11	<0.55	<5.5	32

Location ID	Sample Date	Sample Depth	Sb	As	Cd	Cr	Cr VI	Cu	Pb	Hg	Ni	Ag	Tl	Zn	Hg
Most Stringent Screening Level		(feet)	0.25	0.0005	0.0017	42.00	0.053	25.00	0.33	0.016	0.017	5.05	0.0006

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
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- SITE BOUNDARY
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA
- LOT 1 — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS

Ag	SILVER	Ni	NICKEL
As	ARSENIC	Pb	LEAD
Cd	CADMIUM	Sb	ANTIMONY
Cu	COPPER	Tl	THALLIUM
Cr	CHROMIUM	Zn	ZINC
Hg	MERCURY		

TCLP TOXICS CHARACTERISTIC LEACHING PROCEDURE

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

< ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

MIDDLE DOCK
SOUTH DOCK
NORTH DOCK
10-INCH OUTFALL (OUT1)
5-INCH OUTFALL (OUT3)
6-INCH OUTFALL (OUT2)
BOAT SHED
CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY
RB-1
RB-2
RB-3
RB-4
RB-5
B1
B2
B3
B4/TP-B4
B5/TP-B5
B6
B7/TP-B7
B8
B9
B10
B11
B12/TP-B12
B13
B14
B15
B16
B19
B-1(R)
B-2(R)
B-3(R)
B-4(R)
TP-1(R)
TP-2(R)
TP-3(R)
TP-4(R)
MW1
MW-1D
MW2
MW3
MW-3D
MW4
MW-4D
MW-2D
CB01
CB02
CB03
CB04
CB05
CB06
CB07
CB08
CB09 (PUMPED TO SANITARY SEWER)
CB10
CB11
CB12
SB-1N
SB-1AN
SB-1BN
SB-1S
SB-2N
SB-2S
SB-3N
SB-3S
SB-4S
SB-5S
LOT 1
LOT 2
LOT 3
LOT 4
LOT 5
LOT 6
LOT 7
LOT 14
LOT 15
LOT 16
LOT 19
1ST AVENUE SOUTH
FRONT STREET LEASED
TEMPORARY BUILDING
DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER
3635
3415
3447
4565
4545
SAMSON TUG AND BARGE
WAREHOUSE

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CAD FILE: 0826-001_2011RI_FIG12B_SD

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 12B
SOIL ANALYTICAL RESULTS FOR METALS

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Well ID	Sample Date	ORPH	1,1,-DCA	1,2,4-TMB
MW3	3/27/2002	<400	**2.2**	<0.20
	2/6/2004	**550**	NA	NA
	6/9/2008	<420	<0.20	**0.21**

Well ID	Sample Date	DRPH	ORPH	Total PCBs	TEQ	Naphthalene	1,2,4-TMB
MW2	3/27/2002	**2,700**	**4,900**	**0.28**	**17.258**	**140**	**1**

Boring ID	Sample Date	DRPH	ORPH	Benzene
B-3(R)	8/3/2000	**520**	**1,600**	**2.7**

Well ID	Sample Date	GRPH
MW4	3/27/2002	NA

Boring ID	Sample Date	DRPH	ORPH	Total PCBs
SB-3N	1/8/2004	<260	<410	**0.48**

Boring ID	Sample Date	DRPH	ORPH
B-2(R)	8/3/2000	**520**	**650**

Well ID	Sample Date	PCE
MW1	3/27/2002	**0.69**

DUWAMISH WATERWAY
MIDDLE DOCK
SOUTH DOCK
NORTH DOCK
10-INCH OLTFALL (OUT1)
5-INCH OJTFALL (OUT3)
6-INCH OUTFALL (OUT2)
BOAT SHED
CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY
DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER
SAMSON TUG AND BARGE
3447
3415
3635
4565
4545
LOT 19
LOT 18
LOT 17
LOT 16
LOT 15
LOT 14
LOT 7
LOT 6
LOT 5
LOT 4
LOT 3
LOT 2
LOT 1

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- SITE BOUNDARY
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA
- 0.5-FOOT INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)
- INFERRED SHALLOW ZONE GROUNDWATER FLOW DIRECTION

ANALYTICAL RESULTS ARE SHOWN IN MICROGRAMS PER LITER

- DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL.
- DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

cPAH — CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS
VOC — VOLATILE ORGANIC COMPOUNDS

PCBs — POLYCHLORINATED BIPHENYLS
TEQ — TOXICITY EQUIVALENT FOR CARCINOGENIC POLYNUCLEAR AEROMATIC HYDROCARBONS
GRPH — GASOLINE-RANGE PETROLEUM HYDROCARBONS
DRPH — DIESEL-RANGE PETROLEUM HYDROCARBONS
ORPH — OIL-RANGE PETROLEUM HYDROCARBONS

NA — NOT ANALYZED
1,2,4-TMB — 1,2,4-TRIMETHYLBENZENE
1,1-DCA — 1,1-DICHLOROETHANE
PCE — TETRACHLOROETHENE

Well/Boring ID	Sample Date	Analytical Results (Micrograms per liter)								
		Benzene	GRPH	DRPH	ORPH	Total PCBs	1,2,4-Trimethylbenzene	1,1-DCA	PCE	Naphthalene
Most Stringent Screening Level		**<0.21**	**800/1,000**	**500**	**500**	**0.000023**	**0**	**0.48**	**<260**	**<410**

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 13
SHALLOW ZONE GROUNDWATER ANALYTICAL RESULTS FOR GRPH, DRPH, ORPH, TEQ, TOTAL PCBs, AND VOCs

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG13_GD_BLR\JQC.DWG
5/9/2013
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Well ID	Sample Date	Sb		As		Cd		Cr	Cu		Hg		Pb	Ni		Se		Zn
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved
MW3	3/27/2002	NA	7.9	<3.0	12.0	<4.0	<4.4	58	NA	140	NA	0.55	89	NA	<22	NA	10	NA
	11/5/2003	NA	NA	NA	NA	NA	NA	NA	<11	NA	NA	<0.50	NA	NA	NA	NA	NA	NA
	2/6/2004	NA	NA	NA	NA	NA	NA	NA	<10	NA	NA	<0.50	NA	NA	NA	NA	NA	NA
	5/12/2004	NA	NA	NA	NA	NA	NA	NA	<10	NA	NA	0.50	NA	NA	NA	NA	NA	NA
	8/20/2004	NA	NA	NA	NA	NA	NA	NA	<10	NA	NA	<0.50	NA	NA	NA	NA	NA	NA
	6/9/2008	<5.0	<5.6	6.0	15	<4.0	<4.4	<10	<10	<11	<0.50	<0.5	<1.1	<20	<22	<7.5	<7.5	<50
		<5.0	NA	6.3	NA	<4.0	NA	NA	<10	NA	<0.50	NA	NA	<20	NA	<7.5	NA	<50

Well ID	Sample Date	Sb	As			Cd		Cr	Cu		Pb	Hg		Ni	Se	Zn
		Total	Dissolved	Total	Dissolved	Total	Total	Dissolved	Total	Total	Dissolved	Total	Total	Total	Total	Total
MW2	3/27/2002	56	NA	220	NA	12	140	NA	810	2,100	NA	2	240	34	2,000	
	5/13/2002	NA	13	NA	<4.0	NA	NA	NA	NA	NA	<0.50	NA	NA	NA	NA	
	12/4/2002	NA	NA	NA	NA	NA	NA	39	NA	NA	NA	NA	NA	NA	NA	

Well ID	Sample Date	Sb		As		Cd		Cu		Pb	Hg		Ni		Se		Zn
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
MW4	3/27/2002	NA	5.6	5.7	8	NA	<4.4	NA	45	7	NA	<0.5	NA	37	NA	33	NA
	6/4/2008	<5.0	<5.6	<3.0	<3.0	<4.0	<4.4	<10	<11	<1.1	<0.50	<0.5	30	32	<7.5	<10	<50

Well ID	Sample Date	Dissolved Metals									Total Metals
		Sb	As	Be	Cd	Cu	Ni	Ag	Zn		Hg
SB-1S	1/9/2004	<5.0	23	<10	<4.0	29	<20	<10	<50		<0.50

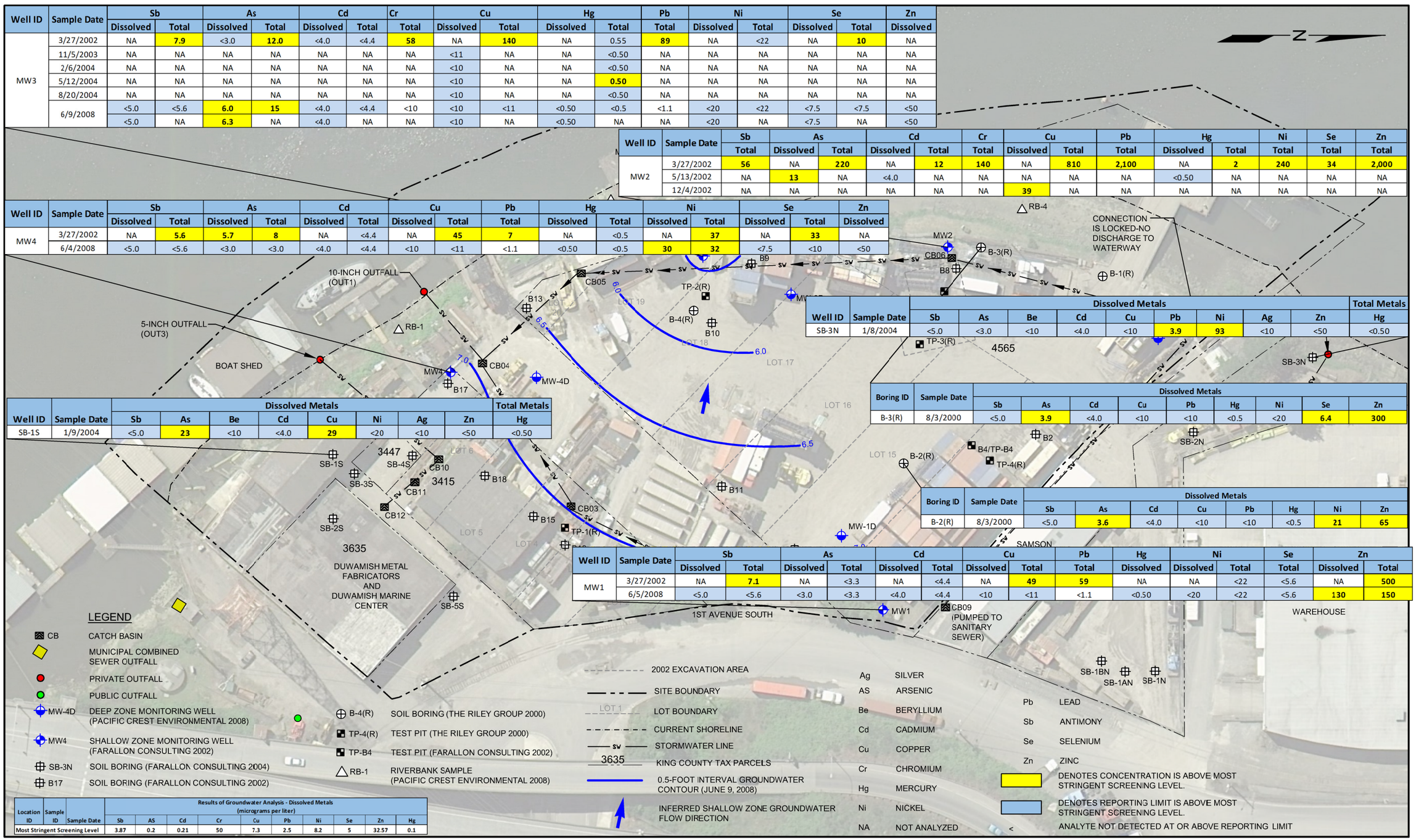
Well ID	Sample Date	Dissolved Metals								Total Metals
		Sb	As	Be	Cd	Cu	Pb	Ni	Ag	Zn	Hg
SB-3N	1/8/2004	<5.0	<3.0	<10	<4.0	<10	3.9	93	<10	<50	<0.50

Boring ID	Sample Date	Dissolved Metals									
		Sb	As	Cd	Cu	Pb	Hg	Ni	Se	Zn	
B-3(R)	8/3/2000	<5.0	3.9	<4.0	<10	<10	<0.5	<20	6.4	300	

Boring ID	Sample Date	Dissolved Metals							
		Sb	As	Cd	Cu	Pb	Hg	Ni	Zn
B-2(R)	8/3/2000	<5.0	3.6	<4.0	<10	<10	<0.5	21	65

Well ID	Sample Date	Sb		As		Cd		Cu		Pb	Hg	Ni		Se	Zn	
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved	Dissolved	Total	Total	Dissolved	Total
MW1	3/27/2002	NA	7.1	NA	<3.3	NA	<4.4	NA	49	59	NA	NA	<22	<5.6	NA	500
	6/5/2008	<5.0	<5.6	<3.0	<3.3	<4.0	<4.4	<10	<11	<1.1	<0.50	<20	<22	<5.6	130	150

Location ID	Sample ID	Sample Date	Results of Groundwater Analysis - Dissolved Metals (micrograms per liter)									
			Sb	AS	Cd	Cr	Cu	Pb	Ni	Se	Zn	Hg
Most Stringent Screening Level			3.87	0.2	0.21	50	7.3	2.5	8.2	5	32.57	0.1



LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC CUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B17 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B4 — TEST PIT (FARALLON CONSULTING 2002)
- RB-1 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- 2002 EXCAVATION AREA
- SITE BOUNDARY
- LOT 1 — LOT BOUNDARY
- CURRENT SHORELINE
- SW — STORMWATER LINE
- 3635 — KING COUNTY TAX PARCELS
- 0.5-FOOT INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)
- INFERRED SHALLOW ZONE GROUNDWATER FLOW DIRECTION

Ag	SILVER
AS	ARSENIC
Be	BERYLLIUM
Cd	CADMIUM
Cu	COPPER
Cr	CHROMIUM
Hg	MERCURY
Ni	NICKEL
NA	NOT ANALYZED
Pb	LEAD
Sb	ANTIMONY
Se	SELENIUM
Zn	ZINC

- DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL.
- DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL.
- < — ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

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DATE: 04/24/12
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CAD FILE: 0826-001_2011RI_FIG14_GD

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 14
SHALLOW ZONE GROUNDWATER ANALYTICAL RESULTS FOR TOTAL AND DISSOLVED METALS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG14 GD JQC.DWG

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Well ID	Sample	Acenaphthene
MW-3	3/27/2002	5

Well ID	Date	Acenaphthene	Benzo(g,h,i) perylene	Fluoranthene	Flourene	1- Methylnaphthalene	Phenanthrene	Pyrene
MW-2	3/27/2002	13	7	24	9.7	8.4	29	24

Boring ID	Sample	Pentachlorophenol
SB-3N	1/8/2004	<4.8

Boring ID	Sample	Pentachlorophenol
SB-4S	1/9/2004	<4.7

Boring ID	Sample	Pentachlorophenol
SB-1S	1/9/2004	<4.7

Well ID	Date	Acenaphthene	1- Methylnaphthalene
MW-1	3/27/2002	3.8	1.9

DUWAMISH WATERWAY

MIDDLE DOCK

NORTH DOCK

SOUTH DOCK

BOAT SHED

CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY

10-INCH OUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

FRONT STREET LEASED

SAMSON TUG AND BARGE

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER

WAREHOUSE

1ST AVENUE SOUTH

3447

3415

3635

4565

4545

LOT 19 LOT 18 LOT 17 LOT 16 LOT 15 LOT 14 LOT 7 LOT 6 LOT 5 LOT 4 LOT 3 LOT 2 LOT 1

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004))
- B19 — SOIL BORING (FARALLON CONSULTING 2002))
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVER BANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)

LOT 1 — LOT BOUNDARY

3635 — KING COUNTY TAX PARCELS

SITE BOUNDARY

CURRENT SHORELINE

SV — STORMWATER LINE

2002 EXCAVATION AREA

SVOCs — SEMI-VOLATILE ORGANIC COMPOUNDS

-- — NOT SAMPLED

ANALYTICAL RESULTS ARE SHOWN IN MICROGRAMS PER LITER

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL.

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL.

< — ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

0.5-FOOT-INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)

INFERRED SHALLOW ZONE GROUNDWATER FLOW DIRECTION

Sample ID	Sample Date	Groundwater Analytical Results (micgrams per liter)							
		Acenaphthene	Benzo(g,h,i) perylene	Fluoranthene	Flourene	1- Methylnaphthalene	Phenanthrene	Pyrene	Pentachlorophenol
Most Stringent Screening Level		2.61	0.1	2.26	2.04	1.5	4.81	9.8	0.219

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 15
SHALLOW ZONE GROUNDWATER
ANALYTICAL RESULTS FOR SVOCs

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG15 GD BLR\JQC.DWG

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DUWAMISH WATERWAY

Well ID	Sample Date	GRPH	DRPH	Naphthalene	1,2,4-Trimethylbenzene	Tetrachloroethene
MW-3D	6/4/2008	850	1,000	360	1.3	<0.20

Well ID	Sample Date	Tetrachloroethene
MW-4D	6/4/2008	<0.20

Well ID	Sample Date	TEQ	Tetrachloroethene
MW-2D	6/4/2008	0.134	<0.20

Well ID	Sample Date	Tetrachloroethene
MW-1D	6/4/2008	<0.20

MIDDLE DOCK
NORTH DOCK
SOUTH DOCK
BOAT SHED
10-INCH OUTFALL (OUT1)
5-INCH OUTFALL (OUT3)
6-INCH OUTFALL (OUT2)
CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY
FRONT STREET LEASED
DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER
SAMSON TUG AND BARGE
WAREHOUSE
1ST AVENUE SOUTH
3635
3447
3415
4565
4545
LOT 19
LOT 18
LOT 17
LOT 16
LOT 15
LOT 14
LOT 7
LOT 6
LOT 5
LOT 4
LOT 3
LOT 2
LOT 1
RB-1
RB-2
RB-3
RB-4
RB-5
MW1
MW2
MW3
MW4
MW-1D
MW-2D
MW-3D
MW-4D
TP-1(R)
TP-2(R)
TP-3(R)
TP-4(R)
B-1(R)
B-2(R)
B-3(R)
B-4(R)
B1
B2
B3
B4/TP-B4
B5/TP-B5
B6
B7/TP-B7
B8
B9
B10
B11
B12/TP-B12
B13
B14
B15
B16
B17
B18
B19
CB01
CB02
CB03
CB04
CB05
CB06
CB07
CB08
CB09 (PUMPED TO SANITARY SEWER)
CB10
CB11
CB12
SB-1N
SB-1S
SB-2N
SB-2S
SB-3N
SB-3S
SB-4S
SB-5S
SB-1AN
SB-1BN
5.0
5.5
6.0

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- SITE BOUNDARY
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA
- 0.5-FOOT INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)
- INFERRED DEEP ZONE GROUNDWATER FLOW DIRECTION

GRPH	GASOLINE-RANGE PETROLEUM HYDROCARBONS
DRPH	DIESEL-RANGE PETROLEUM HYDROCARBONS
TEQ	TOXICITY EQUIVALENT FOR CARCINOGENIC POLYNUCLEAR AEROMATIC HYDROCARBONS
TPH	TOTAL PETROLEUM HYDROCARBONS
VOCs	VOLATILE ORGANIC COOMPOUNDS
µg/L	MICROGRAMS PER LITER

ANALYTICAL RESULTS ARE SHOWN IN MICROGRAMS PER LITER

- DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL.
- DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL.
- < ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

Well ID	Sample Date	Groundwater Analytical Results (micrograms per liter) DRPH	GRPH	TEQ	Tetrachloroethene	Naphthalene	1,2,4-Trimethylbenzene
Most Stringent Screening Level		500	800/1,000	0.1	0.021	53.80	0.2

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DATE: 05/07/12
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CHECKED BY: CCC
CAD FILE: 0826-001_2011RI_FIG16_GD

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 16
DEEP ZONE GROUNDWATER ANALYTICAL RESULTS FOR GRPH, DRPH, TEQ, AND VOCs

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG16 GD BLRJQC.DWG

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Well	Sample Date	Sb		As		Cd		Cu		Hg		Ni		Se	Zn
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved
MW-3D	6/4/2008	<5.0	<5.6	<3.0	<3.3	<4.0	<4.4	<10	<11	<0.50	<0.5	<20	<22	<5.6	<50

Well	Sample Date	Sb		As		Cd		Cu		Hg		Ni		Se	Zn
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved
MW-2D	6/4/2008	<5.0	<5.6	<3.0	4	<4.0	<4.4	<10	<11	<0.50	<0.5	<20	<22		

Well	Sample Date	Sb		As		Cd		Cu		Hg		Ni		Se	Zn
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved
MW-4D	6/4/2008	<5.0	<5.6	<3.0	<3.3	<4.0	<4.4	<10	<11	<0.50	<0.5	<20	<22	<5.6	<50

Well	Sample Date	Sb		As		Cd		Cu		Hg		Ni		Se	Zn
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved
MW-1D	6/4/2008	<5.0	<5.6	<3.0	<3.3	<4.0	<4.4	<10	<11	<0.50	<0.5	<20	<22	<5.6	<50

DUWAMISH WATERWAY

MIDDLE DOCK

NORTH DOCK

SOUTH DOCK

CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY

10-INCH CUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

BOAT SHED

3447

3415

3635

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER

4565

SAMSON TUG AND BARGE

WAREHOUSE

FRONT STREET LEASED

1ST AVENUE SOUTH

LOT 1 LOT 2 LOT 3 LOT 4 LOT 5 LOT 6 LOT 7 LOT 8 LOT 14 LOT 15 LOT 16 LOT 17 LOT 18 LOT 19

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC CUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- SITE BOUNDARY
- CURRENT SHORELINE
- SV — STORMWATER LINE
- 2002 EXCAVATION AREA
- 0.5-FOOT INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)
- INFERRED DEEP ZONE GROUNDWATER FLOW DIRECTION

Cu	COPPER
Hg	MERCURY
Ni	NICKEL
Pb	LEAD
Sb	ANTIMONY
Se	SELENIUM
Zn	ZINC
As	ARSENIC
Cd	CADMIUM
<	ANALYTE NOT DETECTED AT OR ABOVE REPORTING LIMIT

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL.

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL.

Well ID / Sample Date	(µg/L) Sb	As	Cd	Cu	Hg	Ni	Se	Zn
Most Stringent Screening Level	3.87	0.05	0.21	7.30	0.0052	8.20	5.0	32.57

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 17
DEEP ZONE GROUNDWATER ANALYTICAL RESULTS - TOTAL AND DISSOLVED METALS

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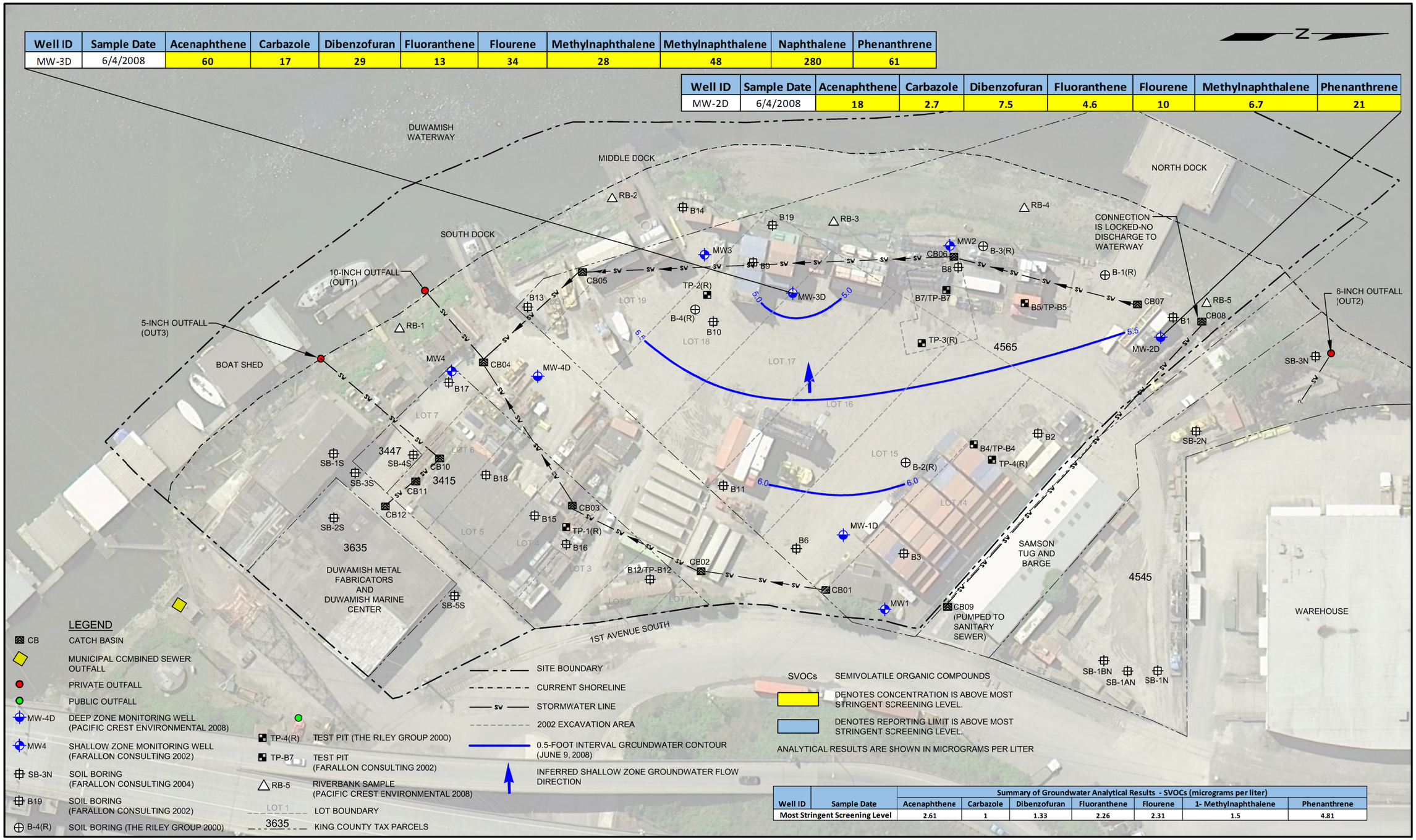
Well ID	Sample Date	Acenaphthene	Carbazole	Dibenzofuran	Fluoranthene	Flourene	Methylnaphthalene	Methylnaphthalene	Naphthalene	Phenanthrene
MW-3D	6/4/2008	60	17	29	13	34	28	48	280	61

Well ID	Sample Date	Acenaphthene	Carbazole	Dibenzofuran	Fluoranthene	Flourene	Methylnaphthalene	Phenanthrene
MW-2D	6/4/2008	18	2.7	7.5	4.6	10	6.7	21



LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- SITE BOUNDARY
- CURRENT SHORELINE
- SV — STORMWATER LINE
- 2002 EXCAVATION AREA
- 0.5-FOOT INTERVAL GROUNDWATER CONTOUR (JUNE 9, 2008)
- INFERRED SHALLOW ZONE GROUNDWATER FLOW DIRECTION

SVOCs — SEMIVOLATILE ORGANIC COMPOUNDS

DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LEVEL.

DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL.

ANALYTICAL RESULTS ARE SHOWN IN MICROGRAMS PER LITER

Well ID	Sample Date	Summary of Groundwater Analytical Results - SVOCs (micrograms per liter)						
		Acenaphthene	Carbazole	Dibenzofuran	Fluoranthene	Flourene	1- Methylnaphthalene	Phenanthrene
Most Stringent Screening Level		2.61	1	1.33	2.26	2.31	1.5	4.81

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 18
DEEP ZONE GROUNDWATER ANALYTICAL RESULTS FOR SVOCs

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG18 GD BLRJQC.DWG

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Sample ID	Sample Date	Depth	TEQ	Total PCBs
RB-2	5/29/2008	0-1	0.1395	0.14

Sample ID	Sample Date	Depth	Total PCBs
RB-3	5/29/2008	0-1	<0.052

Sample ID	Sample Date	Depth	TEQ	Total PCBs
RB-4	5/29/2008	0-1	0.1135	<0.053

Sample ID	Sample Date	Depth	TEQ	Total PCBs
CB-2	5/29/2008	0-1	0.3428	<0.060

Sample ID	Sample Date	Depth	TEQ	Total PCBs
RB-5	5/29/2008	0-1	0.1448	<0.054

Sample ID	Sample Date	Depth	TEQ	Total PCBs
CB-1	5/29/2008	0-1	1.164	<0.062

Sample ID	Sample Date	Depth	Total PCBs
RB-1	5/29/2008	0-1	<0.051

Sample ID	Sample Date	Depth	TEQ	Total PCBs
CB-4	5/29/2008	0-1	0.96	0.68

Sample ID	Sample Date	Depth	Total PCBs
CB02	5/29/2008	0-1	<0.060

DUWAMISH WATERWAY
MIDDLE DOCK
SOUTH DOCK
NORTH DOCK
CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY
10-INCH CUTFALL (OUT1)
5-INCH OUTFALL (OUT3)
6-INCH OUTFALL (OUT2)
BOAT SHED
LEASED LAND (PORT OF SEATTLE)
TEMPORARY BUILDING
DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER
FRONT STREET LEASED
SAMSON TUG AND BARGE
WAREHOUSE
1ST AVENUE SOUTH
3447
3415
3635
4565
4560
4545
LOT 19
LOT 18
LOT 17
LOT 16
LOT 15
LOT 14
LOT 7
LOT 6
LOT 5
LOT 4
LOT 3
LOT 2
LOT 1
RB-1
RB-2
RB-3
RB-4
RB-5
CB02
CB03
CB04
CB05
CB06
CB07
CB08
CB09 (PUMPED TO SANITARY SEWER)
CB10
CB11
CB12
CB01
MW1
MW2
MW3
MW4
MW-1D
MW-2D
MW-3D
MW-4D
B1
B2
B3
B4/TP-B4
B5/TP-B5
B6
B7/TP-B7
B8
B9
B10
B11
B12/TP-B12
B13
B14
B15
B16
B17
B18
B19
TP-1(R)
TP-2(R)
TP-3(R)
TP-4(R)
B-1(R)
B-2(R)
B-3(R)
B-4(R)
SB-1S
SB-2S
SB-3S
SB-4S
SB-5S
SB-1N
SB-1AN
SB-1BN
SB-2N
SB-3N

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- SITE BOUNDARY
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA

TEQ — TOXICITY EQUIVALENT FOR CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS
PCBs — POLYCHLORINATED BIPHENYLS
PORT OF SEATTLE PROPERTY
DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LAVEL
DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL
< — ANALYZE NOT DETECTED AT OR ABOVE REPORTING LIMIT

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

CATCH BASINS LABELED CB-1, CB-2, AND CB-4 IN THE PACIFIC CREST 2003 REPORT ARE NOW REFERRED TO AS CB04, CB05, AND CB07, RESPECTIVELY

Sample ID	Sample Date	Depth (feet)	TEQ	Total PCBs
Most stringent screening level			0.062	0.0022

0 35 70 140
APPROXIMATE SCALE IN FEET

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FIGURE 19
RIVERBANK AND CATCH BASIN SEDIMENT ANALYTICAL RESULTS FOR TEQ AND TOTAL PCBs

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Sample ID	Sample Date	Bis2C	BBP
RB-2	5/29/2008	<0.035	0.075

Sample ID	Sample Date	Bis2C
RB-3	5/29/2008	<0.034

Sample ID	Sample Date	Bis2C
RB-4	5/29/2008	<0.035

Sample ID	Sample Date	Bis2C	DBF
RB-5	5/29/2008	<0.036	<3.6

Sample ID	Sample Date	ACN	Anth	Bis2C	Bis2Eph	BBP	CBZ	DMP	1-MNP
CB-1	5/29/2008	0.062	1.2	0.064	1.9	1.2	0.39	0.76	<0.41

Sample ID	Sample Date	Bis2C
CB-2	5/29/2008	<0.04

Sample ID	Sample Date	Bis2C
RB-1	5/29/2008	<0.034

Sample ID	Sample Date	ACN	Bis2C	Bis2Eph	BBP	CBZ	Fluor	1-MNP	Phen	Pyr
CB-4	5/29/2008	0.26	<0.44	2.7	0.39	0.41	3.9	0.087	1.7	3.6

DUWAMISH WATERWAY
MIDDLE DOCK
SOUTH DOCK
NORTH DOCK
CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY
10-INCH OUTFALL (OUT1)
5-INCH OUTFALL (OUT3)
6-INCH OUTFALL (OUT2)
BOAT SHED
LEASED LAND (PORT OF SEATTLE)
FRONT STREET LEASED
TEMPORARY BUILDING
DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER
SAMSON TUG AND BARGE
1ST AVENUE SOUTH
CB09 (PUMPED TO SANITARY SEWER)
LOT 19
LOT 18
LOT 17
LOT 15
LOT 14
LOT 7
LOT 6
LOT 5
LOT 4
LOT 3
LOT 2
LOT 1
4565
4560
4545
3447
3415
3635

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- SITE BOUNDARY
- CURRENT SHORELINE
- 3656 — KING COUNTY TAX PARCELS
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA
- PORT OF SEATTLE PROPERTY
- DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LAVEL
- DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL
- < — ANALYZE NOT DETECTED AT OR ABOVE REPORTING LIMIT

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

CATCH BASINS LABELED CB-1, CB-2, AND CB-4 IN THE PACIFIC CREST 2003 REPORT ARE NOW REFERRED TO AS CB04, CB05, AND CB07, RESPECTIVELY

Sample Location	Sample ID	Sample Date	ACN	Anth	Bis2C	Bis2Eph	BBP	CBZ	DBF	DMP	Fluor	1-MNP	Phen	Pyr
Most stringent screening level			0.05	0.96	0.008	1.3	0.063	0.06	0.54	0.071	1.7	0.01	1.5	2.6

Bis2C	BIS(2-CHLOROETHYOXY)METHANE
1-MNP	1-METHYLNAPHTHALENE
DMP	DIMETHYLPHTHALATE
ACN	ACENAPHTHENE
DBF	DIBENZOFURAN
Phen	PHENANTHRENE
Anth	ANTHRACENE
CBZ	CARBOZOLE
Fluor	FLUORANTHENE
Pyr	PYRENE
BBP	BUTYLBENZYLPHTHALATE
Bis2Eph	BIS(2-ETHYLHEXYL)PHTHALATE

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CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 20
RIVERBANK AND CATCH BASIN SEDIMENT ANALYTICAL RESULTS FOR SVOCs

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Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead
Duwamish River Bank	RB-2	5/29/2008	<11	40	66

Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead
Catch Basin #2 (5)	CB-2	5/29/2008	<12	44	45

Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead
Duwamish River Bank	RB-3	5/29/2008	<11	24	60

Sample Location	Sample ID	Sample Date	Arsenic	Chromium
Duwamish River Bank	RB-4	5/29/2008	<11	31

Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead
Duwamish River Bank	RB-5	5/29/2008	<11	43	260

Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead
Catch Basin #1 (4)	CB-1	5/29/2008	<12	78	160

Sample Location	Sample ID	Sample Date	Arsenic	Chromium
Duwamish River Bank	RB-1	5/29/2008	<10	19

Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead	Zinc
Catch Basin #4 (7)	CB-4	5/29/2008	18	72	140	510

DUWAMISH WATERWAY

MIDDLE DOCK

SOUTH DOCK

NORTH DOCK

CONNECTION IS LOCKED-NO DISCHARGE TO WATERWAY

10-INCH CUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

RB-1 RB-2 RB-3 RB-4 RB-5

CB01 CB02 CB03 CB04 CB05 CB06 CB07 CB08 CB09 (PUMPED TO SANITARY SEWER) CB10 CB11 CB12

MW1 MW2 MW3 MW4 MW-1D MW-2D MW-3D MW-4D

B1 B2 B3 B4/TP-B4 B5/TP-B5 B6 B7/TP-B7 B8 B9 B10 B11 B12/TP-B12 B13 B14 B15 B16 B17 B18 B19 B-2(R) B-3(R) B-4(R) B-1(R) TP-1(R) TP-2(R) TP-3(R) TP-4(R) SB-1N SB-1S SB-2N SB-2S SB-3N SB-3S SB-4S SB-5S

LOT 1 LOT 2 LOT 3 LOT 4 LOT 5 LOT 6 LOT 7 LOT 14 LOT 15 LOT 16 LOT 17 LOT 18 LOT 19

LEASED LAND (PORT OF SEATTLE)

BOAT SHED

TEMPORARY BUILDING

FRONT STREET LEASED

SAMSON TUG AND BARGE

WAREHOUSE

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER

1ST AVENUE SOUTH

3635 3415 3447 4565 4560 4545

LEGEND

- CB — CATCH BASIN
- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC CUTFALL
- MW-4D — DEEP MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRCNMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- SITE BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- CURRENT SHORELINE
- sv — STORMWATER LINE
- 2002 EXCAVATION AREA
- < — ANALTE NOT DETECTED AT OR ABOVE REPORTING LIMIT
- PORT OF SEATTLE PROPERTY
- DENOTES CONCENTRATION IS ABOVE MOST STRINGENT SCREENING LAVEL
- DENOTES REPORTING LIMIT IS ABOVE MOST STRINGENT SCREENING LEVEL

ANALYTICAL RESULTS ARE SHOWN IN MILLIGRAMS PER KILOGRAM

Sample Location	Sample ID	Sample Date	Arsenic	Chromium	Lead	Zinc
Most Stringent Screening Level			0.39	1.6	40	410

CATCH BASINS LABELED CB-1, CB-2, AND CB-4 IN THE PACIFIC CREST 2003 REPORT ARE NOW REFERRED TO AS CB04, CB05, AND CB07, RESPECTIVELY

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CITY, STATE: SEATTLE, WASHINGTON

REGION:

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APPROXIMATE SCALE IN FEET

FIGURE 21
RIVERBANK AND CATCH BASIN SEDIMENT ANALYTICAL RESULTS FOR METALS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG21 SED BLRJQC.DWG

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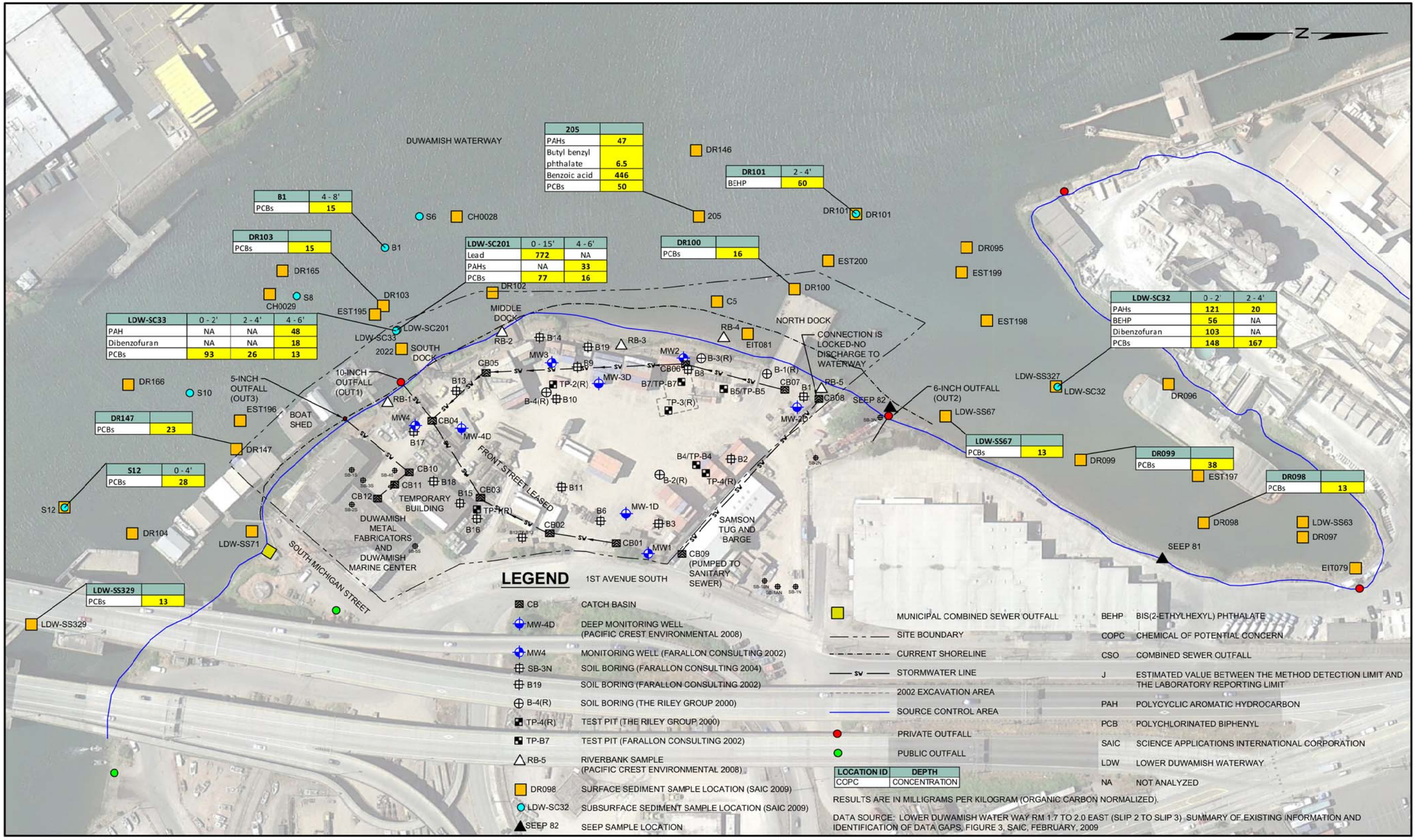

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 65 130 260
APPROXIMATE SCALE IN FEET

FIGURE 22
SEDIMENT SAMPLE LOCATIONS AND ANALYTICAL RESULTS IN LOWER DUWAMISH WATERWAY

5/8/2012
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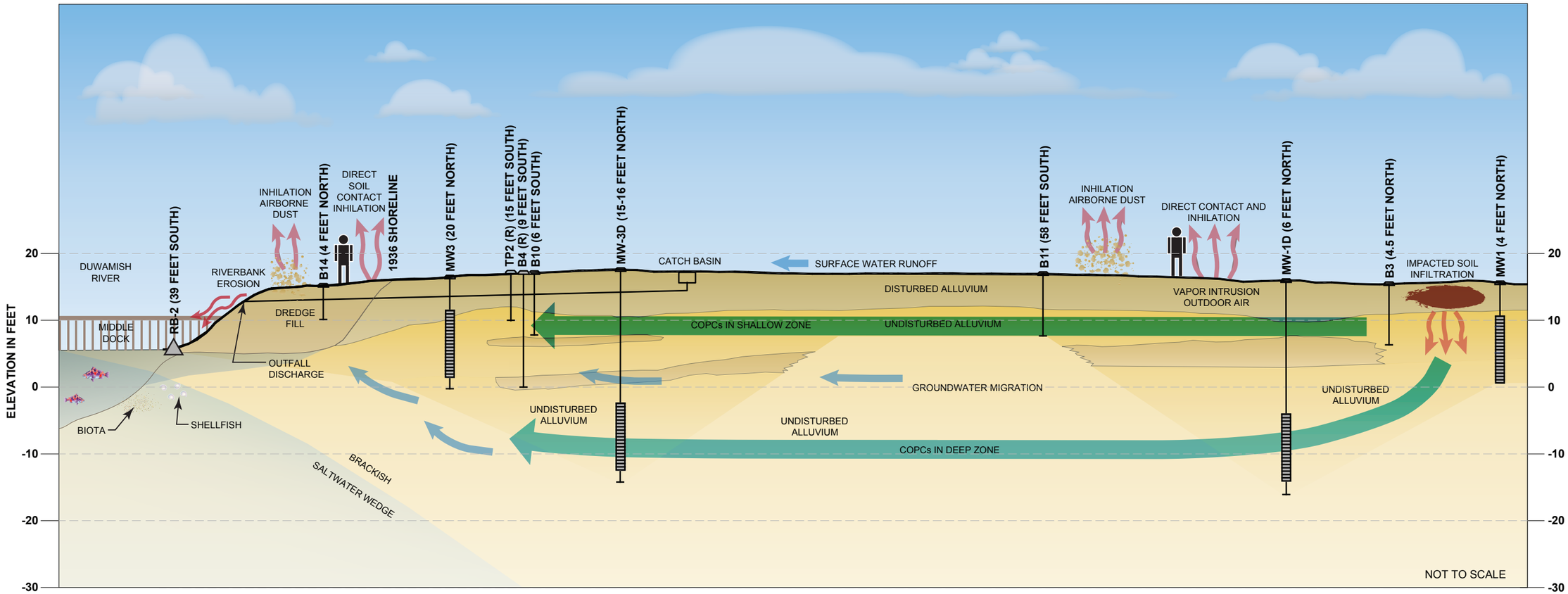

LEGEND

MONITORING WELL

SOIL BORING

(3 FEET NORTH) EXPLORATION LOCATED 3 FEET NORTH OF CROSS SECTION

COPCs CONTAMINANTS OF POTENTIAL CONCERN

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-01
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 15 30 60
APPROXIMATE SCALE IN FEET

FIGURE 23
GENERALIZED CONCEPTUAL SITE MODEL

P:\0826 Duwamish Marine Center\Technical\CAD\2011RI\0826-001_2011RI_FIG23_GCSM.AI

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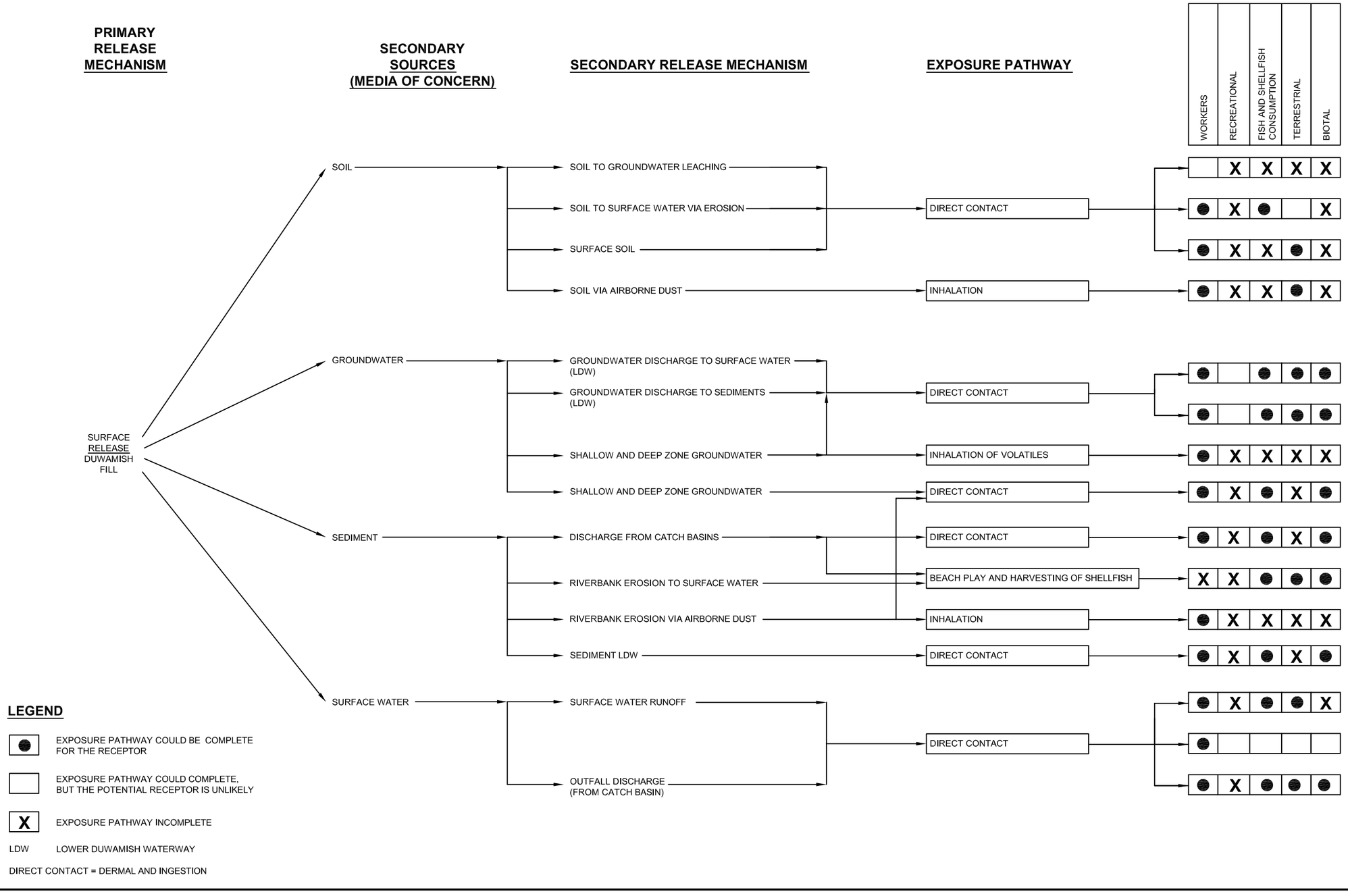

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DATE: 04/24/12
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CAD FILE: 0826-001_2011RI_FIG24_CSM

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

NOT TO SCALE

FIGURE 24
PRELIMINARY EXPOSURE ASSESSMENT CONCEPTUAL SITE MODEL

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG24_CSM_BLR_JQC.DWG

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5/10/2013

N

SUSPECTED LOCATION OF MARINE RAILWAY (1940 TO 1970)

SUSPECTED TEMPORARY LOCATION OF DUWAMISH STOCKPILED DREDGE SPOILS (1982)

SUSPECTED LOCATION OF AMERICAN PILE DRIVING COMPANY (1936 TO 1974) AND JUNK YARD DEALER (1960's TO 1970's)

2007

CURRENT SHORELINE

1966

1936

2010

MIDDLE DOCK

NORTH DOCK

SOUTH DOCK

10-INCH OUTFALL (OUT1)

5-INCH OUTFALL (OUT3)

6-INCH OUTFALL (OUT2)

BOAT SHED

LEASED LAND (PORT OF SEATTLE)

FRONT STREET LEASED

TEMPORARY BUILDING

EQUIPMENT WASH AREA

DUWAMISH METAL FABRICATORS AND DUWAMISH MARINE CENTER (LEASED)

SAMSON TUG AND BARGE (LEASED)

WAREHOUSE
LONE STAR NORTHWEST
OR SEATTLE BIODIESEL

1ST AVENUE SOUTH

EAST SIDE OF TEMPORARY BUILDING

FORMER BURGESS ENTERPRISE

SEATTLE CITY DEPARTMENT OF TRANSPORTATION

RB-1 RB-2 RB-3 RB-4 RB-5 RB-6 RB-7 RB-8 RB-9 RB-10 RB11

B1 B2 B3 B4/TP-B4 B5/TP-B5 B6 B7/TP-B7 B8 B9 B10 B11 B12/TP-B12 B13 B14 B15 B17 B18 B19

MW1 MW2 MW3 MW4 MW-1D MW-2D MW-3D MW-4D MW5/SB06 MW6/SB07 MW7/SB09 MW8/SB13 MW9/SB10 MW5D/SB11 MW6D/SB12 MW10/SB15

SB01 SB02 SB03 SB04 SB05 SB08 SB14 SB16 SB-1S SB-2S SB-3S SB-4S SB-5S SB-2N SB-3N SB-1BN SB-1AN SB-1N

CB01 CB02 CB03 CB04 CB05 CB06 CB07 CB08 CB09 CB10 CB11 CB12

TP-1(R) TP-2(R) TP-3(R) TP-4(R) B-1(R) B-2(R) B-3(R) B-4(R)

LOT 1 LOT 2 LOT 3 LOT 4 LOT 5 LOT 6 LOT 7 LOT 8 LOT 9 LOT 10 LOT 11 LOT 12 LOT 13 LOT 14 LOT 15 LOT 16 LOT 17 LOT 18 LOT 19 LOT 20

2410 3635 3447 3415 4565 4560 4545 4505

LEGEND

- MUNICIPAL COMBINED SEWER OUTFALL
- PRIVATE OUTFALL
- PUBLIC OUTFALL
- MW-4D — DEEP ZONE MONITORING WELL (PACIFIC CREST ENVIRONMENTAL 2008)
- MW4 — SHALLOW ZONE MONITORING WELL (FARALLON CONSULTING 2002)
- SB-3N — SOIL BORING (FARALLON CONSULTING 2004)
- B19 — SOIL BORING (FARALLON CONSULTING 2002)
- B-4(R) — SOIL BORING (THE RILEY GROUP 2000)
- TP-B7 — TEST PIT (FARALLON CONSULTING 2002)
- TP-4(R) — TEST PIT (THE RILEY GROUP 2000)
- RB-5 — RIVERBANK SAMPLE (PACIFIC CREST ENVIRONMENTAL 2008)
- LOT 1 — LOT BOUNDARY
- SUSPECTED SOURCE AREA
- APPROXIMATE CURRENT SHORELINE
- APPROXIMATE SHORELINE 2007
- APPROXIMATE SHORELINE 1966
- SHORELINE 1966 AND 2007 OVERLAPPING
- APPROXIMATE SHORELINE 1936
- SITE BOUNDARY
- 3635 — KING COUNTY TAX PARCELS
- SV — STORMWATER LINE
- 2002 EXCAVATION AREA
- CB — PROPOSED CATCH BASIN SAMPLE LOCATION
- RB-11 — PROPOSED RIVERBANK SAMPLE LOCATION
- SB06 — PROPOSED BORING LOCATION
- MW8/SB13 — PROPOSED MONITORING WELL LOCATION
- PORT OF SEATTLE PROPERTY

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CAD FILE: 0826-001_2011RI_FIG025

PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 35 70 140
APPROXIMATE SCALE IN FEET

FIGURE 25

MAP SHOWING PROPOSED SOIL, GROUNDWATER, CATCH BASIN, AND RIVERBANK SAMPLE LOCATIONS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001_2011RI_FIG25_PSL_BLR.DWG

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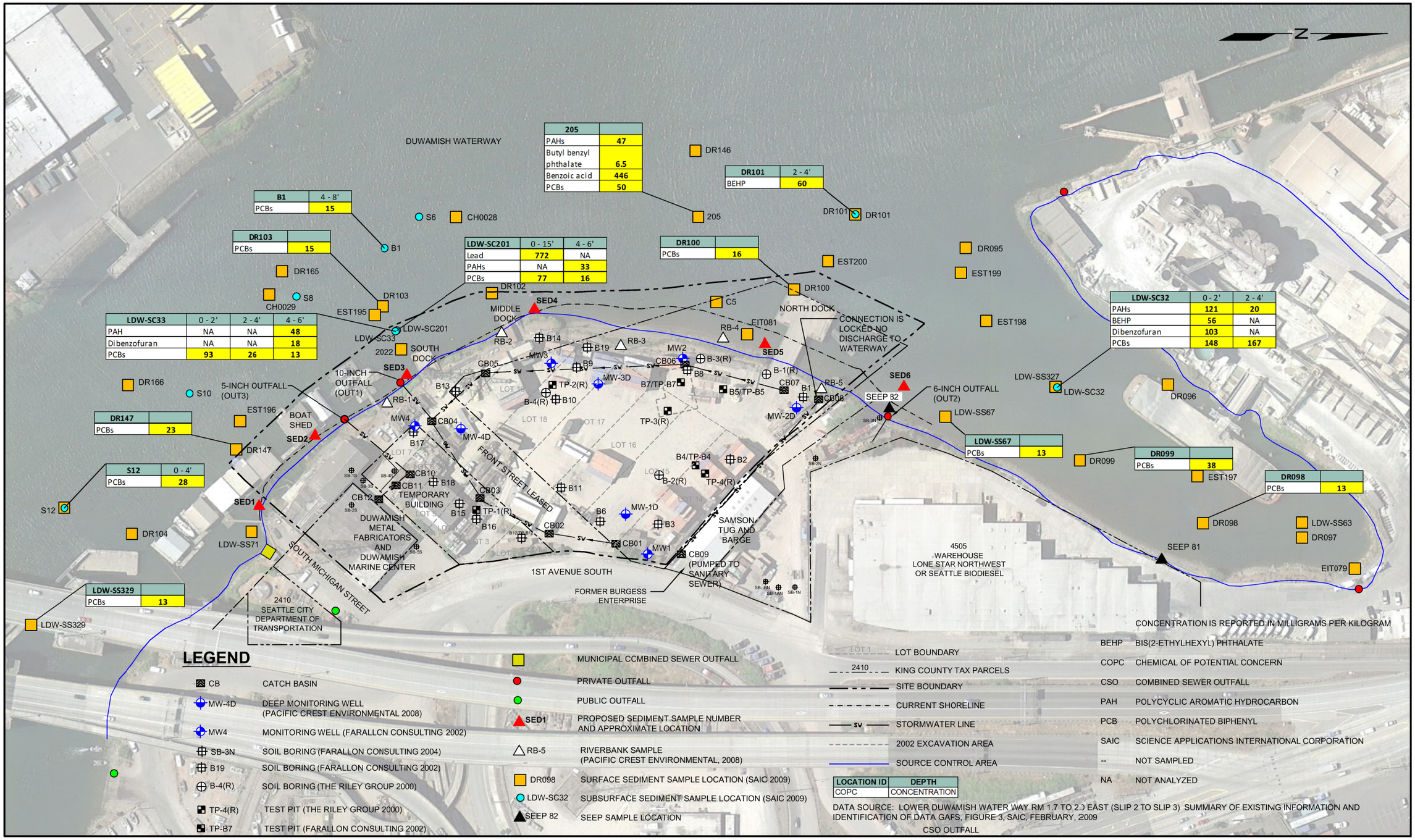

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PROJECT NAME: DUWAMISH MARINE CENTER
PROJECT NUMBER: 0826-001-02
STREET ADDRESS: 6365 FIRST AVENUE SOUTH
CITY, STATE: SEATTLE, WASHINGTON

REGION:

0 65 130 260
APPROXIMATE SCALE IN FEET

FIGURE 26
MAP SHOWING PROPOSED SEDIMENT SAMPLING LOCATIONS

P:\0826 DUWAMISH MARINE CENTER\TECHNICAL\CAD\2011RI\0826-001 2011RI FIG26 SED-PSED BLR-JQC.DWG

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TABLES

Table 1
Groundwater Elevation Data
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Well Identification	Date of Measurement	Measured By	Top of Casing Relative Elevation (feet)[1]	Screen Elevation - Top (feet)	Screen Elevation - Bottom (feet)	Depth to Water (feet)	Groundwater Elevation (feet)
Shallow Zone Wells							
MW1	3/22/2002	Farallon	15.38	10.38	0.38	7.94	7.44
	3/27/2002	Farallon				8.89	6.49
	5/13/2002	Farallon				7.58	7.80
	6/4/2008	Pacific Crest				10.83	4.55
	6/6/2008	Pacific Crest				--	--
	6/9/2008	Pacific Crest				8.10	7.28
MW2	3/22/2002	Farallon	15.85	10.85	0.85	10.87	4.98
	3/27/2002	Farallon				10.82	5.03
	5/13/2002	Farallon				11.31	4.54
	6/4/2008	Pacific Crest				--	--
	6/6/2008	Pacific Crest				--	--
	6/9/2008	Pacific Crest				--	--
MW3	3/22/2002	Farallon	15.73	10.73	0.73	11.43	4.30
	3/27/2002	Farallon				10.11	5.62
	5/13/2002	Farallon				9.06	6.67
	6/4/2008	Pacific Crest				--	--
	6/6/2008	Pacific Crest				--	--
	6/9/2008	Pacific Crest				10.33	5.40
MW4	3/22/2002	Farallon	14.14	9.14	-0.86	9.93	4.21
	3/27/2002	Farallon				8.09	6.05
	5/13/2002	Farallon				7.09	7.05
	6/4/2008	Pacific Crest				6.53	7.61
	6/6/2008	Pacific Crest				--	--
	6/9/2008	Pacific Crest				7.02	7.12
Deep Zone Wells							
MW-1D	6/4/2008	Pacific Crest	15.89	-4.11	-14.11	12.33	3.56
	6/6/2008	Pacific Crest				7.40	8.49
	6/9/2008	Pacific Crest				9.62	6.27
MW-2D	6/4/2008	Pacific Crest	15.88	-4.12	-14.12	12.40	3.48
	6/6/2008	Pacific Crest				7.30	8.58
	6/9/2008	Pacific Crest				10.35	5.53
MW-3D	6/4/2008	Pacific Crest	17.54	-2.46	-12.46	14.77	2.77
	6/6/2008	Pacific Crest				--	--
	6/9/2008	Pacific Crest				12.70	4.84
MW-4D	6/4/2008	Pacific Crest	15.56	-4.44	-14.44	11.86	3.70
	6/6/2008	Pacific Crest				7.36	8.20
	6/9/2008	Pacific Crest				9.69	5.87

NOTES:
[1]Elevation based on arbitrary datum elevation of 15.00 feet.

-- = not gauged
Farallon = Farallon Consulting, L.L.C.
Pacific Crest = Pacific Crest Environmental, LLC

Table 2
Summary of Groundwater Elevations - 72-Hour Tidal Influence Study
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Start	End	Maximum Elevation (feet)	Minimum Elevation (feet)	Average Elevation (feet)	Tidal Fluctuation (feet)
MW-1D[1]	6/6/2008	6/9/2008	10.831	4.1	8.3	6.7
MW-2D[1]			11.675	0.25	6.9	11.4
MW-3D[1]			No data collected due to pressure transducer malfunction			
MW-4D[1]			10.055	2.5	7	7.5
Tide[2]			12.17	-3.3	6.1	15.5

NOTES:

[1]Heron Instruments Dipper-Log, Hermit mini-logger and BarroLogger used to measure fluctuations in water level elevations based well survey elevation.

[2]Tidal data obtained from National Oceanic and Atmospheric Administration for Seattle Station #9447130 at <http://tidesandcurrents.noaa.gov.>

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Table 3
Summary of Soil Analytical Results for GRPH, DRPH, and ORPH
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[1]	Total Petroleum Hydrocarbons (milligrams/kilogram)		
					GRPH[2]	DRPH[3]	ORPH[3]
TP-1(R)	TP-1(R)-1.5'	Riley Group	7/17/2000	1.5	<28	<28	**1,600**
TP-2(R)	TP-2(R)-4.5'			4.5	NA	NA	NA
TP-2(R)	TP-2(R)-5.5'			5.5	<32	<64	<130
TP-3(R)	TP-3(R)-5.5'			5.5	<29	<29	**1,400**
TP-4(R)	TP-4(R)-2'			2	<31	<31	**1,600**
B1(R)	B-1(R)-6	Riley Group	8/3/2000	14-14.5	NA	**210**	**440**
B2(R)	B-2(R)-1			2.5-4.0	NA	**460**	**1,400**
B3(R)	B-3(R)-3			12.5-14	NA	**5,100**	**21,000**
B4(R)	B-4(R)-3			10-11.5	NA	<27	<75
B1	B1-0-3	Farallon	3/13/2002	0-3	NA	<140	**850**
B2	B2-0-3			0-3	NA	<130	**720**
B3	B3-0-3			0-3	NA	**350**	**1,800**
B4	B4-0-3			0-3	NA	**730**	**3,700**
	B4-3-6			3-6	NA	<26	<52
B5	B5-3-4			3-4	NA	**4,800**	**10,000**
	B5-6-9			6-9	NA	<140	**570**
B6	B6-0-3			0-3	NA	<27	**100**
B7	B7-2-4			2-4	NA	<140	**3,700**
	B7-6-7.5			6-7.5	NA	<27	**540**
B8	B8-2-3			2-3	NA	<28	**1,800**
B9	B9-1.5-2			1.5-2	NA	<26	**160**
B10	B10-1-3			1-3	NA	<27	<56
B11	B11-0-3	Farallon	3/14/2002	0-3	NA	<28	<53
B12	B12-0-1			0-1	NA	<27	<55
B13	B13-0-3	Farallon	3/13/2002	0-3	NA	<28	**580**
B14	B14-2-3			2-3	NA	<27	**82**
B15	B15-0-3	Farallon	3/14/2002	0-3	NA	**97**	**390**
B16	B16-0-1.5			0-1.5	NA	<29	**790**
B17	B17-0-3			0-3	NA	<26	**270**
B18	B18-0-3			0-3	NA	<28	**820**
B19	B19-1.5-3	Farallon	3/13/2002	1.5-3	NA	**180**	**810**
MW1	MW1-3-4.5	Farallon	3/18/2002	3-4.5	NA	<29	**120**
	MW1-5-6.5			5-6.5	NA	<27	<54
	MW1-7.5-9			7.5-9	NA	<36	<71
MW2	MW2-2-4			2-4	NA	<31	**1,400**
MW3	MW3-2.5-4			2.5-4	NA	<28	**160**
SB1	SB1-5-8	Farallon	1/8/2004	5-8	NA	<27	<53
SB3	SB3-8-12	Farallon	1/8/2004	8-12	NA	<34	**410**
SB-1N	SB-1N	Farallon	1/8/2004	5-8	NA	<27	<53
SB-3N	SB-3N			8-12	NA	<34	**410**
SB-3S	SB-3S	Farallon	1/9/2004	6-8	NA	<32	<64
SB-4S	SB-4S			6-8	NA	<40	<79
MW-1D	MW1D-5-6.0	Pacific Crest	6/2/2008	5.0-6.0	<6.7	<42	**310**
MW-2D	MW2D-6-6.5			6.0-6.5	<5.5	**53**	**110**
MW-3D	MW3D-8	Pacific Crest	5/30/2008	8	<6.2	<30	<60
MW-4D	MW4D-6.5			6.5	<5.4	<28	<52
Most Stringent Screening Level					**30/100**[a,b]	**200**[c]	**2,000**[b]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Depth measured in feet below ground surface.

[2]Analyzed by NWTPH Method NWTPH-Gx.

[3]Analyzed by NWTPH Method NWTPH-Dx.

[a]30 mg/kg when benzene is present and 100 mg/kg when benzene is not present.

[b]MTCA Cleanup Regulation, Chapter 173-340-900 of WAC, Table 740-1 Method A Soil Cleanup Levels for Unrestricted Land Uses.

[c]Soil, Method B, Terrestrial, WAC 173-340-740(3)(b)(ii), WAC 173-340-7493, Table 749-3, Soil Biota (Site-Specific Terrestrial Ecological Evaluation).

< = analyte not detected at or above the reporting limit
DRPH = diesel-range petroleum hydrocarbons
Farallon = Farallon Consulting, L.L.C.
GRPH = gasoline-range petroleum hydrocarbons
MTCA = Washington State Model Toxics Control Act
NA = not analyzed
NWTPH = Northwest Total Petroleum Hydrocarbon
ORPH = oil-range petroleum hydrocarbons
Pacific Crest = Pacific Crest Environmental, LLC
Riley Group = The Riley Group, Inc.
WAC = Washington Administrative Code

Table 4
Summary of Soil
Analytical Results for SVOCs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[2]	Semivolatile Organic Compounds[1] (milligrams/kilogram)																
					Naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo[g,h,i]perylene	bis(2-Ethylhexyl) phthalate	Butyl benzyl phthalate	Carbazole	Dibenzofuran	Di-n-butylphthalate	Flouranthene	Flourene	1-Methylnaphthalene	2-Methylnaphthalene	Pentachlorphenol	Phenanthrene	Pyrene
B1(R)	B1(R)-6	Riley Group	8/3/2000	14-14.5	**0.8**	**3**	**0.062**	**2.4**	**0.32**	NA	NA	NA	NA	NA	**12**	**4.3**	NA	**0.21**	<2.8	**14**	**8.2**
B1	B1-0-3	Farallon	3/13/2002	0-3	**3.4**	**0.68**	<0.09	**0.42**	**0.23**	NA	NA	NA	NA	NA	**1.3**	**0.63**	**0.33**	**0.48**	<1.8	**1.6**	**1**
B7	B7-2-4			2-4	**0.49**	**0.14**	<0.04	**0.098**	**0.1**	NA	NA	NA	NA	NA	**0.3**	**0.17**	**0.72**	**1.3**	<0.37	**0.66**	**0.33**
B8	B8-2-3			2-3	**0.11**	**0.061**	<0.04	**0.13**	**0.28**	NA	NA	NA	NA	NA	**0.38**	**0.063**	<0.04	**0.061**	<3.7	**0.35**	**0.41**
B14	B14-2-3			2-3	<0.01	<0.01	<0.01	**0.01**	**0.013**	NA	NA	NA	NA	NA	**0.028**	<0.01	<0.01	<0.01	<0.36	**0.014**	**0.024**
B19	B19-1.5-3			1.5-3	**0.06**	**0.013**	<0.0086	**0.014**	**0.028**	NA	NA	NA	NA	NA	**0.082**	**0.021**	**0.78**	**0.14**	<1.7	**0.087**	**0.13**
SB-3N	SB-3N	Farallon	1/8/2004	8-12	<0.10	<0.10	<0.10	<0.10	<0.010	NA	NA	NA	NA	NA	<0.10	<0.10	<0.10	<0.10	<4.8	<0.10	<0.10
MW-1D	MW1D-5-6.0	Pacific Crest	6/2/2008	5.0-6.0	**0.038**	**0.01**	**0.0094**	**0.027**	**0.12**	**0.099**	<0.037	<0.037	<0.037	**0.043**	**0.17**	**0.016**	**0.016**	**0.036**	<0.17	**0.11**	**0.15**
MW-2D	MW2D-6-6.5			6.0-6.5	**0.079**	**0.07**	**0.0083**	**0.13**	**0.42**	**0.072**	**0.099**	**0.089**	**0.042**	**0.061**	**1.1**	**0.071**	**0.025**	**0.036**	<0.2	**0.56**	**0.95**
MW-3D	MW3D-8	Pacific Crest	5/30/2008	7.5-8.0	**0.026**	**0.012**	<0.0080	<0.0080	<0.0080	<0.040	<0.040	<0.040	<0.040	<0.040	<0.0080	<0.0080	**0.0089**	**0.0091**	NA	<0.0080	<0.0080
MW-4D	MW4D-6.5			6.0-6.5	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.035	<0.035	<0.035	<0.035	<0.035	<0.0069	<0.0069	<0.0069	<0.0069	NA	<0.0069	<0.0069
Most Stringent Screening Level					**0.002**[a]	**0.017**[b]	**0.069**[b]	**0.223**[b]	**0.031**[b]	**0.3**[a]	**0.03**[a]	**0.06**[a]	**0.02**[a]	**0.081**[c]	**0.161**[c]	**0.024**[c]	**35**[d]	**0.043**[b]	**0.1**[a]	**0.101**[b]	**0.683**[c]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8270D SIM.

[2]Depth measured in feet below ground surface.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[b]Ecology, Sediment Quality Standard, Soil to Sediment Protection, WAC 173-340-740(1)(d), Equation 747-1/747-2 Saturated Soil.

[c]Screening level obtained from Ecology worksheet titled "Most Stringent Levels W-O PSW," as requested in Comment #2(b) in Ecology letter dated March 6, 2012.

[d]Soil, Method B, Human Health, Groundwater Protection, Carcinogenic, 40-740(3)(b)(iii)(A), Equation 747-1/747-2 Saturated Soil, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

< = analyte not detected at or above the reporting limit

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CLARC = Cleanup Levels and Risk Calculation

Ecology = Washington State Department of Ecology

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

NA = not analyzed

Pacific Crest = Pacific Crest Environmental, LLC

SVOCs = semivolatile organic compounds

Riley Group = The Riley Group, Inc.

WAC = Washington Administrative Code

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Table 5
Summary of Soil Analytical Results for Metals
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[3]	Total Metals[1] (milligrams/kilogram)													TCLPs[2] (milligrams/liter)		
					Antimony	Arsenic	Beryllium	Cadmium	Chromium	Chromium (VI)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	Cadmium - TCLP	Chromium - TCLP	Lead - TCLP
TP-1(R)	TP-1(R)-1.5'	Riley Group	7/17/2000	1.5	<5.9	<12	NA	7.1	19	NA	99	430	0.85	27	NA	<0.59	<5.9	290	0.055	NA	1.6
TP-2(R)	TP-2(R)-4.5'			4.5	<5.7	<11	NA	0.64	22	NA	45	120	0.45	38	NA	0.62	<5.7	150	NA	NA	NA
TP-3(R)	TP-3(R)-5.5'			5.5	<5.9	<12	NA	5.3	61	NA	150	1,400	<0.29	150	NA	0.84	<5.9	1,700	0.036	NA	12
TP-4(R)	TP-4(R)-2'			2	<6.2	<12	NA	1.4	150	NA	210	340	<0.31	200	NA	<0.62	<6.2	240	NA	<0.2	<0.2
B1(R)	B-1(R)-6	Riley Group	8/3/2000	14-14.5	<5.7	<11	NA	1.1	21	NA	91	70	<0.28	42	NA	<0.57	<5.7	2,100	NA	NA	NA
B2(R)	B-2(R)-1			2.5-4.0	<5.4	<11	NA	<0.54	110	NA	190	170	<0.27	140	NA	<0.54	<5.4	150	NA	NA	NA
B3(R)	B-3(R)-3			12.5-14	<47	<11	NA	43	80	NA	7,400	12,000	1.5	200	NA	4.6	6.2	31,000	NA	NA	NA
B4(R)	B-4(R)-3			10-11.5	<7.5	<15	NA	<0.75	12	NA	26	24	<0.37	3.2	NA	<0.75	<7.5	42	NA	NA	NA
B1	B1-0-3	Farallon	3/13/2002	0-3	<5.4	<11	NA	<0.54	15	NA	58	330	0.28	58	NA	<0.54	<5.4	170	NA	NA	NA
B2	B2-0-3			0-3	<5.4	<11	NA	<0.54	40	NA	71	140	<0.27	58	NA	<0.54	<5.4	100	NA	NA	NA
B3	B3-0-3			0-3	<5.4	<11	NA	<0.54	400	NA	530	360	<0.27	510	NA	1.1	<5.4	300	NA	NA	NA
B4	B4-0-3			0-3	<5.5	<11	NA	<0.55	2,700	<2.2	320	340	<0.27	320	NA	1.5	<5.5	1,400	NA	NA	NA
	B4-3-6			3-6	NA	NA	NA	NA	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B5	B5-3-4			3-4	<5.6	<11	NA	2.4	230	NA	220	670	0.51	120	NA	0.56	<5.6	860	NA	NA	NA
	B5-6-9			6-9	NA	NA	NA	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B6	B6-0-3			0-3	<5.5	<11	NA	<0.55	12	NA	15	67	<0.27	11	NA	<0.55	<5.5	32	NA	NA	NA
B7	B7-2-4			2-4	21	<11	NA	0.65	260	NA	6,900	850	<0.27	450	NA	2.3	<5.5	480	NA	NA	NA
B8	B8-2-3			2-3	<5.5	<11	NA	<0.55	40	NA	71	310	<0.27	39	NA	<0.55	<5.5	79	NA	NA	NA
B9	B9-1.5-2			1.5-2	<5.4	<11	NA	<0.54	10	NA	14	9.9	<0.27	8.2	NA	<0.54	<5.4	26	NA	NA	NA
B10	B10-1-3			1-3	<5.6	12	NA	<0.56	7.4	NA	21	8.5	<0.28	12	NA	<0.56	<5.6	24	NA	NA	NA
B11	B11-0-3	Farallon	3/14/2002	0-3	<5.3	<11	NA	<0.53	7	NA	9.5	<5.3	<0.26	7.9	NA	<0.53	<5.3	19	NA	NA	NA
B12	B12-0-1			0-1	<5.6	<11	NA	<0.56	24	NA	12	<5.6	<0.28	34	NA	<0.56	<5.6	29	NA	NA	NA
B13	B13-0-3	Farallon	3/13/2002	0-3	37	<11	NA	<0.56	36	NA	85	140	<0.28	37	NA	<0.56	<5.6	230	NA	NA	NA
B14	B14-2-3			2-3	<5.4	<11	NA	<0.54	7.2	NA	16	12	<0.27	11	NA	<0.54	<5.4	41	NA	NA	NA
B15	B15-0-3	Farallon	3/14/2002	0-3	<5.4	<11	NA	<0.54	23	NA	41	85	<0.27	35	NA	<0.54	<5.4	99	NA	NA	NA
B16	B16-0-1.5			0-1.5	<5.8	<12	NA	0.86	28	NA	290	200	0.43	29	NA	<0.58	<5.8	250	NA	NA	NA
B17	B17-0-3			0-3	<5.3	<11	NA	<0.53	26	NA	91	67	<0.26	52	NA	<0.53	<5.3	94	NA	NA	NA
B18	B18-0-3			0-3	<5.6	<11	NA	1.1	33	NA	100	540	1.1	42	NA	1	<5.6	290	NA	NA	NA
B19	B19-1.5-3	Farallon	3/13/2002	1.5-3	<5.2	<10	NA	<0.52	8.1	NA	43	70	<0.26	11	NA	<0.52	<5.2	83	NA	NA	NA
MW1	MW1-3-4.5	Farallon	3/18/2002	3-4.5	<5.7	<11	NA	<0.57	16	NA	23	60	<0.29	15	NA	<0.57	<5.7	64	NA	NA	NA
	MW1-5-6.5			5-6.5	<5.3	<11	NA	<0.53	25	NA	12	47	<0.27	13	NA	<0.53	<5.3	18	NA	NA	NA
	MW1-7.5-9			7.5-9	<7	<14	NA	<0.7	13	NA	23	<7	<0.35	13	NA	<0.7	<7	66	NA	NA	NA
MW2	MW2-2-4			2-4	<6.3	<13	NA	<0.63	38	NA	36	210	<0.31	45	NA	<0.63	<6.3	83	NA	NA	NA
MW3	MW3-2.5-4			2.5-4	<5.7	<11	NA	<0.57	21	NA	62	70	<0.28	36	NA	<0.57	<5.7	110	NA	NA	NA
Most Stringent Screening Level					1[a]	0.5[a]	3.16[b]	0.2[a]	42[c]	0.1[a]	0.2[a]	5.4[b]	0.05[a]	0.5[a]	1[a]	0.5[a]	1[a]	2.03[b]	1[d]	5[d]	5[d]

SoundEarth Strategies

Table 5
Summary of Soil Analytical Results for Metals
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[3]	Total Metals[1] (milligrams/kilogram)														TCLPs[2] (milligrams/liter)		
					Antimony	Arsenic	Beryllium	Cadmium	Chromium	Chromium (VI)	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	Cadmium - TCLP	Chromium - TCLP	Lead - TCLP
Excavation	EX1-8.5-10.0	Farallon	5/13/2002	8.5-10	NA	NA	NA	NA	NA	NA	NA	**510**	NA	NA	NA	NA	NA	NA	NA	NA	**28**
	EX1-SSW-3-4.0			3.0-4.0	NA	NA	NA	NA	NA	NA	NA	**140**	NA	NA	NA	NA	NA	NA	NA	NA	**3.2**
	EX1-WSW-4.0			4.0	NA	NA	NA	NA	NA	NA	NA	**45**	NA	NA	NA	NA	NA	NA	NA	NA	**4.1**
	EX1-NSW-4.0			4.0	NA	NA	NA	NA	NA	NA	NA	**95**	NA	NA	NA	NA	NA	NA	NA	NA	<0.20
	EX1-ESW-4.0			4.0	NA	NA	NA	NA	NA	NA	NA	**510**	NA	NA	NA	NA	NA	NA	NA	NA	**7.3**
	EX1-11.0-11.5			11.0-11.5	NA	NA	NA	NA	NA	NA	NA	**1,500**	NA	NA	NA	NA	NA	NA	NA	NA	**13**
	EX1-ESW2-4.0			4.0	NA	NA	NA	NA	NA	NA	NA	**99**	NA	NA	NA	NA	NA	NA	NA	NA	**1.4**
	EX1-15.0-15.5			15.0-15.5	NA	NA	NA	NA	NA	NA	NA	**79**	NA	NA	NA	NA	NA	NA	NA	NA	**0.29**
Stockpile	SP1			NA	NA	NA	NA	NA	NA	NA	NA	**19**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	SP2			NA	NA	NA	NA	NA	NA	NA	NA	**14**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	SP3			NA	NA	NA	NA	NA	NA	NA	NA	**1,300**	NA	NA	NA	NA	NA	NA	NA	NA	**14**
SB-3N	SB-3N	Farallon	1/8/2004	8-12	<6.8	<14	<0.68	<0.68	**48**	NA	**45**	<6.8	<0.34	<3.4	<14	<0.68	<6.8	<3.4	NA	NA	NA
SB-3S	SB-3S	Farallon	1/9/2004	6-8	<6.4	<13	<0.64	<0.64	**5.3**	NA	**6.6**	<6.4	<0.32	**5.9**	<13	<0.64	<6.4	**23**	NA	NA	NA
SB-4S	SB-4S			6-8	<7.9	<16	<0.79	<0.79	**14**	NA	**28**	<7.9	<0.40	**11**	<16	<0.79	<7.9	**30**	NA	NA	NA
MW-1D	MW1D-5-6.0	Pacific Crest	6/2/2008	5.0-6.0	NA	<11	NA	**1.5**	**13**	<1.1	**67**	**2,000**	<0.28	<15	NA	NA	NA	**180**	NA	NA	NA
MW-2D	MW2D-6-6.5			6.0-6.5	NA	**140**	NA	**6.4**	**120**	<1.2	**330**	**560**	<0.03	**120**	NA	NA	NA	**1,300**	NA	NA	NA
MW-3D	MW3D-8	Pacific Crest	5/30/2008	8	NA	<12	NA	**1.72**	**46**	<1.0	**32**	<6.0	<0.30	**53**	NA	NA	NA	**65**	NA	NA	NA
MW-4D	MW4D-6.5			6.5	NA	<10	NA	<0.52	**7.2**	<1.2	**12**	**17**	<0.26	**8.7**	NA	NA	NA	**98**	NA	NA	NA
Most Stringent Screening Level					**1[a]**	**0.5[a]**	**3.16[b]**	**0.2[a]**	**42[c]**	**0.1[a]**	**0.2[a]**	**5.4[b]**	**0.05[a]**	**0.5[a]**	**1[a]**	**0.5[a]**	**1[a]**	**2.03[b]**	**1[d]**	**5[d]**	**5[d]**

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 6010B with total or TCLP extraction.

[2]Samples analyzed by EPA Method 200.8 and 40 CFR Part 261.

[3]Depth in feet below ground surface.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[b]Screening level obtained from Ecology worksheet titled "Most Stringent Levels W-O PSW," as requested in Comment #2(b) in Ecology letter dated March 6, 2012.

[c]Soil, Method B, Terrestrial, WAC 173-340-740(3)(b)(ii), WAC 173-340-7493, Table 749-3, Soil Biota (Site-Specific Terrestrial Ecological Evaluation).

[d]Maximum Concentration of Contaminants for the Toxicity Characteristic, WAC 173-303-090.

< = analyte not detected at or above the reporting limit
CFR = Code of Federal Regulationas
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
Farallon = Farallon Consulting, L.L.C.
MTCA = Washington State Model Toxics Control Act
NA = not analyzed
Pacific Crest = Pacific Crest Environmental, LLC
RCW = Revised Code of Washington
Riley Group = The Riley Group, Inc.
TCLP = Toxics Characteristic Leaching Procedure
WAC = Washington Administrative Code

SoundEarth Strategies

Table 6
Summary of Soil Analytical Results for cPAHs
Duwamish Marine Center
6353 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth (feet bgs)	Carcinogenic Polynuclear Aromatic Hydrocarbons (milligrams per kilogram)[1]							
					Benzo(a) pyrene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3,-cd) pyrene	Benzo(k) fluoranthene	Benzo(a) anthracene	Benzo(b) fluoranthene	TEQ Concentration[2]
B1(R)	B-1(R)-6	Riley Group	8/3/2000	14-14.5	0.91	3.4	0.096	0.31	0.8	2.4	1	**1.405**
B1	B1-0-3	Farallon	3/13/2002	0-3	0.38	0.52	<0.09	0.23	0.34	0.43	0.39	**0.529**
B7	B7-2-4			2-4	0.15	0.29	<0.04	0.093	0.13	0.17	0.19	**0.213**
B8	B8-2-3			2-3	0.37	0.45	0.087	0.26	0.23	0.25	0.36	**0.493**
B14	B14-2-3			2-3	0.012	0.031	<0.09	0.013	0.024	0.018	0.031	**0.025**
B19	B19-1.5-3			1.5-3	0.043	0.1	0.011	0.028	0.029	0.051	0.046	**0.061**
SB-3N	SB-3N	Farallon	1/8/2004	8-12	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
MW-1D	MW1D-5-6.0	Pacific Crest	6/2/2008	5.0-6.0	0.14	0.13	0.031	0.1	0.13	0.095	0.13	**0.190**
MW-2D	MW2D-6-6.5			6.0-6.5	0.71	0.62	0.16	0.42	0.66	0.6	0.57	**0.957**
MW-3D	MW3D-8	Pacific Crest	5/30/2008	7.5-8.0	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	<0.0080	**0.006**
MW-4D	MW4D-6.5			6.0-6.5	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	<0.0069	**0.005**
cPAH Toxicity Equivalent Fraction					**1**	**0.01**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	--
Most Stringent Screening Level[a]					--	--	--	--	--	--	--	**0.002**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8270D SIM.

[2]Analytical result for each individual cPAH is multiplied by the TEF and all seven cPAH values are added. When analytical results are reported as less than the LRL, half of the LRL is used for the calculation.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

-- = not applicable

< = analyte not detected at or above the reporting limit

bgs = below ground surface

cPAHs = carcinogenic polynuclear aromatic hydrocarbons

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

LRL = laboratory reporting limit

Pacific Crest = Pacific Crest Environmental, LLC

Riley Group = The Riley Group, Inc.

TEF = toxicity equivalency fraction

TEQ = toxicity equivalent

WAC = Washington Administrative Code

SoundEarth Strategies

Table 7
Summary of Soil Analytical Results for PCBs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[2]	Polychlorinated Biphenyls[1] (milligrams/kilogram)									
					Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs[3]
TP-1(R)	TP-1(R)-1.5'	Riley Group	7/17/2000	1.5	<0.059	<0.059	<0.059	<0.059	<0.059	<0.059	0.081	NA	NA	**0.081**
TP-2(R)	TP-2(R)-4.5'			4.5	<0.061	<0.061	<0.061	<0.061	<0.061	<0.061	0.09	NA	NA	**0.09**
TP-3(R)	TP-3(R)-5.5'			5.5	<0.059	<0.059	<0.059	2.3	<0.059	<0.059	<0.059	NA	NA	**2.3**
TP-4(R)	TP-4(R)-2'			2	<0.062	<0.062	<0.062	0.53	<0.062	1.6	<0.062	NA	NA	**2.13**
B1(R)	B-1(R)-6	Riley Group	8/3/2000	14-14.5	<0.057	<0.057	<0.057	<0.057	<0.057	<0.057	0.15	NA	NA	**0.15**
B2(R)	B-2(R)-1			2.5-4.0	<0.054	<0.054	<0.054	1	<0.054	0.38	0.11	NA	NA	**1.49**
B3(R)	B-3(R)-3			12.5-14	<0.62	<0.62	<0.62	5	<0.62	3.1	1.7	NA	NA	**9.8**
B4(R)	B-4(R)-3			10-11.5	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	NA	NA	<0.075
B1	B1-0-3	Farallon	3/13/2002	0-3	<0.54	<0.54	<0.54	1.7	<0.54	1.8	2.4	NA	NA	**5.9**
B2	B2-0-3			0-3	<0.054	<0.054	<0.054	0.5	<0.054	0.97	0.39	NA	NA	**1.86**
B3	B3-0-3			0-3	<0.54	<0.54	<0.54	6	<0.54	2.5	<0.54	NA	NA	**8.5**
B4	B4-0-3			0-3	<0.55	<0.55	<0.55	3.7	<0.55	1.7	<0.55	NA	NA	**5.4**
B5	B5-3-4			3-4	<0.56	<0.56	<0.56	5.8	<0.56	1.7	0.79	NA	NA	**8.29**
B6	B6-0-3			0-3	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	<0.55	NA	NA	<0.055
B7	B7-2-4			2-4	<5.5	<5.5	<5.5	34	<5.5	<5.5	<5.5	NA	NA	**34**
	B7-6-7.5			6-7.5	<0.054	<0.054	<0.054	0.24	<0.054	0.19	0.11	NA	NA	**0.54**
B8	B8-2-3			2-3	<0.055	<0.055	<0.055	<0.055	<0.055	0.086	0.12	NA	NA	**0.206**
B9	B9-1.5-2			1.5-2	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	NA	NA	<0.054
B10	B10-1-3			1-3	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	NA	NA	<0.056
B11	B11-0-3	Farallon	3/14/2002	0-3	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	NA	NA	<0.053
B12	B12-0-1			0-1	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055	NA	NA	<0.055
B13	B13-0-3	Farallon	3/13/2002	0-3	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	0.1	NA	NA	**0.1**
B14	B14-2-3			2-3	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	NA	NA	<0.054
B15	B15-0-3	Farallon	3/14/2002	0-3	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	0.057	NA	NA	**0.057**
B16	B16-0-1.5			0-1.5	<0.058	<0.058	<0.058	0.12	<0.058	0.13	0.15	NA	NA	**0.4**
B17	B17-0-3			0-3	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	0.06	NA	NA	**0.06**
B18	B18-0-3			0-3	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	0.11	NA	NA	**0.11**
B19	B19-1.5-3	Farallon	3/13/2002	1.5-3	<0.052	<0.052	<0.052	<0.052	<0.052	0.14	<0.052	NA	NA	**0.14**
Most Stringent Screening Level[a]					--	--	--	--	--	--	--	--	--	**0.1**

SoundEarth Strategies

Table 7
Summary of Soil Analytical Results for PCBs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[2]	Polychlorinated Biphenyls[1] (milligrams/kilogram)									
					Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs[3]
MW1	MW1-3-4.5	Farallon	3/18/2002	3-4.5	<0.057	<0.057	<0.057	<0.057	<0.057	<0.057	<0.057	NA	NA	<0.057
	MW1-5-6.5			5-6.5	<0.053	<0.053	<0.053	0.068	<0.053	<0.053	<0.053	NA	NA	**0.068**
	MW1-7.5-9			7.5-9	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070	NA	NA	<0.070
MW2	MW2-2-4			2-4	<0.063	<0.063	<0.063	<0.063	<0.063	0.091	<0.063	NA	NA	**0.091**
MW3	MW3-2.5-4			2.5-4	<0.057	<0.057	<0.057	<0.057	<0.057	<0.057	<0.057	NA	NA	<0.057
SB-1N	SB-1N	Farallon	1/8/2004	5-8	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	NA	NA	<0.053
SB-3N	SB-3N			8-12	<0.068	<0.068	<0.068	<0.068	<0.068	0.084	<0.068	NA	NA	**0.084**
SB-3S	SB-3S	Farallon	1/9/2004	6-8	<0.064	<0.064	<0.064	<0.064	<0.064	<0.064	<0.064	NA	NA	<0.064
SB-4S	SB-4S			6-8	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
MW-1D	MW1D-5-6.0	Pacific Crest	6/2/2008	5.0-6.0	<0.056	<0.056	<0.056	<0.056	<0.056	0.057	<0.056	<0.056	<0.056	**0.057**
MW-2D	MW2D-6-6.5			6.0-6.5	<0.061	<0.061	<0.061	<0.061	<0.061	0.34	0.33	<0.061	<0.061	**0.67**
MW-3D	MW3D-8	Pacific Crest	5/30/2008	8	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.54
MW-4D	MW4D-6.5			6.5	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052
Most Stringent Screening Level[a]					--	--	--	--	--	--	--	--	--	**0.1**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8082.

[2]Depth measured in feet below ground surface.

[3]PCBs are calculated by summing the detected PCB concentrations.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

-- = not applicable

< = analyte not detected at or above the reporting limit

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

NA = not analyzed

Pacific Crest = Pacific Crest Environmental, LLC

PCBs = polychlorinated biphenyls

Riley Group = The Riley Group, Inc.

Table 8
Summary of Groundwater
Analytical Results for GRPH, DRPH, and ORPH
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Well Depth[1]	Total Petroleum Hydrocarbons (micrograms/liter)		
					GRPH[2]	DRPH[3]	ORPH[3]
Reconnaissance Groundwater							
B2(R)	B2(R)-W	Riley Group	8/3/2000	--	NA	**520**	**650**
B3(R)	B3(R)-W			--	NA	**520**	**1,600**
Shallow Zone Wells							
MW1	MW1	Farallon	3/27/2002	15	<100	<250	<400
	MW1-060508	Pacific Crest	6/5/2008		<100	<280	<450
MW2	MW2	Farallon	3/27/2002	15	NA	**2,700**	**4,900**
	MW2	Pacific Crest	6/4/2008		Not Sampled - Well inaccessible		
MW3	MW3	Farallon	3/27/2002	15	NA	<250	<400
	MW3		11/5/2003		NA	**280**	<410
	MW3020604-01		2/6/2004		NA	**370**	**550**
	GW1-051204-01		5/12/2004		NA	<250	<410
	MW3-082004		8/20/2004		NA	**320**	<400
	MW3-060908	Pacific Crest	6/9/2008		NA	<260	<420
MW4	MW4	Farallon	3/27/2002	15	NA	<250	**820**
	MW4-060408	Pacific Crest	6/4/2008		<100	<270	<440
SB-3N	SB3-GW	Farallon	1/8/2004	--	NA	<260	<410
SB-1S	SB1-GW		1/9/2004	--	NA	<250	**480**
Deep Zone Wells							
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	<100	<260	<420
MW-2D	MW2D-060408			30	<100	<260	<410
MW-3D	MW-3D-060408			30	**850**	**1,000**	<430
MW-4D	MW4d-060408			30	<100	<280	<450
Most Stringent Screening Level[a]					**800/1,000[b]**	**500**	**500**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Depth measured in feet below ground surface.

[2]Analyzed by Method NWTPH-Gx.

[3]Analyzed by Method NWTPH-Dx.

[a]Groundwater, Method A–Human Health, Potable, WAC 173-340-720 (3)(b)(i), Table 720-1, November 2007.

[b]800 µg/L when benzene is present and 1,000 µg/L when benzene is not present.

< = analyte not detected at or above the reporting limit

-- = not measured

µg/L - micrograms per liter

DRPH = diesel-range petroleum hydrocarbons

Farallon = Farallon Consulting, L.L.C.

GRPH = gasoline-range petroleum hydrocarbons

NA = not analyzed

NWTPH = Northwest Total Petroleum Hydrocarbon

ORPH = oil-range petroleum hydrocarbons

Pacific Crest = Pacific Crest Environmental, LLC

Riley Group = The Riley Group, Inc.

WAC = Washington Administrative Code

SoundEarth Strategies

Table 9
Summary of Groundwater Analytical Results for Dissolved Metals
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Well Depth[1]	Dissolved Metals[2] (micrograms/liter)												
					Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury[3]	Nickel	Selenium	Silver	Thallium	Zinc
Reconnaissance Groundwater																	
B2(R)	B2(R)-W	Riley Group	8/3/2000	--	<5.0	**3.6**	NA	<4.0	<10	<10	<10	<0.5	**21**	<5.0	NA	NA	**65**
B3(R)	B3(R)-W			--	<5.0	**3.9**	NA	<4.0	<10	<10	<10	<0.5	<20	**6.4**	NA	NA	**300**
SB-3N	SB3-GW	Farallon	1/8/2004	--	<5.0	<3.0	<10	<4.0	**26**	<10	**3.9**	NA	**93**	<5	<10	<1.0	<50
SB-1S	SB1-GW		1/9/2004	--	<5.0	**23**	<10	<4.0	<1.0	**29**	<1.0	NA	<20	**71**	<10	<1.0	<50
Shallow Zone Wells																	
MW1	MW1	Farallon	3/27/2002	15	NA	NA	NA	NA	NA	NA	<1.0	NA	NA	NA	NA	NA	NA
	MW1-060508	Pacific Crest	6/5/2008		<5.0	<3.0	NA	<4.0	**<10**	<10	<1.0	<0.50	<20	<5.0	NA	NA	**130**
MW2	MW2	Farallon	5/13/2002	15	NA	**13**	NA	<4.0	NA	NA	<1.0	<0.50	NA	NA	NA	NA	NA
	MW2		12/4/2002		NA	NA	NA	NA	NA	**39**	NA	NA	**7.2**	NA	NA	NA	<25
	MW2	Pacific Crest	6/4/2008		Not Sampled - Well Inaccessible												
MW3	MW3	Farallon	3/27/2002	15	NA	<3.0	NA	<4.0	**19**	NA	1.2	NA	NA	NA	NA	NA	NA
	MW3		11/5/2003		NA	NA	NA	NA	NA	<11	NA	NA	NA	NA	NA	NA	NA
	MW3020604-01		2/6/2004		NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA
	GW1-051204-01		5/12/2004		NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA
	MW3-082004		8/20/2004		NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA
	MW3-060908	Pacific Crest	6/9/2008		<5.0	**6.0**	NA	<4.0	<10	<10	<1.0	<0.50	<20	<7.5	NA	NA	<50
	DUP-060908				<5.0	**6.3**	NA	<4.0	**21**	<10	<1.0	<0.50	<20	<7.5	NA	NA	<50
MW4	MW4	Farallon	3/27/2002	15	NA	**5.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	MW4-060408	Pacific Crest	6/4/2008		<5.0	<3.0	NA	<4.0	**17**	<10	<1.0	<0.50	**30**	<7.5	NA	NA	<50
Deep Zone Wells																	
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	<5.0	<3.0	NA	<4.0	<10	<10	<1.0	<0.50	<20	<5.0	NA	NA	<50
MW-2D	MW2D-060408			30	<5.0	<3.0	NA	<4.0	<10	<10	<1.0	<0.50	<20	<5.0	NA	NA	<25
MW-3D	MW-3D-060408			30	<5.0	<3.0	NA	<4.0	<10	<10	<1.0	<0.50	<20	<5.0	NA	NA	<50
MW-4D	MW4D-060408			30	<5.0	<3.0	NA	<4.0	<10	<10	<1.0	<0.50	<20	<5.0	NA	NA	<50
Most Stringent Screening Level					**3.87**[a]	**0.2**[b]	**4**[c]	**0.21**[a]	**50**[d]	**7.3**[a]	**2.5**[a]	**0.1**[b]	**8.2**[a]	**5**[a]	**1.53**[e]	**1**[b]	**32.57**[f]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Depth in feet below ground surface.

[2]Analyzed by EPA Method 200.8.

[3]Analyzed by EPA Method 7470A.

[a]U.S. Environmental Protection Agency, Resource Conservation and Recovery Act, Lower Duwamish Waterway/Plant 2 Total Maximum Contaminate Load.

[b]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[c]Groundwater, State Board of Health, Maximum Contaminant Levels, WAC 173-340-720(3)(b)(ii)C.

[d]Groundwater, Method A–Human Health, Potable, WAC 173-340-720 (3)(b)(i), Table 720-1, November 2007.

[e]Groundwater to Sediment Protection, Washington State Department of Ecology, Cleanup Screening Levels, WAC 173-340-720(1)(c).

[f]Groundwater to Sediment Protection, Washington State Department of Ecology, Sediment Quality Standards, WAC 173-340-720(1)(c).

< = analyte not detected at or above the reporting limit

-- = not measured

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

NA = not analyzed

Pacific Crest = Pacific Crest Environmental, LLC

Riley Group = The Riley Group, Inc.

WAC = Washington Administrative Code

SoundEarth Strategies

Table 10
Summary of Groundwater Analytical Results for VOCs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Well Depth[2]	Volatile Organic Compounds[1] (micrograms/liter)															
					Acetone	Benzene	Carbon Disulfide	Chloroethane	Chloroform	cis 1,2-Dichloroethene	1,1-Dichloroethane	Ethylbenzene	Isopropylbenzene	Naphthalene	Tetrachloroethene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Xylenes
Reconnaissance Groundwater																			
B2(R)	B2(R)-W	Riley Group	8/3/2000	--	NA	<1.0	NA	NA	NA	NA	NA	**15**	NA	NA	NA	**2.7**	NA	NA	**10.3**
B3(R)	B3(R)-W			--	NA	**2.7**	NA	NA	NA	NA	NA	**2.1**	NA	NA	NA	**3.1**	NA	NA	**10.9**
SB-3N	SB3-GW	Farallon	1/8/2004	--	<5.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	**2.0**	<0.20	<0.20	<0.60
SB-1S	SB1-GW			--	<5.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	**1.6**	<0.20	<0.20	<0.60
SB-4S	SB4-GW		1/9/2004	--	<5.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	**1.8**	<0.20	<0.20	<0.60
SB-5S	SB5-GW			--	<5.0	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	**0.89**	<0.20	<0.20	<0.60
Shallow Zone Wells																			
MW1	MW1	Farallon	3/27/2002	15	<5.0	NA	<0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	**0.69**	<0.20	<0.20	<0.20	<0.6
	MW1-060508	Pacific Crest	6/5/2008		<5.0	<0.2	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<1.1	<1.0	<0.20	<0.20	<0.6
MW2	MW2	Farallon	3/27/2002	15	<5.0	NA	<0.20	<0.20	<0.20	**0.24**	<0.20	**0.4**	<0.20	**140**	<0.20	**0.27**	**1**	**0.31**	**1.41**
	MW2	Pacific Crest	6/4/2008																
MW3	MW3	Farallon	3/27/2002	15	**15**	NA	<0.20	**0.51**	<0.20	<0.20	**2.2**	<0.20	<0.2	**49**	<0.20	<0.20	<0.20	<0.20	<0.6
	MW3-060908	Pacific Crest	6/9/2008		<5.0	<0.2	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	**36**	<0.20	<1.0	**0.21**	<0.20	**0.3**
MW4	MW4	Farallon	3/27/2002	15	<5.0	NA	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.6
	MW4-060408	Pacific Crest	6/4/2008		<5.0	<0.2	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<5.5	<0.20	<1.0	<0.20	<0.20	<0.6
Deep Zone Wells																			
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	<5.0	<0.2	<0.20	<1.0	<0.20	<0.20	<0.20	<0.20	<0.20	<1.0	<0.20	<1.0	<0.20	<0.20	<0.6
MW-2D	MW2D-060408			30	<5.0	<0.2	**1.6**	<1.0	**0.45**	<0.20	<0.20	<0.20	**0.6**	**18**	<0.20	<1.0	<0.20	<0.20	<0.6
MW-3D	MW-3D-060408			30	<5.0	<0.2	<0.20	<1.0	<0.20	<0.20	**0.46**	**0.21**	<0.20	**360**	<0.20	<1.0	**1.3**	**0.4**	**0.9**
MW-4D	MW4D-060408			30	<5.0	<0.2	<0.20	<1.0	**1.5**	<0.20	**0.26**	<0.20	<0.20	<1.0	<0.20	<1.0	<0.20	<0.20	<0.6
Most Stringent Screening Level					**6,000[a]**	**1[b]**	**800[c]**	**21,000[d]**	**4.3[d]**	**70[e]**	**1[f]**	**700[g]**	**800[c]**	**53.80[h]**	**0.021[d]**	**1,000[g]**	**0.2[b]**	**45[d]**	**1,000[g]**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

* Unknown, assumed collected from shallow groundwater zone.

[1]Analyzed by EPA Method 8260B.

[2]Depth in feet below ground surface.

[a]Groundwater Method A–Human Health, Potable, ARAR, WAC 173-340-720(3)(b)(ii).

[b]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[c]Groundwater, Method B–Human Health, Non-Carcinogen/Potable, WAC 173-340-720(4)(b)(iii)(A), CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[d]EPA, Resource Conservation and Recovery Act, Lower Duwamish Waterway/Plant 2 Total Maximum Contaminate Load.

[e]Groundwater ARAR, State Primary Maximum Contaminant Level, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[f]Groundwater, State Quality Criteria ARAR, WAC 173-340-720(3)(b)(ii) and WAC 173-200-040(3).

[g]Groundwater, Method A–Human Health, Potable, WAC 173-340-720 (3)(b)(i), Table 720-1, November 2007.

[h]Groundwater to Sediment Protection, Washington State Department of Ecology, Sediment Quality Standards, WAC 173-340-720(1)(c).

< = analyte not detected at or below reporting limit

-- = not measured/not applicable

ARAR's = Applicable or Relevant and Appropriate Requirements

Ecology = Washington State Department of Ecology

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

NA = not analyzed

Pacific Crest = Pacific Crest Environmental, LLC

Riley Group = The Riley Group, Inc.

VOCs = volatile organic compounds

WAC = Washington Administrative Code

Table 11
Summary of Groundwater Analytical Results for SVOCs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Well Depth[2]	Semivolatile Organic Compounds[1] (micrograms/liter)															
					Acenaphthene	Acenaphthylene	Anthracene	Benzo(g,h,i) perylene	Carbazole	Dibenzofuran	Fluoranthene	Flourene	1- Methylnaphthalene	2- Methylnaphthalene	Naphthalene	Nitrobenzene	Pentachlorophenol	Phenanthrene	Pyrene
Reconnaissance Groundwater																			
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	<0.10	<0.10	<0.10	<0.10	NA	NA	<0.10	<0.10	<0.10	<0.10	<0.10	NA	NA	<0.10	<0.10
SB-3N	SB3-GW	Farallon	1/8/2004	--	<0.10	<0.10	<0.10	<0.010	NA	NA	<0.10	<0.10	<0.10	<0.10	<0.10	NA	<4.8	<0.10	<0.10
SB-1S	SB1-GW	Farallon	1/9/2004	--	<0.094	<0.094	<0.094	**0.028**	NA	NA	<0.094	<0.094	<0.094	<0.094	<0.094	NA	<4.7	<0.094	<0.094
SB-4S	SB4-GW	Farallon	1/9/2004	--	<0.094	<0.094	<0.094	<0.0094	NA	NA	<0.094	<0.094	<0.094	<0.094	<0.094	NA	<4.7	<0.094	<0.094
Shallow Zone Wells																			
MW1	MW1	Farallon	3/27/2002	15	**3.8**	<0.50	<0.50	<0.01	NA	NA	<0.50	**1**	**1.9**	**3.8**	**2.7**	NA	NA	<0.50	<0.50
	MW1-060508	Pacific Crest	6/5/2008		<0.10	<0.10	<0.10	<0.010	<1.0	<1.0	NA	<0.10	<0.10	<0.10	<0.10	<1.0	NA	<0.10	NA
MW2	MW2	Farallon	3/27/2002	15	**13**	**0.92**	**5.7**	**7**	NA	NA	**24**	**9.7**	**8.4**	**11**	**41**	NA	NA	**29**	**24**
MW3	MW3	Farallon	3/27/2002	15	**5**	<0.50	<0.50	**0.05**	NA	NA	<0.50	**1.5**	**1.1**	**0.67**	**17**	NA	NA	<0.50	<0.50
	MW3-060908	Pacific Crest	6/9/2008		**2**	<0.1	**0.25**	<0.010	<0.96	<0.96	<0.1	**0.26**	**1.1**	**0.51**	**12**	**2.1**	NA	<0.1	<0.1
MW4	MW4	Farallon	3/27/2002	15	<0.50	<0.50	<0.50	<0.013	NA	NA	<0.50	<0.50	<0.50	<0.50	<2.50	NA	NA	<0.50	<0.50
	MW4-060408	Pacific Crest	6/4/2008		<0.10	<0.1	<0.10	<0.010	<1.0	<1.0	<0.1	<0.10	<0.1	<0.1	<1.0	<1.0	NA	<0.10	<0.1
Deep Zone Wells																			
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	**0.2**	<0.1	<0.10	<0.010	<1.0	<1.0	<0.1	<0.10	<0.10	<0.10	<0.10	<1.0	NA	<0.10	<0.1
MW-2D	MW-2D-060408			30	**18**	**0.14**	**2.2**	**0.035**	**2.7**	**7.5**	**4.6**	**10**	**6.7**	**6.7**	**17**	<1.0	NA	**21**	**3**
MW-3D	MW-3D-060408			30	**60**	**0.48**	**3.1**	<0.010	**17**	**29**	**13**	**34**	**28**	**48**	**280**	<1.0	NA	**61**	**7.2**
MW-4D	MW-4D-060408			30	<0.10	<0.1	<0.10	<0.010	<1.0	<1.0	<0.1	<0.10	<0.10	<0.10	<0.10	<1.0	NA	**0.11**	<0.1
Most Stringent Screening Level					**2.61**[a]	**10.78**[a]	**10.78**[a]	**0.1**[b]	**1**[b]	**1.33**[a]	**2.26**[a]	**2.04**[a]	**1.5**[c]	**18.18**[a]	**53.80**[a]	**16**[d]	**0.219**[c]	**4.81**[a]	**9.8**[e]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8270D/SIM.

[2]Depth in feet below ground surface.

[a]Groundwater to Sediment Protection, Washington State Department of Ecology, Sediment Quality Standards, WAC 173-340-720(1)(c).

[b]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[c]Groundwater, Method B–Human Health, Carcinogen/Potable, WAC 173-340-720(4)(b)(iii)(B), CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[d]Groundwater, Method B–Human Health, Non-Carcinogen/Potable, WAC 173-340-720(4)(b)(iii)(A), CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[e]U.S. Environmental Protection Agency, Resource Conservation and Recovery Act, Lower Duwamish Waterway/Plant 2 Total Maximum Contaminate Load.

< = analyte not detected at or above reporting limit
-- = not measured
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
Farallon = Farallon Consulting, L.L.C.
NA = not analyzed
Pacific Crest = Pacific Crest Environmental, LLC
SVOCs = semi-volatile organic compounds
WAC = Washington Administrative Code

SoundEarth Strategies

Table 12
Summary of Groundwater Analytical Results for cPAHs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Carcinogenic Polynuclear Aromatic Hydrocarbons (micrograms/liter)[1]							
				Benzo[a] anthracene	Chrysene	Benzo[b] fluoranthene	Benzo[k] fluoroanthene	Benzo[a] pyrene	Indeno[1,2,3,-cd] pyrene	Dibenz[a,h] anthracene	TEQ Concentration[2]
Reconnaissance Groundwater											
SB-3N	SB3-GW	Farallon	1/8/2004	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
SB-1S	SB1-GW		1/9/2004	0.015	0.018	0.017	0.015	0.02	0.014	<0.0094	**0.0268**
SB-4S	SB4-GW			<0.0094	<0.0094	<0.0094	<0.0094	<0.0094	<0.0094	<0.0094	**0.0071**
Shallow Zone Wells											
MW1	MW1	Farallon	3/27/2002	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**0.008**
	MW1-060508	Pacific Crest	6/5/2008	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
MW2	MW2	Farallon	3/27/2002	11	15	9.6	13	13	6.8	0.68	**17.258**
	MW2	Pacific Crest	6/4/2008	Not Sampled - Well inaccessible							
MW3	MW3	Farallon	3/27/2002	<0.10	0.14	0.074	0.072	0.084	0.05	0.021	**0.112**
	MW3-060908	Pacific Crest	6/9/2008	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
MW4	MW4	Farallon	3/27/2002	<0.023	0.031	0.018	0.017	<0.013	<0.013	<0.013	**0.013**
	MW4-060408	Pacific Crest	6/4/2008	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
Deep Zone Wells											
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
MW-2D	MW-2D-060408			0.22	0.22	0.13	0.036	0.088	0.033	0.015	**0.134**
MW-3D	MW-3D-060408			0.24	0.15	0.04	<0.010	0.02	<0.010	<0.010	**0.051**
MW-4D	MW-4D-060408			0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.008**
cPAH Toxicity Equivalent Fraction				**0.1**	**0.01**	**0.1**	**0.1**	**1**	**0.1**	**0.1**	--
Most Stringent Screening Level[a]				--	--	--	--	--	--	--	**0.1**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analzed by EPA Method 8270D SIM.

[2]Analytical result for each individual cPAH is multiplied by the TEF and all seven cPAH values are added. When analytical results are reported as less than the LRL, half of the LRL is used for the calculation.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

-- = not applicable

< = analyte not detected at or above reporting limit

cPAHs = carcinogenic polynuclear aromatic hydrocarbons

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

LRL = laboratory reporting limit

Pacific Crest = Pacific Crest Environmental, LLC

TEF = toxicity equivalency fraction

TEQ = toxicity equivalent

SoundEarth Strategies

Table 13
Summary of Groundwater Analytical Results for PCBs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Well Depth[2]	Polychlorinated Biphenyls[1] (micrograms/liter)									
					Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs[3]
Reconnaissance Groundwater														
SB-3N	SB3-GW	Farallon	1/8/2004	--	<0.051	<0.051	<0.051	<0.051	<0.051	0.48	<0.051	<0.051	<0.051	**0.48**
SB-1S	SB1-GW		1/9/2004	--	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	NA	NA	<0.047
Shallow Zone Wells														
MW1	MW-1	Farallon	3/27/2002	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05
	MW1-060508	Pacific Crest	6/5/2008		<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
MW2	MW-2	Farallon	3/27/2002	15	<0.05	<0.05	<0.05	0.15	<0.05	<0.05	0.13	NA	NA	**0.28**
	MW-2	Pacific Crest	6/4/2008		Not Sampled - Well Inaccessible									
MW3	MW-3	Farallon	3/27/2002	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA	<0.05
	MW3		11/5/2003		<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	NA	NA	<0.047
	MW3020604-01		2/6/2004		<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	NA	NA	<0.048
	GW1-051204-01		5/12/2004		<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	NA	NA	<0.047
	MW3-082004		8/20/2004		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA	NA	<0.10
	MW-3-060908	Pacific Crest	6/9/2008		<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
MW4	MW-4	Farallon	3/27/2002	15	<0.05	<0.05	<0.05	0.67	<0.05	0.17	0.11	NA	NA	**0.95**
	MW4-060408	Pacific Crest	6/4/2008		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Deep Zone Wells														
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
MW-2D	MW-2D-060408			30	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048	<0.048
MW-3D	MW-3D-060408			30	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
MW-4D	MW-4D-060408			30	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052
Most Stringent Screening Level[a]					--	--	--	--	--	--	--	--	--	**0.1**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8082.

[2]Depth measured in feet below ground surface.

[3]PCBs are calculated by summing the detected PCB concentrations.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

< = analyte not detected at or above reporting limit

-- = not applicable

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

NA = not analyzed

Pacific Crest = Pacific Crest Environmental, LLC

PCB = polychlorinated biphenyl

Table 14
Summary of Groundwater Analytical Results for Total Metals
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Well Depth[1]	Total Metals[2] (micrograms/liter)									
					Antimony	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury[3]	Nickel	Selenium	Zinc
Reconnaissance Groundwater														
SB-3N	SB3-GW	Farallon	1/8/2004	--	NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA
SB-1S	SB1-GW		1/9/2004	--	NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA
Shallow Zone Wells														
MW1	MW1	Farallon	3/27/2002	15	**7.1**	<3.3	<4.4	**20**	**49**	**59**	<0.05	<22	<5.6	**500**
	MW1-060508	Pacific Crest	6/5/2008		<5.6	<3.3	<4.4	<11	<11	<1.1	<0.05	<22	<5.6	**150**
MW2	MW2	Farallon	3/27/2002	15	**56**	**220**	**12**	**140**	**810**	**2,100**	**2**	**240**	**34**	**2,000**
	MW2	Pacific Crest	6/4/2008		Not Sampled - Well Inaccessible									
MW3	MW3	Farallon	3/27/2002	15	**7.9**	**12.0**	<4.4	**58**	**140**	**89**	0.55	<22	**10**	**150**
	MW3		11/5/2003		NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA
	MW3020604-01		2/6/2004		NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA
	GW1-051204-01		5/12/2004		NA	NA	NA	NA	NA	NA	**0.50**	NA	NA	NA
	MW3-082004		8/20/2004		NA	NA	NA	NA	NA	NA	<0.50	NA	NA	NA
	MW3-060908	Pacific Crest	6/9/2008		<5.6	**15**	<4.4	<10	<11	<1.1	<0.5	<22	<7.5	<28
MW4	MW4	Farallon	3/27/2002	15	**5.6**	**8**	<4.4	**24**	**45**	**7**	<0.5	**37**	**33**	<56
	MW4-060408	Pacific Crest	6/4/2008		<5.6	<3.0	<4.4	**18**	<11	<1.1	<0.5	**32**	<10	<28
Deep Zone Wells														
MW-1D	MW-1D-060408	Pacific Crest	6/4/2008	30	<5.6	<3.3	<4.4	<11	<11	<1.1	<0.05	<22	<5.6	<28
MW-2D	MW-2D-060408			30	<5.6	**4**	<4.4	<11	<11	**1.4**	<0.5	<22	<5.0	<26
MW-3D	MW-3D-060408			30	<5.6	<3.3	<4.4	<11	<11	<1.1	<0.5	<22	<5.6	<28
MW-4D	MW-4D-060408			30	<5.6	<3.3	<4.4	<11	<11	<1.1	<0.5	<22	<5.6	<28
Most Stringent Screening Level					**3.87**[a]	**0.2**[b]	**0.21**[a]	**50**[c]	**7.3**[a]	**2.5**[a]	**0.1**[b]	**8.2**[a]	**5**[a]	**32.57**[d]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Depth measured in feet below ground surface.

[2]Analyzed by EPA Method 200.8.

[3]Analyzed by EPA Method 7470A.

[a]U.S. Environmental Protection Agency, Resource Conservation and Recovery Act, Lower Duwamish Waterway/Plant 2 Total Maximum Contaminate Load.

[b]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[c]Groundwater, Method A–Human Health, Potable, WAC 173-340-720 (3)(b)(i), Table 720-1, November 2007.

[d]Groundwater to Sediment Protection, Washington State Department of Ecology, Sediment Quality Standards, WAC 173-340-720(1)(c).

< = analyte not detected at or above reporting limit

-- = not measured

Ecology = Washington State Department of Ecology

EPA = U.S. Environmental Protection Agency

Farallon = Farallon Consulting, L.L.C.

Pacific Crest = Pacific Crest Environmental, LLC

WAC = Washington Administrative Code

SoundEarth Strategies

Table 15
Summary of Soil Analytical Results for VOCs
Duwamish Marine Center
6353 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[2]	Volatile Organic Compounds[1] (milligrams/kilogram)			
					Acetone	2-Butanone	Carbon Disulfide	Naphthalene
MW-1D	MW1d-5-6.0	Pacific Crest	6/2/2008	5.0-6.0	**0.1**	**0.021**	**0.0069**	**0.0021**
MW-2D	MW2d-6-6.5			6.0-6.5	<0.0058	<0.0058	<0.0012	<0.0012
MW-3D	MW3d-8		5/30/2008	7.5-8.0	**0.019**	<0.0053	<0.0011	0.023
MW-4D	MW4d-6.5			6.0-6.5	**0.021**	<0.0061	<0.0012	<0.0012
Most Stringent Screening Level					**1.73[a]**	**1.376[b]**	**8,000[b]**	**0.002[c]**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8260B.

[2]Depth measured in feet below ground surface.

[a]Screening level obtained from Ecology worksheet titled "Most Stringent Levels W-O PSW," as requested in Comment #2(b) in Ecology letter dated March 6, 2012.

[b]Soil, Method B, Human Health, Groundwater Protection, Non-Carcinogenic, WAC 173-340-740(3)(b)(iii)(A), Equation 747-1/747-2 Saturated Soil, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[c]Friedman & Bruya, Inc. laboratory practical quantitation limit.

< = analyte not detected at or above reporting limit
CLARC = Cleanup Levels and Risk Calculations
EPA = U.S. Environmental Protection Agency
Farallon = Farallon Consulting, L.L.C.
NA = not analyzed
Pacific Crest = Pacific Crest Environmental, LLC
VOCs = volatile organic compounds
WAC = Washington Administrative Code

SoundEarth Strategies

Table 16
Summary of Sediment Analytical Results for DRPH and ORPH
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Sample Depth[1]	Total Petroleum Hydrocarbons[2] (milligrams/kilogram)	
					DRPH	ORPH
Duwamish River Bank	RB-1	Pacific Crest	5/29/2008	0-1	<25	**84**
	RB-2			0-1	**29**	**200**
	RB-3			0-1	<26	**160**
	RB-4			0-1	<27	**110**
	RB-5			0-1	<27	**64**
Catch Basin #1	CB-1			0-1	**230**	**1,400**
Catch Basin #2	CB-2			0-1	**100**	**560**
Catch Basin #4	CB-4			0-1	**250**	**1,700**
Most Stringent Screening Level					**NE**	**NE**

NOTES:

Results in **bold** denote a detected concentration.

[1]Depth measured in feet below ground surface.

[2]Analyzed by NWTPH Method NWTPH-Dx.

< = analyte not detected at or above the reporting limit

DRPH = diesel-range petroleum hydrocarbons

NE = most stringent screening level not established

NWTPH = Northwest Total Petroleum Hydrocarbon

ORPH = oil-range petroleum hydrocarbons

Pacific Crest = Pacific Crest Environmental, LLC

SoundEarth Strategies

Table 17
Summary of Sediment
Analytical Results for SVOCs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Semivolatile Organic Compounds[1] (milligrams per kilogram)																		
				Acenaphthene	Acenaphthylene	Anthracene	Benzo[g,h,i]-perylene	bis(2-Chloroethoxy) methane	bis(2-Ethylhexyl) phthalate	Butyl- benzyl phthalate	Carbazole	Dibenzofuran	Di-n-butylphthalate	Dimethylphthalate	Flouranthene	Flourene	2-Methylnaphthalene	1-Methylnaphthalene	Naphthalene	Pentachlorophenol	Phenanthrene	Phenol	Pyrene
Duwamish River Bank	RB-1	Pacific Crest	5/29/2008	<0.0067	0.0067	<0.0067	**0.011**	<0.034	**0.041**	<0.034	<0.034	<0.034	<0.034	<0.034	**0.023**	<0.0067	<0.0067	<0.0067	<0.0067	<0.17	**0.016**	<0.034	**0.024**
	RB-2			**0.0073**	**0.017**	**0.052**	**0.13**	<0.035	**0.048**	**0.075**	<0.035	<0.035	<0.035	<0.035	**0.019**	**0.0078**	<0.0071	<0.0071	<0.0071	<0.18	**0.095**	<0.035	**0.2**
	RB-3			<0.0069	<0.0069	<0.0069	**0.019**	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034	**0.037**	<0.0069	<0.0069	<0.0069	<0.0069	<0.17	**0.021**	<0.034	**0.038**
	RB-4			<0.0071	<0.0071	**0.018**	**0.071**	<0.035	**0.056**	<0.035	<0.035	<0.035	<0.035	<0.035	**0.2**	<0.0071	<0.0071	<0.0071	<0.0071	<0.18	<0.0071	<0.035	**0.2**
	RB-5			**0.014**	**0.011**	**0.036**	**0.085**	<0.036	**0.1**	<0.036	<0.036	<3.6	<0.036	<0.036	**0.4**	**0.016**	**0.0091**	<0.0072	**0.015**	<0.18	**0.2**	<0.036	**0.3**
Catch Basin #1	CB-1			**0.062**	**0.1**	**1.2**	**0.6**	**0.064**	**1.9**	**1.2**	**0.39**	**0.13**	<0.041	**0.76**	**1.3**	**0.19**	**0.082**	<0.41	**0.091**	<0.21	**1.0**	**0.16**	**1.7**
Catch Basin #2	CB-2			**0.03**	**0.032**	**0.19**	**0.21**	<0.04	**0.16**	<0.4	**0.048**	<0.04	<0.04	<0.04	**0.4**	**0.045**	**0.016**	<0.008	**0.015**	<0.2	**0.016**	<0.040	**0.38**
Catch Basin #4	CB-4			**0.26**	**0.087**	**0.66**	**0.46**	<0.44	**2.7**	**0.39**	**0.41**	**0.23**	<0.044	<0.044	**3.9**	**0.35**	**0.15**	**0.087**	**0.11**	<0.22	**1.7**	<0.044	**3.6**
Most Stringent Screening Level				**0.05**[a]	**0.56**[b]	**0.96**[b]	**0.67**[a]	**0.008**[c]	**1.3**[a]	**0.063**[b]	**0.06**[c]	**0.54**[a]	**1.4**[a]	**0.071**[a]	**1.7**[b]	**0.54**[b]	**0.67**[a]	**0.01**[c]	**2.1**[a]	**0.36**[a]	**1.5**[a]	**0.42**[a]	**2.6**[a]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

Organic carbon value of 1% used for river bank samples based on site specific average total organic carbon values for upland soil.

Samples collected at ground surface or within 1-ft of ground surface.

[1]Analyzed by EPA Method 8270D/SIM.

[a]Sediment Management Standards/Sediment Quality Standards, WAC 173-340-760.

[b]Sediment Management Standards, Lowest Apparent Effects Threshold, WAC 173-340-760 (1988).

[c]Friedman & Bruya, Inc. laboratory practical quantitation limit.

< = analyte not detected at or above the reporting limit

Ecology = Washington State Department of Ecology

EPA = U.S. Environmental Protection Agency

NE = most stringent screening levels not established

Pacific Crest = Pacific Crest Environmental, LLC

SVOCs = semi-volatile organic compounds

WAC = Washington State Administrative Code

Table 18
Summary of Sediment Analytical Results for cPAHs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Carcinogenic Polynuclear Aromatic Hydrocarbons[1] (milligrams/kilogram)[1]							
				Benzo(a)pyrene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3,-cd) pyrene	Benzo(k) fluoranthene	Benzo(a) anthracene	Benzo(b) fluoranthene	TEQ Concentration[2]
Duwamish River Bank	RB-1	Pacific Crest	5/29/2008	0.0099	0.015	<0.0067	0.082	<0.0067	0.0088	0.016	**0.02073**
	RB-2			0.096	0.11	0.03	0.094	0.095	0.085	0.12	**0.1395**
	RB-3			0.017	0.031	<0.0069	0.016	0.012	0.014	0.034	**0.02491**
	RB-4			0.083	0.12	0.023	0.058	0.092	0.023	0.097	**0.1135**
	RB-5			0.11	0.16	0.027	0.075	0.011	0.099	0.12	**0.1448**
Catch Basin #1	CB-1			0.74	2.4	0.17	0.6	0.7	0.89	1.6	**1.164**
Catch Basin #2	CB-2			0.27	0.28	<0.0079	0.13	0.23	0.17	0.17	**0.3428**
Catch Basin #4	CB-4			0.61	1.8	0.15	0.41	0.56	1.2	1	**0.96**
Most Stringent Screening Level[a]				--	--	--	--	--	--	--	**0.062**

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8270D-SIM.

[2]Analytical result for each individual cPAH is multiplied by the TEF and all seven cPAH values are added. When analytical results are reported as less than the LRL, half of the LRL is used for the calculation.

[a]CERCLA 40 CFR 160, Human Health - Lower Duamish Waterway Beach Play & Clam Fishing.

< = analyte not detected at or above the reporting limit

-- = not applicable

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

cPAHs = carcinogenic polynuclear aromatic hydrocarbons

EPA = U.S. Environmental Protection Agency

Pacific Crest = Pacific Crest Environmental, LLC

TEFs = Toxicity Equivalency factors

TEQ = toxicity equivalent

Table 19
Summary of Sediment Analytical Results for VOCs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Volatile Organic Compounds[1] (milligrams/kilogram)									
				Acetone	2-Butanone	Carbon Disulfide	m,p,-Xylene	o-Xylene	Naphthalene	p-Isopropyltoluene	Total Xylenes	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene
Duwamish River Bank	RB-1	Pacific Crest	5/29/2008	--	--	--	--	--	--	--	--	--	--
	RB-2			--	--	--	--	--	--	--	--	--	--
	RB-3			--	--	--	--	--	--	--	--	--	--
	RB-4			--	--	--	--	--	--	--	--	--	--
	RB-5			--	--	--	--	--	--	--	--	--	--
Catch Basin #1	CB-1			**0.12**	**0.033**	**0.0073**	**0.0045**	**0.0042**	**0.0088**	**0.0035**	**0.0087**	**0.007**	**0.0031**
Catch Basin #2	CB-2			<0.00095	<0.0047	<0.00095	<0.0019	<0.00095	**0.00099**	<0.00095	<0.00285	<0.00095	<0.00095
Catch Basin #4	CB-4			**0.033**	**0.01**	<0.0013	**0.0028**	**0.0021**	**0.0049**	<0.0013	**0.0049**	**0.0038**	**0.002**
Most Stringent Screening Level				**0.5**[a]	**1.376**[b]	**5**[a]	**0.1**[a]	**0.05**[a]	**2.1**[c]	**0.05**[a]	**0.04**[d]	**0.05**[a]	**0.05**[a]

NOTES:

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8260B.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[b]CERCLA 40 CFR 160, Human Health - Lower Duamish Waterway Beach Play & Clam Fishing.

[c]Sediment Management Standards/Sediment Quality Standards, WAC 173-340-760.

[d]Sediment Management Standards, Lowest Apparent Effects Threshold, WAC 173-340-760 (1988).

< = analyte not detected at or above the reporting limit

-- = not analyzed

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

EPA = U.S. Environmental Protection Agency

NE = most stringent screening levels not established

Pacific Crest = Pacific Crest Environmental, LLC

VOCs = volatile organic compound

WAC = Washington Administrative Code

Table 20
Summary of Sediment Analytical Results for PCBs
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Polychlorinated Biphenyls[1] (milligrams/kilogram)									
				Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs[2]
Duwamish River Bank	RB-1	Pacific Crest	5/29/2008	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
	RB-2			<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	0.14	<0.053	<0.053	**0.14**
	RB-3			<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052	<0.052
	RB-4			<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053
	RB-5			<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054	<0.054
Catch Basin #1	CB-1			<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062	<0.062
Catch Basin #2	CB-2			<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060
Catch Basin #4	CB-4			<0.066	<0.066	<0.066	<0.066	<0.066	0.35	0.033	<0.066	<0.066	**0.68**
Most Stringent Screening Level[a]				--	--	--	--	--	--	--	--	--	**0.0022**

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 8082.

[2]PCBs are calculated by summing the detected PCB concentrations.

[a]Friedman & Bruya, Inc. laboratory practical quantitation limit.

< = analyte not detected at or above the reporting limit

-- = not applicable

EPA = U.S. Environmental Protection Agency

Pacific Crest = Pacific Crest Environmental, LLC

PCBs = polychlorinated biphenyls

Table 21
Summary of Sediment Analytical Results for Metals
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location ID	Sample ID	Sampled By	Sample Date	Metals[1] (milligrams/kilogram)								
				Arsenic	Cadmium	Chromium	Chromium (VI)[2]	Copper	Lead	Mercury	Nickel	Zinc
Duwamish River Bank	RB-1	Pacific Crest	5/29/2008	<10	<0.51	**19**	<1.0	**14**	<5.1	<0.25	**23**	**35**
	RB-2			<11	<0.53	**40**	<1.1	**66**	**66**	<0.27	**48**	**130**
	RB-3			<11	<0.52	**24**	<1.0	**69**	**60**	<0.26	**27**	**110**
	RB-4			<11	<0.53	**31**	<1.1	**27**	**26**	<0.27	**35**	**75**
	RB-5			<11	**1.6**	**43**	<1.1	**62**	**260**	<0.27	**37**	**280**
Catch Basin #1	CB-1			<12	**0.83**	**78**	<1.2	**150**	**160**	<0.31	**45**	**350**
Catch Basin #2	CB-2			<12	<0.60	**44**	<1.2	**87**	**45**	<0.30	**75**	**140**
Catch Basin #4	CB-4			**18**	**0.68**	**72**	<1.3	**190**	**140**	<0.33	**63**	**510**
Most Stringent Screening Level				**0.39**[a]	**3.7**[a]	**1.6**[a]	**5**[b]	**310**[a]	**40**[a]	**0.41**[c]	**140**[d]	**410**[c]

NOTES:

denotes concentration is above the most stringent screening level.

denotes reporting limit is above the most stringent screening level.

Results in **bold** denote a detected concentration.

[1]Analyzed by EPA Method 6010/7000.

[2]Hexavalent Chromium analyzed by EPA Method 3060A/7196A.

[a]CERCLA 40 CFR 160, Human Health - Lower Duamish Waterway Beach Play & Clam Fishing.

[b]Friedman & Bruya, Inc. laboratory practical quantitation limit.

[c]Sediment Management Standards/Sediment Quality Standards, WAC 173-340-760.

[d]Sediment Management Standards, Lowest Apparent Effects Threshold, WAC 173-340-760 (1988).

< = analyte not detected at or below reporting limit

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

EPA = U.S. Environmental Protection Agency

Pacific Crest = Pacific Crest Environmental, LLC

WAC = Washington Administrative Code

Table 22
Summary of Sediment Sampling Events
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location Name	Date Collected	Collection Depth (feet)	Event Name	Source
c-1	6/23/1995	0 to 4	Lone Star Northwest and Hardie Gypsum	Hartman 1995
c-2		0 to 5		
EST200	10/6/1997	Surface	Duwamish Waterway Sediment Characterization Study	NOAA 1998
EST197	10/7/1997			
EST199				
EST195	10/14/1997			
CH0028	10/16/1997			
CH0029				
EIT081	10/17/1997			
EST196	10/22/1997			
EIT079	11/4/1997			
EST198	11/13/1997			
205	6/23/1998	Surface	Puget Sound Sediment Sampling	Ecology 2000a
DR165	8/13/1998	Surface	EPA Site Inspection	Weston 1999
DR166				
DR103	8/18/1998			
DR104				
DR146	8/19/1998			
DR094	8/20/1998			
DR095				
DR097				
DR098				
DR099				
DR100				
DR101				
DR102				
DR096	9/2/1998			
DR147				
DR101	9/21/1998	0 to 2		
DR101		2 to 4		
3	11/28/1998	0 to 4	Hardie Gypsum Round 1	Spearman 1999
4				
5				
3	7/15/1999	0 to 3	Hardie Gypsum Round 2	Spearman 1999
4				
5.2				
C				
D				
E				
B1	8/26/1999	4 to 8	PSDDA Sediment Characterization	SEA 2000a, 2000b
S10		0 to 4		
S12				
S6				
S8				

Table 22
Summary of Sediment Sampling Events
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Location Name	Date Collected	Collection Depth (feet)	Event Name	Source
00		Surface	Sampling	Weston 2000
C5	8/27/2004	Surface	LDW RI Phase 2 Round 1	Winward 2005a
LDW-SS63	1/21/2005			
LDW-SS67	1/21/2005			
LDW-SS65	3/8/2005	Surface	LDW RI Phase 2 Round 2	Winward 2005b
LDW-SS71	3/15/2005			
LDW-SS69b	3/16/2005			
LDW-SS327	10/2/2006	Surface	LDW RI Phase 2 Round 3	Winward 2007b
LDW-SS328				
LDW-SS329				
LDW-SC201	2/10/2006	0 to 1.5	LDW RI Phase 2 Subsurface	Winward 2007a
LDW-SC201		1.5 to 4		
LDW-SC201		4 to 6		
LDW-SC201		8 to 10		
LDW-SC32		0 to 1		
LDW-SC32		1 to 2		
LDW-SC32		2 to 4		
LDW-SC32		5 to 8		
LDW-SC33		0 to o.5		
LDW-SC33		0.5 to 1		
LDW-SC33		0 to 2		
LDW-SC33		1 to 1.5		
LDW-SC33		1.5 to 2		
LDW-SC33		2 to 2.5		
LDW-SC33		2 to 4		
LDW-SC33		2.5 to 3		
LDW-SC33		4 to 6		
LDW-SC33		8 to 10		
LDW-SC31	2/16/2006	0 to 1		
LDW-SC31		1 to 3		
LDW-SC31		3 to 4		

NOTES:
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
Hartman = Hartman & Associates, Inc.
LDW = Lower Duwamish Waterway
NOAA = National Oceanic and Atmospheric Administration
PSDDA = Puget Sound Dredged Disposal Analysis
RI = Remedial Investigation
SEA = Striplin Environmental Associates, Inc.
Spearman = Spearman Engineering
Weston = Weston Solutions
Windward = WindWard Environmental, LLC

Table 23
Summary of Lower Duwamish Sediment Analytical Results
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Concentration (mg/kg OC)	Most Stringent Screening Level
Metals						
LDW RI Phase 2 Subsurface	LDW-SC201	2/10/2006	0-15	Lead	**772**[a]	40[c]
PAHs						
Puget Sound Sediment Sampling	205	6/23/1998	--	Benzo(g,h,i)perylene	**44**	**0.067**[b]
			--	Chrysene	**111**	**0.062**[c]
			--	Indeno(1,2,3,-cd)pyrene	**47**	
LDW RI Phase 2 Subsurface	LDW-SC32	2/10/2006	1-2	Acenaphthene	**121**	0.5[b]
	LDW-SC33		4-6		**48**	
	LDW-SC201		4-6		**33**	
	LDW-SC32		2-4		**20**	
	LDW-SC201		4-6	Fluoranthene	**235**	1.7[d]
	LDW-SC32		1-2		**216**	
			1-2	Fluorene	**164**	0.54[d]
	LDW-SC33		4-6		**30**	
	LDW-SC201		4-6		**24**	
	LDW-SC32		1-2	Phenanthrene	**319**	1.5[b]
LDW RI Phase 2 Subsurface	LDW-SC32	2/10/2006	1-2	Total LPAH (calc'd)	**647**	5.2[b]
Phthalates						
Puget Sound Sediment Sampling	205	6/23/1998	--	Butyl benzyl phthalate	**6.5**	**0.063**[d]
EPA Site Inspection	DR101	9/21/1998	2-4	Bis(2-ethylhexyl) phthalate	**60**	1.3[b]
LDW RI Phase 2 Subsurface	LDW-SC32	2/10/2006	1-2		**56**	
Other SVOCs						
Puget Sound Sediment Sampling	205	6/23/1998	--	Benzoic acid	**446**	**0.65**[b]
LDW RI Phase 2 Subsurface	DEW-SC32	2/10/2006	1-2	Dibenzofuran	**103**	0.54[b]
	LDW-SC33		4-6		**18**	
PCBs						
Puget Sound Sediment Sampling	205	6/23/1998	--	PCB Mixtures	**50**	**0.0022**[e]
EPA Site Inspection	DR103	8/18/1998	--		**15**	
	DR099	8/20/1998	--		**38**	
					38	
	DR100		--		**16**	
			--		**12**	
	DR098		--		**13**	
	DR147	9/2/1998	--		**15**	
			--		**23**	
PSDDA Phase 2 Subsurface	S12	8/26/1999	0-4		**28**	
	B1		4-8		**15**	
LDW RI Phase 2 Round 1	LDW-SS67	1/21/2005	--		**13**	
LDW RI Phase 2 Subsurface	LDW-SC33	2/10/2006	1-1.5		**186**	
			0-2		**93**	
			1.5-2		**103**	
	LDW-SC32		2-4		**167**	
			1-2		**148**	
	LDW-SC201		0-1.5		**77**	
	LDW-SC32		0-1		**56**	

Table 23
Summary of Lower Duwamish Sediment Analytical Results
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Event Name	Location Name	Date Collected	Sample Depth (feet)	Chemical	Concentration (mg/kg OC)	Most Stringent Screening Level
LDW RI Phase 2 Subsurface	LDW-SC33	2/10/2006	2.5-3	PCB Mixtures	**47**	**0.0022**[e]
			0.5'1		**37**	
LDW RI Phase 2 Subsurface	LDW-SC201	2/10/2006	1.5-4		**40**	
	LDW-SC33		0-0.5		**28**	
			2-4		**26**	
	LDW-SC31		0-1		**15**	
	LDW-SC201		4-6		**16**	
	LDW-SC31		1-2.8		**15**	
LDW RI Phase 2 Subsurface	LDW-SC33	2/10/2006	4-6		**13**	
LDW RI Phase 2 Subsurface	LDW-SC33	2/10/2006	2-2.5		**16**	
LDW RI Phase 2 Round 3	LDW-SS329	10/2/2006	--		**13**	

NOTES:

denotes concentration is above the most stringent screening level.

Results in **bold** denote detected concentrations.

Table presents detected chemicals only.

[a]Value represents Dry Weight.

[b]Sediment Management Standards/Sediment Quality Standards, WAC 173-340-760.

[c]CERCLA 40 CFR 160, Human Health - Lower Duamish Waterway Beach Play & Clam Fishing.

[d]Sediment Management Standards, Lowest Apparent Effects Threshold, WAC 173-340-760 (1988).

[e]Friedman & Bruya, Inc. laboratory practical quantitation limit.

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

mg/kg = milligrams per kilogram

OC = organic carbon normalized

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

SVOCs = semivolatile organic compounds

TOC = total organic carbon

LDW = Lower Duwamish Waterway

RI = Remedial Investigation

PSDDA = Puget Sound Dredged Disposal Analysis

WAC = Washington Administrative Code

Table 24
Summary of Data Gaps and Proposed Sampling Locations
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemicals of Potential Concern	Identified Data Gaps	Proposed Scope of Work To Address Data Gaps	Rationale for the Proposed Scope of Work
Soil and Groundwater			
PCB, SVOCs, PAHs and Metals	Nature and extent of COPCs at the former Marine Railway not defined (Parcel No. 4565 Lot 19).	Advance two borings (SB01 and SB02) to 20 feet bgs.	The suspected source area has not been fully characterized. COPCs have been identified in soil and and/or groundwater at concentrations exceeding the most stringent screening levels and/or select COPCs were not previously analyzed.
PCB, SVOCs, PAHs and Metals	Nature and extent of COPCs at the former American Pile Driving Company and the "junk" dealer not defined (Parcel No. 4565 Lot 14 an 15). The extent of aquitard between the Shallow and Deep Zones has not been determined.	Advance one boring to 20 feet bgs (SB04). Advance three borings to 30 feet bgs (SB03, SB05, and SB06). Install at Shallow Zone groundwater monitoring wells in borng SB06	The suspected source area has not been fully characterized. COPCs have been identified in soil and and/or groundwater at concentrations exceeding the most stringent screening levels. The aquitard separting the Shallow and Deep Zone has not be fully defined and may act as an impermeable barrier for vetrical migration of COPCs.
DRPH, ORPH, PCB, VOCs, SVOCs, PAHs and Metals	Nature and extent of COPCs in Equipment Wash Area (Parcel No. 3447).	Advance two boring to 20 feet bgs and install one Shallow Zone groundwater monitoring well (SB07/MW6 and SB08).	The suspected source area has not been fully characterized. A previous investigation identified COPCs at concentrations above the most stringent screening levels.
PCB, SVOCs, PAHs and Metals	Nature and extent of COPCs in Parcel No. 4560 not defined. An Ecology Water Compliance Inspection report identified the use of basic cleanup solution in tank this area of the parcel. Discharge from the tank was piped to the Slip 2.	Advance one boring to 20 feet bgs and install one Shallow Zone groundwater monitoring well (SB13/MW8)	The suspected source area has not been fully characterized. A previous investigation identified COPCs at concentrations above the most stringent screening levels.
PCB, VOCs, PAHs, and Metals	Boring for installation of groundwater monitoring well (Parcel 3415 Lot 5). Groundwater not previously characterized. The extent of aquitard between the Shallow and Deep Zones has not been determined	Advance one boring to 30 feet bgs and install one Shallow Zone groundwater monitoring well (SB09/MW7)	The suspected source area has not been fully characterized or select COPCs were not previously analyzed. The aquitard separting the Shallow and Deep Zone has not be fully defined and may act as an impermeable barrier for vetrical migration of COPCs.
DRPH, ORPH, PCB, VOCs, SVOCs, PAHs and Metals	Potential upgradient source and/or area background concentrations for COPCs in groundwater at the Site.	Advance two borings to 20 feet bgs and install two Shallow Zone groundwater monitoring well (SB10/MW9 and SB15/MW10). Advance two borings to 30 feet bgs and install two Deep Zone groundwater monitoring wells (SB11/MW-5D and SB12/MW-6D) in 1st Avenue South Right-of-Way.	The suspected upgradient sources for COPCs in the Shallow and Deep Zones groundwater beneath the Site may exist but have not been documented.
DRPH, ORPH, PCB, VOCs, SVOCs, PAHs and Metals	Extent of aquitard between the Shallow and Deep Zones has not been determined	Advance the boring to 30 feet bgs (SB16).	The aquitard may act impermeable barrier for vetrical migration of COPCs.
Sediments (catch basins, riverbank, and off-shore)			
VOCs, SVOCs, PCBs, SVOCs, PAHs, and Metals	Concentration of COPCs in previous riverbanks samples exceed the most stringent screening levels.	Collect six riverbanks samples (RB-6 through RB-11)	Locations of riverbanks samples collected during previous investigations cannot be verified, resampling is required to confirm COPCs.
DRPH, ORPH, PCB, VOCs, SVOCs, PAHs, and Metals	Concentrations of COPCs in catch basin samples exceed the most stringent Screening level.	Collect one sediment sample from catch basins CB01 through CB08 conveying stormwater to outfall Out1, and three sediment samples from the catch basins CB10 through CB12 conveying stormwater to Out3.	Confirm the concentrations of COPCs in catch basins CB01, CB02, and CB04, and collect samples from catch basins CB03, CB05, CB06, CB07, CB09, CB10, and CB11 and CB12
PCB, VOCs, SVOCs, PAHs, and Metals	Concentration of COPCs in subsurface sediments have not been evaluated off-shore of the Site.	Advance six sediment cores to a depth of 4 feet below mudline (SED01 through SED06). Cores will be advanced near the Michigan Street CSO and outfals OUT1 and 3 and offshore of the Former Burgess Enterprise	Off-shore subsurface sediment samples have not been collected previously.

Table 24
Summary of Data Gaps and Proposed Sampling Locations
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Seep Samples			
VOCs, SVOCs, PCBs, SVOCs, PAHs, and Metals	Seep samples have not been previously collected.	The number of seep samples to be collected is unknown since seeps have not been identified at the riverbanks.	Seep samples will be collected to evaluate groundwater quality discharging from the riverbank.

APPENDIX A

WASHINGTON STATE DEPARTMENT OF ECOLOGY RESPONSE LETTERS

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

June 1, 2005

Ms. Loren Carroll
Senior Hydrologist
Farralon Consulting
320 3rd. Avenue NE Suite 200
Issaquah, WA 98027

Dear Ms. Carroll,

RE: Duwamish Marine, Gilmur/Hale Trust Site

The Department cannot issue a No Further Action (NFA) letter for Duwamish Marine. From your first submission it has been clear that Duwamish Marine is a very difficult site. That is partially because it is on the Duwamish River and within the boundary of the Lower Duwamish River Superfund Site. Another and probably more important reason is that, except for the lead, there is no clear source of the contaminants found on Duwamish Marine's property. A site is defined in the Model Toxics Control Act (WAC 173-340-200) as where a hazardous substance has come to be located. Without a good idea of how the contaminants were released, it is impossible to determine the extent of the site, except perhaps by a truly exhaustive sampling regime. Also, the definition cited above prevents the Department from dividing a site and issuing a NFA for a portion of a site. In any case, it seems likely that contamination is present in adjacent Duwamish River sediments, and the Department cannot give NFA Letters for Sediments. River bank soils have not, for the most part, been characterized. Cleanup criteria for river bank soils depend on the carbon content of adjacent sediments which is unknown.

It has been suggested that the contamination could have arrived on the site as part of a river dredging and straightening project. The date of early dredging is given as 1927. PCBs were not in wide use at that time. If the contaminants arrived in later dredge materials, then the size of the site could be truly huge.

Sincerely,

John Keeling
Toxics Cleanup Program

JK:cu

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

July 6, 2006

Mr. Jim Gilmur
16 South Michigan Street
Seattle, WA 98108

Dear Mr. Gilmur:

Re: Further Action Determination under WAC 173-340-515(5) for the following Hazardous Waste Site:

- Name: Gilmur/Hale Family Trust (Duwamish Marine Center)
- Address: 6365 First Avenue South, Seattle, Washington 98108
- Facility/Site No.: 21945598
- VCP No.: NW0892

Thank you for submitting your independent remedial action report for the Gilmur/Hale Family Trust (Duwamish Marine Center) facility (Site) for review by the State of Washington Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP). Ecology appreciates your initiative in pursuing this administrative option for cleaning up hazardous waste sites under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding whether further remedial action is necessary at the Site to meet the substantive requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC. Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding the Site:

1. Phase / Environmental Audit, dated January 17, 2000, prepared by Environmental Associates, Incorporated;

2. Preliminary Phase II Subsurface Investigation, dated September 13, 2000, prepared by The Riley Group, Inc.;

3. Site Closure Report for the Gilmur/Hale Property, dated September 25, 2002, prepared by Farallon Consulting, LLC (Farallon);

4. Site Closure Report Addendum, dated January 23, 2003, prepared by Farallon

5. Report of Compliance Monitoring and Request for No Further Action Determination for Groundwater and Soil dated December 8, 2004, prepared by Farallon.

The documents listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact at 425-649-7190.

The Site is defined by the extent of contamination caused by the following release(s):

- PCBs in Soil
- Heavy Metals in Soil

The Site is more particularly described in Enclosure A to this letter, which includes a detailed Site diagram. The description of the Site is based solely on the information contained in the documents listed above.

Based on a review of the independent remedial action report and supporting documentation listed above, **Ecology has determined that the independent remedial action(s) performed at the Site are not sufficient to meet the substantive requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing any of the contamination at the Site.** Therefore, pursuant to WAC 173-340-515(5), Ecology is issuing this opinion that **further remedial action is necessary** at the Site under MTCA.

An interim action has been taken to remove lead contaminated soils. Soil and groundwater has been sampled. No sediment sampling or cleanup activities have occurred. The primary reason Ecology feels that further action is necessary is because of the sediments. Sediments are governed by Chapter 173-204 WAC, the Sediment Management Standards in addition to Chapter 173-340, the Model Toxics Control Act. The Sediment Management Standards do not allow Ecology to issue No Further Action letters under the Voluntary Cleanup Program. Additionally, Ecology considers it likely that it will take further action under Chapter 173-204 WAC for the sediments portion of the site.

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or performed at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me at 425-649-7052.

Sincerely,

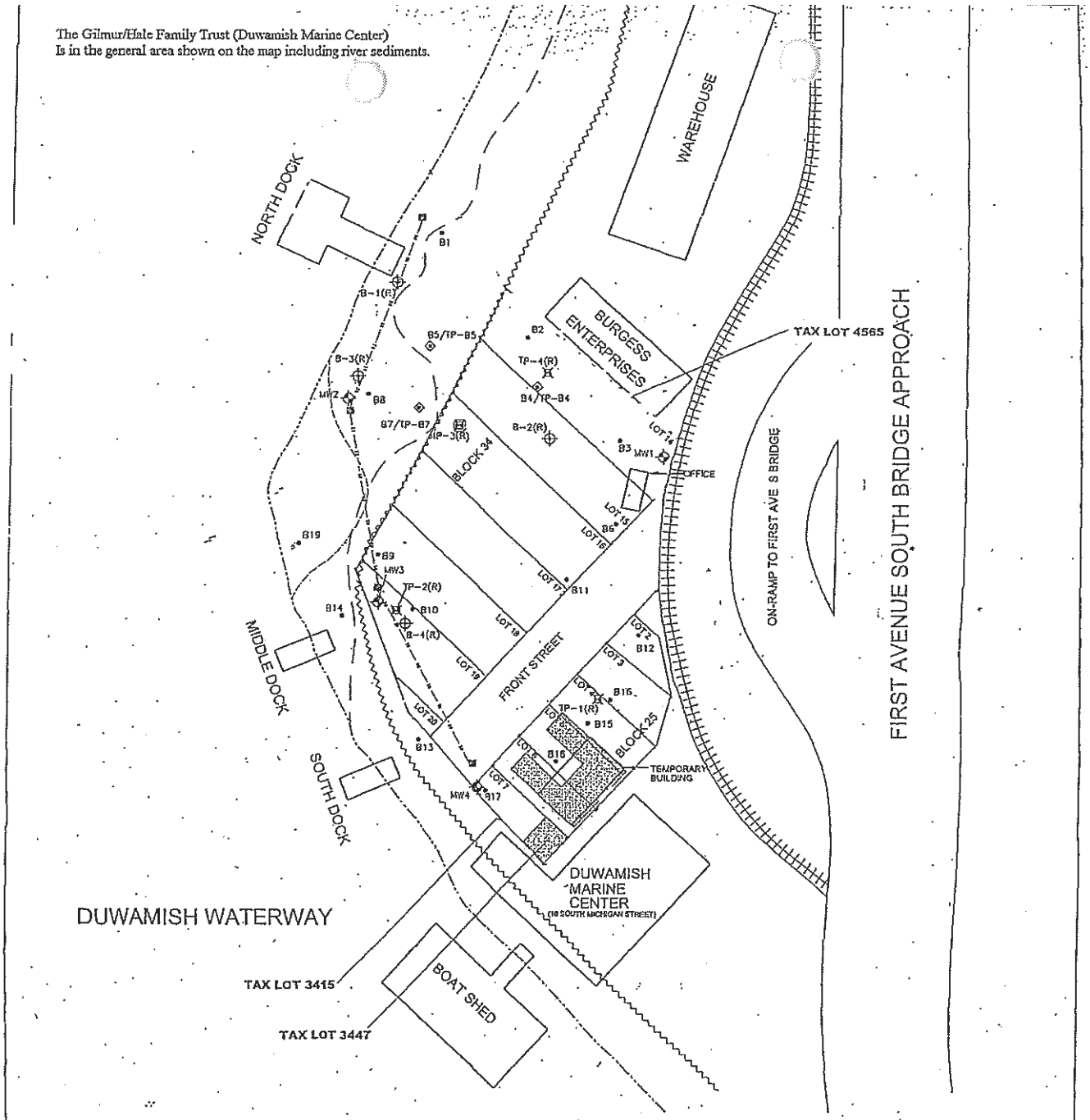
John Keeling
NWRO Toxics Cleanup Program

JK:nr

Enclosures

cc: Mark Edens, Department of Ecology
Dale Myers, Department of Ecology
Lauren G. Carroll, Pacific Crest Environmental, LLC

The Gilmur/Hale Family Trust (Duwamish Marine Center)
Is in the general area shown on the map including river sediments.



LEGEND

TP-1(R) — TEST PIT 7/17/2000 (THE RILEY GROUP)	CONCRETE PADS
B-1(R) — BORING 8/3/2000 (THE RILEY GROUP)	CATCH BASIN AND DRAINAGE LINE
B1 — BORING 3/13-14/2002 (FARALLON)	
MW-4 — MONITORING WELL 3/18/2002 (FARALLON)	APPROXIMATE CURRENT SHORELINE
TP-B7 — TEST PIT 5/13/02 (FARALLON)	APPROXIMATE SHORELINE 1982
TP-3(R) — TEST PIT IN AREA EXCAVATED FOR INTERIM ACTION	APPROXIMATE SHORELINE 1966
AREA EXCAVATED FOR INTERIM ACTION MAY 2002	APPROXIMATE SHORELINE 1924/1936
	LOT 19 — LOT BOUNDARY AND LOT NUMBER

Taken From Figure 2
By Farallon Consulting
10/28/03

0 100 200
APPROXIMATE SCALE IN FEET

N

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

MEMORANDUM

TO: Site File

FROM: Mark Edens, TCP-NWRO

DATE: March 29, 2007

SUBJECT: Gilmur/Hale Family Trust Site (Duwamish Marine Center) VCP I.D. # NW1646

The purpose of this memorandum is to document the concerns regarding this site pursuant to reassignment to a new site reviewer. A draft opinion letter was prepared for this site, however after the applicant's representatives became aware of the contents of the letter they requested that it not be sent. This memorandum documents what was reviewed for this site and the opinions of the previous reviewer regarding additional site work that is needed.

Database information on this site is as follows:

- Name: Gilmur/Hale Family Trust Site
- Address: 6365 First Avenue South, Seattle, WA 98108
- Facility/Site No.: 21945598
- VCP No.: NW1646

The applicant requested an opinion letter regarding their proposed remedial action at the site. Their proposal included capping of the site and providing drainage controls. A restrictive covenant would also be executed to protect and maintain the cap and to prohibit the extraction of groundwater for potable uses

The site is located adjacent to the Lower Duwamish Waterway (LDW). Sediment in the LDW is currently undergoing cleanup as a CERCLA site with USEPA as the lead agency. Ecology is the lead agency for source control efforts to prevent continued contamination of LDW sediments from upland contaminated sites. Ecology's source control strategy identified four early action areas on the LDW. These areas have associated upland sites that have the highest priority for cleanup. The Gilmur/Hale Family Trust Site (the Site) has not been included among these high priority sites and the Site has been allowed to continue in the VCP. If the Site is found to be contributing significant levels of contamination to the LDW, it will be considered for formal site status.

The following information was reviewed to prepare the draft opinion letter:

1. Phase 1 Environmental Audit Three (3) Tax Parcels Covering a Total of Approximately 2.79 Acres, 6365 First Avenue South, Seattle, Washington 98108, prepared by Environmental Associates, Inc. on January 17, 2000.

2. Preliminary Phase II Subsurface Investigation, Duwamish Marine Center Property, 6365 First Avenue South, Seattle, Washington 98108, prepared by the Riley Group, Inc. on September 13, 2000.

3. Site Closure Report, Gilmur/Hale Family Trust Site, prepared by Farallon Consulting on September 25, 2002.

4. Site Closure Report Addendum – Response to Comments Gilmur/Hale Family Trust Site, prepared by Farallon Consulting on January 23, 2003.

5. Report of compliance Monitoring and Request for No Further Action Determination for Groundwater and Soil, Gilmur Hale Family Trust Site, prepared by Farallon Consulting on December 8, 2004.

6. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated October 28, 2002, providing comments on the Site Closure Report.

7. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated March 5, 2003, indicating that Ecology cannot issue a no further action letter for groundwater or sediments for the Site and requesting additional site information.

8. Letter from Lauren Carroll of Farallon Consulting to John Keeling of Ecology dated June 30, 2003, summarizing unresolved Site issues and requesting that Ecology conduct further review and evaluation of these issues to facilitate the issuing of a no further action letter for the Site.

9. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated August 11, 2003, indicating that Ecology was prepared to issue an NFA for the site following implementation of proposed capping and institutional controls, stating that area background in Duwamish sediments cannot be applied to Site soils, stating that monitoring well MW-3 is an acceptable point of compliance for groundwater flowing to surface water at the Site, stating that four consecutive quarters of groundwater monitoring at MW-3 would be adequate to show groundwater compliance, and stating that the use of the fats, oils, and grease test and limits would not be suitable for MTCA compliance at the site.

10. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated June 1, 2005, indicating that Ecology cannot issue an NFA for the Site

because of the complex nature of the Site, the inability of Ecology to issue an NFA for a portion of the Site, and the lack of characterization of riverbank soils.

11. Letter from Lauren Carroll of Pacific Crest Environmental, LLC to Mark Edens of Ecology dated April 28, 2006, requesting an advisory opinion from Ecology that proposed risk-based remedial actions are likely to be sufficient to meet the substantive requirements of MTCA.

12. Letter from John Keeling of Ecology to Mr. Jim Gilmur dated July 6, 2006, indicating that further action is necessary to address sediments at the site.

13. E-mail communication from Lauren Carroll of Pacific Crest Environmental, LLC to Dale Myers of Ecology dated July 11, 2006, requesting a meeting with Ecology, requesting that Ecology rescind the opinion letter issued by John Keeling on July 6, 2006, and requesting involvement of the Washington State Attorney General's office in reviewing Site issues.

Soil contamination on the Site includes total petroleum hydrocarbons (diesel and oil range; TPH-D and TPH-O, respectively), polychlorinated biphenyls (PCBs), cadmium, lead, and total carcinogenic polycyclic aromatic hydrocarbons (total cPAHs). Groundwater contamination on the Site includes TPH-D, TPH-O, arsenic, total cPAHs, benzo(a)pyrene, and PCBs. The total cPAHs, benzo(a)pyrene, and PCBs might have been detected in groundwater because the samples were turbid.

The proposed remedial action for the Site was determined to not likely be sufficient to meet the substantive requirements of MTCA. The Site needs to be adequately characterized in accordance with WAC 173-340-350 before a determination can be made regarding the adequacy of the proposed cleanup action. Additional necessary site characterization includes:

1. **Riverbank** – Sampling and testing of the riverbank has not been done and the composition of the riverbank has not been determined. A plan for sampling and testing soils along the riverbank and for characterizing the riverbank needs to be developed and implemented. Riverbank sampling, testing, and characterization needs to include areas that are owned by the Gilmur/Hale Family Trust and areas that are or were associated with Site activities.

2. **Sediment** – No sampling and testing has been done of sediment in the LDW, Slip 2, or in catch basins located on the Site. A plan for sampling and testing sediments needs to be developed and implemented. Sediment sampling and testing needs to include sediment areas that are owned by the Gilmur/Hale Family Trust and sediment areas that are or were associated with Site activities. The existing surface water system including piping, catch basins, and outfall needs to be mapped. If the outfall for this system is in the LDW or Slip 2, all of the catch basins need to be sampled and tested and the sediment in the vicinity of the outfall needs to be sampled and tested.

3. **Groundwater** – Previous communications from Ecology (letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated August 11, 2003) indicated that groundwater monitoring well MW-3 would be an acceptable point of compliance and that four quarters of clean groundwater sampling and testing in MW-3 would be sufficient to demonstrate compliance. Unfortunately this opinion did not consider the fact that groundwater sampling was performed at high tide. This previous opinion also did not consider the initial detections of TPH-D, TPH-O, arsenic, benzo(a)pyrene, total cPAHs, and PCBs in monitoring well MW-2 or the initial detection of TPH-O in monitoring well MW-4. A tidal study needs to be completed on all Site monitoring wells to determine when optimum groundwater flow occurs from the Site to the LDW or Slip 2. Additional groundwater monitoring in all down gradient monitoring wells during optimum groundwater flow conditions is necessary to demonstrate compliance with MTCA cleanup levels.

4. **Upland Soils** – Some areas of the Site were not sampled and tested because they are not owned by the Gilur/Hale Family Trust. Rights-of-way and properties that were or are part of operations may be considered part of the Site, depending on where contamination has come to be located. These areas need to be identified and appropriate sampling and testing needs to be planned and implemented. The proposed cleanup action includes capping of the site with institutional control. The institutional control would include a restrictive covenant that protects and maintains the cap and that prohibits the extraction of groundwater for potable uses. The proposed capping of the site does not include removal of soils contaminated with PCBs, TPH-D, TPH-O, cadmium, chromium, and total cPAHs. Cleanup standards for these contaminants cannot be determined until the additional investigations of the riverbank, sediments, and groundwater are completed. When cleanup standards are established, some of these contaminants might be found to exceed the standards. Further, WAC 173-340-360(2)(e)(iii) states that cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of a site. To leave soil contaminants on the site in excess of cleanup standards, it will be necessary to demonstrate that it is not technically feasible to cleanup the contaminated soils or it will be necessary to complete a disproportionate cost analysis in accordance with WAC 173-340-360(3)(e).

Site conditions and the proposed cleanup were evaluated by the NWRO Toxics Cleanup Program Section Manager and by staff who are involved in LDW sediment cleanup and source control efforts. This evaluation was done to determine if the Site should remain in the VCP or if it should be managed as a formal site under an agreed order. The Section Manager and staff agreed that since there was no current sediment or riverbank information available for the site, that there was not enough information available at this time to make a determination. When additional Site sediment and riverbank sampling and testing becomes available, the information should be reevaluated by the LDW team to determine if this Site may remain in the VCP or must be managed as a formal site.

Adams, Mark (ECY)

From: Adams, Mark (ECY)
Sent: Monday, April 07, 2008 7:01 AM
To: 'William Carroll'
Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Bill:

Yes the work plan is approved with the inclusion of the amended scope in the email. Please forward a revised final Work Plan for our records.

Thanks.

Mark Adams

Toxics Cleanup Program
Northwest Regional Office
WA Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
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ph (425) 6497107
fax (425) 649-7098
MADA461@ecy.wa.gov

From: William Carroll [mailto:wcarroll@arrowenv.com]
Sent: Friday, April 04, 2008 2:23 PM
To: Adams, Mark (ECY)
Cc: 'Lauren Carroll'; 'Chuck Wolfe'
Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Mark:

I understand your qualifications and appreciate that some issues continue to be in flux. With regard to the issue of PCBs, we did include analysis of PCB in soil, catch basin sediment and groundwater samples collected as part of the proposed scope of work. Previous investigations also analyzed samples for PCBs.

Does your email mean that the Work Plan is approved and we can proceed with the scope as amended in the email?

William Carroll | Tel: (425) 888-4990| Fax: (425) 888-4994
Arrow Environmental |1531 Bendigo Blvd, North Bend, WA 98045

From: Adams, Mark (ECY) [mailto:MADA461@ECY.WA.GOV]
Sent: Tuesday, March 25, 2008 4:18 PM
To: William Carroll
Cc: Lauren Carroll; Chuck Wolfe

Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

William:

The proposed changes to the scope of work are fine, but please take the following into account:

- I am often more optimistic than others here in Ecology about what can be done, so my belief in the possibility of an NFA should be interpreted accordingly.
- The final form of the property-specific letters has not been set, so we can't be entirely certain whether they will be applicable (I believe, however, they are very very close to being issued, so we should know soon).
- I should have said "the one key characterization issue", because there will be other key (or knotty) issues once you get beyond the characterization phase. For example, you will need to demonstrate that a capping/covenant cleanup action meets the criteria under Section -360.
- You indicated the purpose of the email is to obtain concurrence that the proposed approach meets the substantive requirements of MTCA. In my opinion the proposed work is on the way to meeting the substantive requirements of MTCA, which as you know includes a lot of territory.

Finally a question - I don't have the original SAP in front of me, so I can't recall whether PCBs have been checked or whether the SAP includes PCB analyses.

Best Regards.
Mark Adams

From: William Carroll [mailto:wcarroll@arrowenv.com]
Sent: Thu 3/20/2008 2:27 PM
To: Adams, Mark (ECY)
Cc: 'Lauren Carroll'; 'Chuck Wolfe'
Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Mark:

We are encouraged that you believe it may be possible to get to an NFA with restrictive covenant for the upland portion of the property when the "property-specific NFA letter" that is currently being drafted by Ecology becomes available. The purpose of this e-mail is to obtain concurrence from Ecology that the approach proposed in the Compliance Sampling Plan (CSP) and revised in this e-mail meets the substantive requirements of MTCA.

We understand that it is Ecology's position that the one key issue that needs to be addressed before a property-specific NFA letter could be issued is that all of the current contaminant discharge pathways to the Duwamish River need to be understood. These include ground water discharge, stormwater runoff, and direct contact with riverbank fill. In light of this issue and your comments provided in the e-mail dated February 14, 2008, we propose the following amendments to the CSP:

Catch Basin Sediment Sampling: In addition to the analytes proposed in the CSP include lead (Pb), both Cr3 and Cr6, and VOCs. Eliminate the following analytes: antimony, beryllium, selenium, and thallium. Provide Ecology with a revised table that includes the target detection limits relative to applicable cleanup levels. Conduct reconnaissance of the Site during a rain event to identify runoff patterns.

Monitoring Well Installation - Install 4 additional groundwater monitoring wells to depths of approximately 30 feet. A site map that illustrates the proposed locations is attached. During installation of the monitoring wells collect one soil/fill sample from each boring for laboratory analysis of NWTPH-Dx, NWTPH-Gx, VOCs, SVOCs, PCBs, TOC, and metals (As, Cd, Cr(total), Cr+6, Pb, Cu, Hg, Ni, Zn). Due to the tidally influenced groundwater elevation fluctuations, soil samples will be collected from soil that is above the maximum high water level. Screen the wells between 30-ft bgs and
20-ft bgs.

Ground Water Sampling: Conduct one groundwater sampling event that includes existing and new groundwater monitoring wells. In addition to the analytes proposed in the CSP include VOCs by SW-846 Method 8260B and gasoline-range organics by Ecology Method NWTPH-Gx. Provide Ecology with a revised table that includes the target detection limits for groundwater analytes relative to applicable cleanup levels.

Tidal Study: Amend the scope of work to include the monitoring wells installed as part of the revised scope of work.

River bank sampling - Collect 5 samples from the river bank at low tide, near the high water mark, and analyze the samples for metals(As, Cd, Cr(total), Cr+6, Pb, Cu, Hg, Ni, Zn) and heavy end organics (NWTPH-Dx and SVOCs). A site map that illustrates the proposed locations is attached.

Please call if you have any questions or to discuss the proposed scope of work further.

Regards,

William Carroll
Pacific Crest|1531 Bendigo Blvd, North Bend, WA 98045
|Tel: (425) 888-4990| Fax: (425) 888-4994

From: Adams, Mark (ECY) [mailto:MADA461@ECY.WA.GOV]
Sent: Wednesday, February 13, 2008 9:31 AM
To: wcarroll@arrowenv.com
Subject: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Hi Bill:

I've had a chance to go over the file and wanted to get you my initial thoughts on the site and the referenced plan. As we discussed, I am approaching the site from the ground up, so to speak, with the recognition that Ecology has already provided input on a number of previous occasions. The most recent and relevant communication is the March 29, 2007 memorandum to the file by Mark Edens.

I'll start with my initial characterization conclusions, and then relate these to the scope of work proposed in the referenced plan.

1. Has the basic geologic/hydrogeologic framework been defined in light of areas of potential contamination and contaminant transport? No. Historical information indicates the property has been progressively filled with material of questionable quality. Part of the fill apparently comprises a thin(?) covering over native floodplain deposits and the rest comprises a thickened wedge along the Duwamish River. Investigations to date have been very shallow, with borings and test pits mostly 8 feet deep or less. Only a few deeper 15-foot borings have been drilled. As a result, the basic geometry and composition of the fill is undefined, as is the composition of the underlying floodplain deposits. Hydrogeologic conditions are also largely undefined, other than the obvious conclusion that ground water occurs at shallow depth within the fill and discharges to the river. The relationship between this shallow ground water and ground water present within the underlying native deposits is unknown, as is the discharge/recharge relationship between surface water and ground water.

2. Has the extent of contamination been defined in soil? No. It appears the primary investigation focus has been to define the impact of industrial operations on near surface soils on the "upland" portion of the site. While this may be a good approach for property originally underlain by "clean" soils, it is not appropriate by itself for sites underlain by fills of suspect quality. As a result of the sampling strategy, the vertical extent of contamination has not been defined. Furthermore, an extensive stretch of fill bordering the river in the south half of the site has not been investigated at all (the area between the current shoreline and the estimated 1924/1936 shoreline).

3. Has the nature of contamination in soil been adequately explored? Mostly, but soil analyses have not included gasoline-range hydrocarbons or volatile organics. The number of samples analyzed for PAHs has also been inadequate (6 out of 33) given the concentrations observed in these six samples.

4. Has the extent of contamination been defined in ground water? No. Ground water samples appear to have been collected without reference to tidal influences, and only the very top of the water table has been sampled. Ground water deeper in the fill or in the underlying sediments may be impacted.

5. Has the nature of contamination in ground water been adequately explored. Mostly, but the analyses to date have not included gasoline range hydrocarbons, volatile organics.

6. Has the nature and extent of contamination in Duwamish River sediment attributable to the site been defined? No.

7. Has the nature and extent of contamination on the Duwamish river bank been explored. Not fully. The river bank is a special case of fill contamination because at this location the soil is directly exposed to tidally influenced surface water. Some of the fill data collected from inland borings can be used to extrapolate conditions along the river bank. However, certain stretches of the river bank have no corresponding inland data.

8. Has the potential for contaminant movement in stormwater runoff been evaluated. No.

With all that being said, I believe it may be possible to get to an NFA with restrictive covenant for the upland portion of the property without necessarily doing all of the implied characterization work (assuming the property-specific letter becomes available). There is however, one key issue that needs to be addressed to get to that NFA - all of the current contaminant discharge pathways to the Duwamish River need to be understood. These include ground water discharge, stormwater runoff, and direct contact with riverbank fill.

Now let's take a look at the Compliance Sampling Plan in light of these issues.

1. Tidal Study: Good. This study will be helpful in defining ground water movement in response to tidal fluctuations.

2. Catch Basin Sediment Sampling: Good, but needs to include lead, both Cr3 and Cr6, and VOCs. The following metals can be eliminated - antimony, berylium, selenium, and thalium. The sampling and analysis plan should have a table with target detection limits relative to applicable cleanup levels (probably sediment standards) . Also I would suggest a reconnaisance be conducted during a heavy rainstorm to identify runoff patterns and confirm all runoff is captured in the catch basins.

3. Another Round of Ground Water Sampling: Good, but needs to include VOCs and gasoline-range hydrocarbons. Also the sampling and analysis should include a table with target detection limits relative to

applicable cleanup levels (both surface water and ground water).

Clearly the scope of work in the Compliance Sampling Plan does not address all of the issues raised by me or Mark Edens. So I suggest considering the following additions:

1. Three or four deeper borings drilled along the edge of the river to define the depth and nature of the fill, and completed as deeper ground water monitoring wells. At least one deep boring, also completed as a well, in the upland portion of the property to define the base of the fill and type of underlying native sediment. Soil/fill/ground water samples to be obtained for chemical analysis.

2. Including those deeper wells in the tidal study.

3. Sampling the river bank for a variety of analytes, principally metals and heavy-end organics.

The items that I don't think we need to address for the moment are sediment sampling in the river and a full vertical characterization of contamination in the upland soil. The whole sediment issue will likely need to be worked out over time as part of the ongoing Superfund cleanup. This part of the "site" would not, of course, be eligible for an NFA until such time as the sediment issue was resolved. The vertical characterization might also need to come back in later, if straight capping of the property can't be supported via the WAC 173-34-360 demonstrations.

I think that's it for now. Please call if you have any questions or to discuss things further.

Regards,
Mark Adams
NWRO TCP
425-649-7107
mada461@ecy.wa.gov

Louise
FYI

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

August 11, 2009

Mr. Jim Gilmur
c/o Duwamish Metal Fabricators
16 South Michigan Street
Seattle, WA 98108

Re: Opinion on *May 11, 2009, Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington,* for the following Site:

- **Site Name:** Duwamish Marine Center
- **Site Address:** 6365 First Avenue South
- **Facility/Site No.:** 21945598
- **VCP Project No.:** NW 1646

Dear Mr. Gilmur:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Duwamish Marine Center facility (Site), also referred to as the Gilmur/Hale Trust property (the property). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding a review of submitted documents/reports pursuant to requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site:

- Arsenic, cadmium, copper, lead, mercury, nickel, polychlorinated biphenyls (PCBs), diesel- and oil-range petroleum hydrocarbons, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) into the Soil

- Arsenic, cadmium, copper, lead, mercury, nickel, zinc, PCBs, diesel- and oil-range petroleum hydrocarbons, and cPAHs into the Ground Water

- These same compounds and metals may have been released to Surface Water and Sediment

The Site is defined by the extent of contamination caused by the releases listed above. The Remedial Investigation (RI) report referenced below suggests the extent of contamination (i.e., the Site) be defined as areas within the Gilmur/Hale Trust property impacted by releases from on-property activities and by the placement of contaminated fill derived from off-property

locations. While these areas are certainly part of the Site, there may be other off-property areas also included within the Site. Specifically, these include areas of potential sediment contamination in the Duwamish Waterway and impacted areas within adjoining upland property.

Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding your proposed remedial action(s):

This opinion is based on the information contained in the following documents:

1. 2009, May 11, *Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington,* report prepared by Pacific Crest Environmental, LLC.

This document is kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. You can make an appointment by calling the NWRO resource contact, Sally Perkins, at 425 649-9190.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Based on a review of supporting documentation listed above, pursuant to **requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site, Ecology has determined:**

1. The Remedial Investigation is not sufficient to allow cleanup levels to be established and a cleanup action to be selected, because the RI report does not present the necessary characterization information in a manner which allows these issues to be settled:

   - A characterization of "natural" conditions at the Site and in the surrounding area has not been presented. Specifically, sections on geology, surface water, ground water, and natural resources are missing or inadequately developed. These sections, based on a synthesis of RI data and previously collected data, are needed to provide the foundation for understanding site contamination.

- The lateral and vertical extent of contamination in soil and ground water is not presented in sufficient detail to understand distributions across the property. Although Figures 4, 5, and 6 provide a clear visual interpretation of the lateral extent of soil contaminant groupings, these figures lack data supporting the boundary lines.

A revised RI report will therefore need to be submitted. To assist in that revision, an outline of the elements to be included is attached in Enclosure A. Note that the suggested outline is organized around the premise that the body of an RI should focus on interpretation and synthesis, with supporting details and methodology included in the appendices. For example, only a synopsis of the current RI and former pre-RI investigations scopes of work are needed in the body of the report, with most of the information being conveyed on tables and figures. There is no need to weave together an extended discussion of scope and methodology together with findings in the same section of the report. The findings should go in a later section, and investigation details are best placed in an appendix. The main purpose of a scope of work section is to acquaint the reader with the data points (RI and pre-RI) that are available to understand site conditions (i.e., exploration locations, chemical analyses, monitoring).

2. The Remedial Investigation report does not address potential sediment contamination, based on a discussion with Ecology that this issue be set aside until it can be addressed within the context of the Lower Duwamish Waterway Superfund cleanup. Nevertheless, river sediment should be considered part of the "Site" and some discussion of former and current mechanisms for sediment contamination discussed in the revised RI. The revised RI should also explicitly state that sediment evaluation is needed for full characterization of the Site, and, though not included in the RI, will be addressed at a later date.

3. The discussion of cleanup levels in the RI is fairly thorough, but needs to be reorganized along the lines of media/exposure scenario or media/pathway. In addition, the RI needs to incorporate exposure pathways outlined in the November 5, 2007 draft Remedial Investigation report for the Lower Duwamish Waterway (LDW) (a revised draft document is currently being reviewed by the agencies involved, and it is expected that the document will be finalized in the near future). Specifically, each of the exposure pathways listed below needs to be evaluated as to whether an associated cleanup level is appropriate for this Site, and the most stringent of the applicable levels selected as the soil or ground water cleanup level for the Site.

Human Health Cleanup Levels

Soil: On-Site workers – Direct contact and ingestion

Ground Water: Potable use

Surface Water: Recreational use – Direct contact and ingestion
Associated cleanup levels:
- Soil protective of leaching to surface water
- Ground water protective of surface water

Surface Water: Fish consumption
Associated cleanup levels:
- Soil protective of leaching to surface water
- Soil protective of leaching to ground water
- Ground water protective of surface water

River Sediment: Workers – Direct contact and ingestion

River Sediment: Fish consumption
Associated Site cleanup levels:
- Soil protective of sediment
- Ground water protective of sediment

Ecological Health Cleanup Levels

The draft LDW Remedial Investigation report also includes an ecological risk assessment which identifies 10 receptors of concern (ROCs) in and along the Duwamish Waterway. Each of the ROCs is a species selected to represent a larger group of animals, and cleanup standards were identified for each. Soil and ground water cleanup levels protective of ROCs exposed to river sediment must be included in the revised evaluation of cleanup levels for the Site.

Note that a detailed review of the RI report was not completed, pending submittal of a revised version incorporating the elements discussed above.

This opinion does not represent a determination by Ecology that a proposed remedial action will be sufficient to characterize and address the specified contamination at the Site. To obtain this opinion, you must submit appropriate documentation to Ecology and request such an opinion under the VCP. **This letter also does not provide an opinion regarding the sufficiency of any other remedial action proposed for or conducted at the Site.**

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or conducted at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me at 425 649-7107.

Sincerely,

Mark Adams
NWRO Toxics Cleanup Program

ma/kp

Enclosures: A

cc: William Carroll, Pacific Crest Environmental, LLC

Remedial Investigation Outline
July 2009

The following annotated outline is a suggested schematic for elements to be included in a Remedial Investigation report. It is not intended to replace MTCA's specific requirements as presented in 173-340-350(7) WAC.

The main purpose of the outline is to facilitate the preparation of a document that is clear, comprehensive, and to the point. A secondary, but important, purpose is to make document preparation and review more efficient.

INTRODUCTION
(*concise, bulleted if possible*)

- Site name,VCP number, Name, address, and phone number of project consultant, Current owner/operator
- Purpose of document *(very brief restatement of what an RI is for, reference the WAC)*

SITE IDENTIFICATION AND LOCATION
(*focus on defining the site in the context of its' location*)

- Site discovery and regulatory status (*describe how the site was identified and where it is in the MTCA process)*
- Site and property location/definition (*define actual MTCA site location relative to property or study area*)
- Neighborhood setting

Figure – Vicinity Map (*preferably with topography*)
Figure – Property/Site Map (*preferably with topography*)

Appendix – Legal description of property, present owner and operator, chronological listing of past owners and operators

ENVIRONMENTAL INVESTIGATION/INTERIM ACTION SUMMARY
(*Concise summary presentation of the investigations that have been done at the site, along with prior remedial actions. Focused mostly on figures and tables. Details of and methods used in former investigations and remediation in appendices*)

- Constituents of Concern (*brief discussion about which specific compounds were chosen for analysis and why)*
- Soil
- Surface water
- Ground water
- Sediment
- Air/soil vapor

- Natural resources/wildlife
- Cultural history/archeology
- Interim actions (*brief intro to prior remediation activities*)

Figure – Soil investigation data points (*show potential source areas*)
Figure – Surface water/groundwater investigation data points (*show potential source areas*)
Figure – Air investigation data points (*show potential source areas*)
Figure – Prior remediation activities

Table – Exploration Summary
Table – Analytical Schedule per media (*include analytical methods and reporting limits,as possible)*

Appendix – Previous Investigations (*detailed discussion goes here)*
Appendix - Exploration and sampling methodology (*may combine with Previous Investigations)*
Appendix – Boring/ Well logs
Appendix - Prior Interim Actions

PROPERTY DEVELOPMENT AND HISTORY

(*this section focuses on the built environment, both current and historical, and presents the sources of contamination and release mechanisms*)

- Past site uses and facilities
- Current site use and facilities
- Proposed or potential future site uses
- Zoning (*if appropriate)*
- Transportation/roads
- Utilities, water supply
- Potential sources of site contamination
- Potential sources of contamination from neighboring properties (*discuss nearby sources if known)*

Figure – Historical site features (*may be combined with Figure 2*)
Figure – Potential contaminant sources
Figure – Utilities (*may be combined with Figure 2*)

Table – Potential Contaminants

NATURAL CONDITIONS

- Physiographic setting/topography

- Geology
  (*focus on interpretation*)

  - Regional Setting (*brief*)
  - Property Geologic Conditions (*synthesis, not regurgitation of boring logs, provide cross sections*)
  - Physical Properties (*unlikely to need this section, but in some cases may be useful to present data on soil adsorptive capacity, organic content, strength, etc.)*

  Figure – Plan view of geologic unit distribution (*if helpful*)
  Figure - Cross section A-A' (*show borings, wells, screened intervals, water levels*)
  Figure – Cross section B-B' (*if necessary*)

- Surface Water
  (*brief description of the surface water system*)

  - Property drainage
  - Area surface water/floodplain issues
  - Regulatory classifications, if any (*e.g surface water classification)*

  Figure – Surface water Conditions (*only if information not already in a prior figure*)

- Ground Water
  (*focus on interpretation, show on cross sections*)

  - Occurrence (*aquifers, water levels, confinement, geometry, continuity, physical properties*)
  - Movement (*directions, gradient if important, seasonal fluctuations, tidal influence*)
  - Discharge
  - Recharge (*if significant for site*)
  - Regulatory classifications, if any (*e.g. sole source aquifer*)

  Figure – Cross section with ground water information (*if not already included above*)
  Figure – Water table/potentiometric surface maps (*for various seasons or tidal conditions, show surface water*)

  Appendix – Ground water elevation data (*a table)*

- Natural Resources and Ecological Receptors
  (*preparatory to a TEE*)

  - Greenbelts and other natural habitat
  - Wildlife
  - Other Information required to conduct evaluations under -7491, -7492, or if necessary -7493

  Figure – showing natural areas, as appropriate

CONTAMINANT OCCURRENCE AND MOVEMENT

(*very little text, mostly figures and tables, main point is to provide easy-to-understand figures showing the depth and breadth of contamination*)

- Waste Material (*sludges, fluids, stockpiles)*
- Soil
- Surface Water
- Ground Water
- Sediment
- Air/Soil Vapor

  Figures – Cross sections showing soil contamination with depth
  Figures – Plan views showing soil contamination across site (*relative to releases if known*)
  Figures – Cross section showing ground water contamination with depth (*if appropriate*)
  Figures – Plan views showing ground water contamination in each aquifer (*relative to soil contamination and P-head map*)
  Figures – XY plots of specific contaminants with time (*as appropriate*)
  Figures – Others as appropriate to show the distribution of surface water, ground water, or air data

  Tables – All of the analytical data against final cleanup levels (*exceedances highlighted, no need to develop screening levels*)
  Tables – Summary of exceedances (*if helpful*)

  Appendix – QA report
  Appendix – Analytical lab reports

CONCEPTUAL MODEL

(*putting the whole story together, graphic illustrations are best*)

- Contaminant release/fate and transport/potential or actual receptors
- Data gaps (*is anything missing)*

CLEANUP STANDARDS

(*developing appropriate cleanup standards based on receptors and pathways*)

- Soil
  - Reasonable maximum exposure
  - Cleanup levels protective of contact, ground water, inhalation, terrestrial species, surface water, sediment
  - Points of compliance
  - Regulatory classifications (*classification of soil as dangerous or solid waste*)
- Ground Water
  - Highest beneficial use/reasonable maximum exposure
  - Cleanup levels protective of potable use, inhalation, surface water, sediment
  - Points of compliance
- Other Media as appropriate
  - Cleanup levels protective of ....
  - Points of compliance

Table – Cleanup Levels (*all potentially applicable values with final selected cleanup level noted*)

AREAS REQUIRING CLEANUP

(*the final story detailing where the contamination exceeds an applicable cleanup standard, brief text, mostly tables, figures*)

- Constitutuents of Concern (*a brief summary of compounds that exceed cleanup levels or "indicator hazardous substances" under MTCA. For most service station sites, the COCs should be the same)*
- Soil – vertical and lateral
- Ground water – vertical and later
- Sediment –
- Surface Water
- Soil Vapor/air

Figures – Plan view and vertical sections of areas requiring cleanup

REFERENCES



DRAFT PUBLIC PARTICIPATION PLAN

DUWAMISH MARINE CENTER
SEATTLE, WASHINGTON

Prepared by
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

August 2011

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Introduction

The Washington State Department of Ecology (Ecology) developed this public participation plan according to the Model Toxics Control Act (MTCA). This plan is designed to promote meaningful community involvement during the investigation and cleanup of the Duwamish Marine Center. The site is located in Seattle, Washington next to the Lower Duwamish Waterway (LDW). This plan describes the tools Ecology will use to inform the public about site cleanup activities, and the ways the community can become involved in this process.

Ecology and the potentially liable persons (PLPs), James and Jacqueline Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust, have negotiated a legal agreement called an Agreed Order that formally describes their working relationship. Under the Agreed Order the PLPs will conduct a Remedial Investigation (RI) and Feasibility Study (FS) and prepare a Draft Cleanup Action Plan (CAP) at the site. The Remedial Investigation/Feasibility Study (RI/FS) is required under WAC 173-340-350 and is part of the cleanup process for this site. The RI will determine the nature and extent of contamination in the upland area soil, groundwater, stormwater and stormwater solids, and seeps. The Feasibility Study will use the results of the RI to evaluate and select cleanup action alternatives for the site.

Cleanup actions might be identified during this RI or FS process that will eliminate or minimize current releases of contamination to the Lower Duwamish Waterway (LDW) or actions that are necessary to prevent an imminent threat to human health or the environment. Ecology will consider implementing such cleanup actions as interim actions under the existing Agreed Order.

Project Description

Location

This site is located at 6365 1st Avenue S in Seattle, Washington on the east bank of the Lower Duwamish Waterway (see figure on page seven). The site is bordered on the

north by Lone Star Investors Property, on the east by First Avenue S, and on the south and west by the Duwamish River, and by Slip 2 on the northwest. The final site boundaries will be defined by the extent of contamination determined during the RI.

Site Background

Duwamish Marine Center leases portions of the property to other companies. Samson Tug and Barge operates in the northern portion of the Duwamish Marine Center, and Duwamish Metal Fabricators operates on the southern portion of the property. Burgess Enterprises formerly operated in the area now occupied by Samson.

There are three docks at the Duwamish Marine Center, which are known as the north, middle, and south docks. An approximately 80-foot-wide strip of land that runs between the docks and the parcel boundaries is owned by the Port of Seattle. A series of boathouses with moorage for 12 to 15 boats is located along the shoreline near the Duwamish Metal Fabricators facility.

Historically, the site has been the location of a marine shipyard, railyard, junk dealer, various construction services companies, and a barge shipping terminal. A marine railway was located adjacent to the southwestern shoreline from 1940 to the mid-1970s.

Contaminants of Concern

Contamination at this site is due to historical use. The contaminants of concern in the soil are:

- Metals
- Polynuclear aromatic hydrocarbons (PAHs)
- Petroleum hydrocarbons
- Polychlorinated biphenyls (PCBs)

The contaminants of concern in the groundwater are:

- Metals
- PAHs
- Pentachlorophenol
- Tetrachloroethene
- Petroleum hydrocarbons

The contaminants of concern in the sediments adjacent to the site are:

- PCBs
- PAHs

Previous Cleanup Work

Several environmental investigations have been conducted at the Duwamish Marine Center. In 2000, soil and groundwater samples were collected from the site. Petroleum hydrocarbons, metals, PCBs, and PAHs were detected above cleanup action levels in soil. Petroleum hydrocarbons were detected above cleanup action levels in groundwater.

A soil and groundwater investigation was performed at the property in 2002. The goal of the study was to determine the vertical and lateral extent of contaminants that had been identified in the previous investigation. Nineteen soil borings were placed at depths between 4 and 12 feet below ground surface and four groundwater monitoring wells were installed at the property. Petroleum hydrocarbons, metals, PCBs, and PAHs were above cleanup levels in soil and groundwater, and the groundwater also contained solvents.

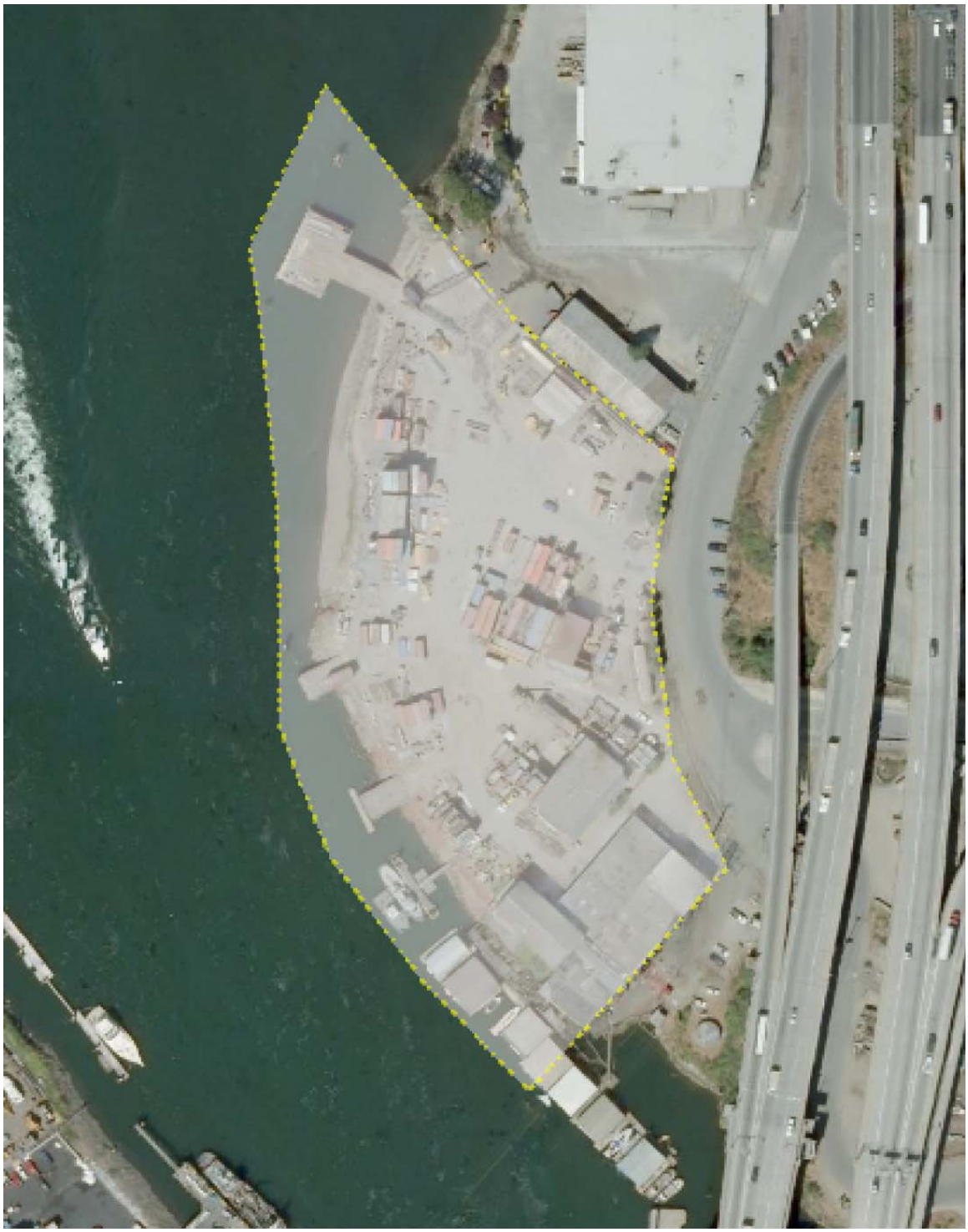
Approximately 50 cubic yards of soil containing lead above hazardous waste levels was excavated and removed from the central area of the site. Confirmation samples collected from the bottom and sidewalls of the excavation indicated that all soil containing lead above the hazardous waste levels was removed from the property.

Groundwater was sampled at one of the wells at the Duwamish Marine Center in November 2003 and February, May, and August 2004. Total mercury and petroleum hydrocarbons were detected in groundwater above levels of concern.

Current Activity

The Agreed Order requires that Duwamish Marine Center complete a

- Work Plan
- Remedial Investigation (RI)
- Feasibility Study (FS), and
- A draft Cleanup Action Plan (CAP).



Duwamish Marine Center

Lower Duwamish Waterway (LDW) Site Cleanup

The Duwamish Marine Center is located adjacent to the LDW site and within the LDW source control study area. The LDW site is a Superfund site that consists of the 5.5 mile stretch of the Duwamish River that flows north into Elliot Bay at the south end of Harbor Island. The LDW site is designated as a contaminated site under both state and federal law due to contaminants in the river and intertidal sediments. The site is one of several sites near the LDW that will be cleaned up to reduce the threat to human health and the environment from releases of hazardous substances, and to assist in preventing recontamination of the sediments after the LDW site cleanup is complete.

The sediments in the LDW site contain a wide range of contaminants due to years of industrial activity and runoff from urban areas. Ecology and EPA are working together to clean up contaminated sediments in the LDW site and to control sources of recontamination from nearby areas.

In 2000, EPA and Ecology entered into an Administrative Order on Consent with King County, the Port of Seattle, the City of Seattle, and The Boeing Company. This legal agreement requires these four parties perform a Remedial Investigation (RI) and Feasibility Study (FS) of sediment contamination in the waterway. Information about the RI/FS for the LDW site is located at http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish.

EPA is leading the RI/FS work, and Ecology is leading source control efforts. The source control efforts will prevent recontamination of the waterway after cleanup. Source control is the process of finding and then stopping or reducing releases of pollution to the river from various sources such as direct discharges via piped outfalls, bank erosion from adjacent properties, surface runoff from adjacent properties, groundwater discharge, air deposition, and spills. It includes identifying and managing sources of contamination to waterway sediments in coordination with sediment cleanups.

Ecology is coordinating these source control efforts with the City of Seattle, King County, the Port of Seattle, the City of Tukwila, and EPA. Ecology partners with these other agencies through the Source Control Work Group. Their work includes a business inspection program; monitoring sediments from storm drain systems; permitting to prevent direct discharges to the waterway; contaminated site cleanups; and testing various household products/materials to determine if they contain chemicals found in waterway sediments.

As part of these source control efforts, Ecology is developing Source Control Action Plans (SCAPs) for the 24 subbasins (or source control areas) that drain to the LDW site. The SCAPS identify potential contamination sources and the actions needed to keep sediments from being contaminated again after cleanup occurs. In addition, the SCAPs describe source control actions that are planned or currently underway, and sampling and monitoring activities that will be conducted to identify additional sources.

A SCAP has been completed for the source control area where the Duwamish Marine Center is located and is known as the River Mile (RM) 1.7-2.0 East (Slip 2 to Slip 3). The SCAP was based on a thorough review of information pertinent to sediment recontamination in this source control area. This SCAP is located on Ecology's website: http://www.ecy.wa.gov/pubs/0909085.pdf

The Duwamish River Cleanup Coalition

The Duwamish River Cleanup Coalition (DRCC) is an advisory group to EPA and Ecology and works with the South Park and Georgetown neighborhoods and other stakeholders to ensure a Duwamish River cleanup that is accepted by and benefits the community and is also protective of aquatic life, wildlife and human health.

DRCC was formed by an alliance of community, environmental, tribal, and small business groups affected by ongoing pollution and cleanup plans for the LDW. The coalition members include: Community Coalition for Environmental Justice, the Duwamish Tribe, I'M A PAL Foundation, Environmental Coalition of South Seattle,

Georgetown Community Council, People for Puget Sound, Puget Soundkeeper Alliance, South Park Neighborhood Association, Washington Toxics Coalition, and Waste Action Project.

DRCC is a formal "community advisory group" recognized by EPA and representing the interests of the community toward the cleanup work along the LDW. DRCC receives public participation grant funding from Ecology. They also receive technical assistance grants from EPA for technical advisors to review all LDW Superfund cleanup related studies and plans. They are involved in many aspects of the proposed Superfund cleanup and related MTCA cleanups. DRCC is working with Ecology to ensure that the cleanup and source control measures meet community standards.

Enhanced Public Participation

Ecology will work with EPA and stakeholders according to the enhanced public participation efforts that occur for the LDW Superfund site. Ecology site managers and community involvement coordinators may participate in community meetings and events as needed. Ecology will coordinate with the DRCC throughout the public involvement process. This may include such activities as coordination for public meetings and sharing drafts of documents with DRCC for review, as appropriate.

Ecology's goal is to be transparent to the community and all other stakeholders. This will be done by posting electronic documents on Ecology's website for stakeholder review at key points in the Duwamish Marine Center cleanup process. The stakeholders will be able to see the planned schedule for the next phase of work at the site by reviewing the Agreed Order for the site.

Community Profile

For decades much of the land along to the LDW has been industrialized. Current commercial and industrial operations include cargo handling and storage, marine

construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing.

Although the LDW is viewed primarily as an industrial corridor, two residential neighborhoods border the banks of the river: South Park and Georgetown. The South Park neighborhood is on the western shore of the LDW, and the Georgetown neighborhood is on the eastern side of the Duwamish Waterway. The residents of the community are well known for their commitment to neighborhood issues particularly related to the ongoing site cleanups along the LDW. A description of these communities is provided below.

South Park Community Description

The South Park neighborhood is located in South Seattle, on the west bank of the LDW. Native Americans of the Duwamish Tribe were the first residents of South Park who lived on the shores of the Duwamish River for thousands of years. This area was once a small farming town composed of Italian and Japanese farmers who supplied fresh produce to Seattle's Pike Place Market. South Park became part of the City of Seattle in 1907. By 1920 the Duwamish River was straightened out into a straight, deep channel that would accept ocean-going ships and barges. This change in the Duwamish greatly impacted South Park. The curving meanders had been straightened, which made it easier for industry to develop along the banks of the waterway.

In the mid 1960s, South Park was rezoned as industrial. Over 4,000 people complained and the City of Seattle changed the zoning to low-density residential. The City of Seattle built the South Park Community Center in 1989 which remains a vital resource within the community. The South Park Community Center offers a wide variety of free and low cost programs and special events. Special events include free breakfasts and family events. The community center provides before and after-school programs and school break camps for students. They also offer adult classes ranging from yoga to technology to English classes. South Park is also served by the City-owned neighborhood center, managed by the South Park Neighborhood Association. The neighborhood center houses

several non-profit and city services including the South Park Food Bank, City-sponsored South Park Action Agenda, and the Environmental Coalition of South Seattle.

The Seattle Public Library opened the new South Park branch at 8604 Eighth Avenue South (at Cloverdale Street) in September 2006. This new branch is 5,019 square feet and has the capacity to hold 18,700 books and materials (about one-third of the collection is Spanish-language, including bilingual children's materials and Spanish Language fiction and non-fiction). The library also has bilingual staff on hand to answer questions and to help patrons.

The South Park neighborhood is comprised of about 3,717 people of various ethnicities: 37% Hispanic, 34% white, 14% Asian, 7 % Black, 5% multiracial, 2% American Indian, 1% Native Hawaiian/Pacific Islander. The average age is 31 years old and the average income is $20,917 (based on records from 2005). A variety of retail and service businesses are located along 14th Avenue South. Data from the Seattle Office of Economic Development lists the primary categories of employment in South Park as wholesale trade, transportation and utilities; construction/resources; manufacturing; and services.

Georgetown Community Description

The Georgetown neighborhood is located in South Seattle, on the east side of the LDW across the river from South Park. Georgetown is Seattle's oldest neighborhood, settled by Luther Collins in 1851. It was incorporated as the City of Georgetown from 1904-1910, and later annexed by the City of Seattle.

According to records from 2005, just over 1,100 people live in Georgetown. The largest local employers in Georgetown are in the arts, entertainment, and recreation industries. The Georgetown neighborhood is home to large employers such as The Boeing Company and King County International Airport.

The community is host to local events such as art walks, an annual Arts and Garden Tour. The neighborhood is home to historic buildings such as the Old Georgetown City Hall, and the Georgetown Steam Plant. The South Seattle Community College has recently revitalized its Georgetown Campus and is home to the Puget Sound Industrial Excellence Center Apprenticeship and Education Center. The campus offers more than 25 apprenticeship programs including masonry, meat cutters, electricians, iron workers, and cosmetology. The neighborhood is also home to The Georgetown Community Council which meets once a month and is very active in the community.

Key Community Concerns and Issues

Ecology and EPA conducted interviews with community members, environmental organizations, and community organizations in October 2002 for the LDW site Community Involvement Plan. The Duwamish Marine Center is located within the larger LDW site. Ecology conducted an abbreviated version of community interviews in 2006 and determined that the concerns raised in 2002 were still pertinent. In 2008 stakeholder groups provided comments to EPA and Ecology on the LDW Remedial Investigation Draft Report developed for the LDW Superfund site. Although these comments are directed to the entire Superfund site, they are relevant for the Duwamish Marine Center because it is part of the larger Superfund site. The stakeholder comments indicated that their concerns have remained constant with the concerns outlined below.

There is clear interest in this cleanup process along the LDW. The following is representative of significant concerns and issues expressed during the community interviews. Ecology will work to respond to community concerns through the cleanup process and through coordination with EPA, other organizations, such as state and local health agencies, and the community advisory group that has been established for the site.

- **Health:** Stakeholders are concerned that living close to the LDW could affect their health. They expressed concern about consumption of all bottom fish and parts of other fish, as well as contamination from chemicals, bacteria and viruses. There is concern about exposure to contaminated sediments through contact at public access

parks, employment at industries on the waterway, restoration work, and other cleanup work. Some said that there should be limited access to the river if there is a health risk.

- **Wildlife:** Stakeholders expressed concern for fish and wildlife. Sea lions, salmon, bottom fish, crabs, mussels, clams, shrimp, opossums, squirrels, ducks and other birds were mentioned, as well as concern about the disappearance of herons and for herons on Kellogg Island in the Duwamish Waterway.

- **Domestic animals:** There is concern about dogs eating garbage from the river and horses being on a greenbelt above the river.

- **River and groundwater contamination:** There is concern that the river is dying and that it contains contaminants, including PCBs and mercury. There is concern about the effect of septic systems near the river; sewer overflows; surface water runoff, including oil, antifreeze and fertilizers; unreported spills and illegal dumping; and pumping of waste into the river or groundwater. There is concern that permits for discharges to the river are not being enforced or will be revised to be less strict. There is concern that sources of PCBs are not being addressed and that calculated cleanup levels for many contaminants will not be strict enough. There is also concern that the current efforts to control ongoing sources of pollution will not be enough to actually control the sources.

- **Economics:** Some people interviewed are concerned about contamination lowering property values. Others are concerned that businesses will leave the area due to the designation of the LDW as a Superfund site.

- **Cleanup:** Some people are concerned that South Park and the businesses on the water will be affected by cleanup activities, such as increased truck or barge traffic and potential accidents. There are concerns about the costs of damages to natural resources and the possibility that parties responsible for contamination will do some

early cleanup activities but nothing more.

- **Information:** Several people expressed concern about a lack of warning signs for fishermen and recreational users and suggested that such signs should be installed. People are concerned about whether adequate information reaches the Spanish-speaking and other non-English-speaking communities and whether the average person and immigrants understand the risks.

- **Image:** While some people described the LDW neighborhood as an industrial area, others are concerned that it is perceived as a dumping ground.

- **Tribal Rights:** Some community members are concerned that the tribal rights to harvest fish and shellfish in the LDW are not being honored at a level protective of these treaty rights.

Other public concerns may be identified over the course of the cleanup through: public comment periods; further community interviews; surveys; meetings; and other contacts with individuals, community groups, or organizations.

Ecology will work to respond to community concerns through the cleanup process and coordination with other regulatory agencies and property owners as necessary.

Public Participation Activities and Responsibilities

The purpose of this Public Participation Plan is to promote public understanding and participation in the MTCA activities planned for this site. This section of the plan addresses how Ecology will share information and receive public comments and community input on the site activities.

Public Participation Activities

Ecology uses a variety of activities to facilitate public participation in the investigation and cleanup of MTCA sites. Ecology will integrate this input into its decisions as much as is feasible.

The following is a list of the public involvement activities that Ecology will use, their purposes, and descriptions of when and how they will be used during this site's investigation and cleanup.

Formal Public Comment Periods

Comment periods are the primary method Ecology uses to get feedback from the public on proposed investigation and cleanup decisions. Comment periods usually last 30 days and are required at key points during the investigation and cleanup process before final decisions are made.

During a comment period, the public can submit comments in writing, orally, and via e-mail. After formal comment periods, Ecology reviews all comments received and may respond in a document called a Responsiveness Summary.

Ecology will consider the need for changes or revisions based on input from the public. If significant changes are made, then a second comment period may be held. If no significant changes are made, then the draft document(s) will be accepted and finalized.

Future public comment periods will be held for other documents and legal agreements that are developed for the site.

Public Meetings and Hearings

Public meetings may be held at key points during the investigation and cleanup process. Public comment is accepted during public meetings. Ecology also may offer public meetings for actions expected to be of particular interest to the community. These meetings will be held at locations convenient to the community.

Information Repositories

Information repositories are places where the public may read and review site information, including documents that are the subject of public comment.

Ecology has established two repositories for the Duwamish Marine Center site.

- Washington State Department of Ecology, 3190 160th Avenue SE, Bellevue, WA 98008, (425) 649-7190. Please call for an appointment.
- Seattle Public Library, South Park Branch, 8604 Eight Ave S. at Cloverdale St. Seattle, WA

Site information also will be posted on Ecology's web site at:
https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=4146

Site Register

Ecology's Toxics Cleanup Program uses its bimonthly *Site Register* to announce all of its public meetings and comment periods, as well as many other activities. To receive the *Site Register* in electronic or hard copy format, contact Seth Preston at (360) 407-6848 or by e-mail at seth.preston@ecy.wa.gov. It is also available on Ecology's web site at:
http://www.ecy.wa.gov/programs/tcp/pub_inv/pub_inv2.html

Mailing List

Ecology has compiled a mailing list for the site. The list includes individuals, groups, public agencies, elected officials, private businesses, potentially affected parties, and other known interested parties. The list will be maintained at Ecology's Northwest Regional Office and will be updated as needed.

To have your address added or deleted from this mailing list, please contact the Ecology Victoria Sutton at (425) 649-7219 or vsut461@ecy.wa.gov.

Fact Sheets

Ecology will mail fact sheets to persons and organizations interested in the Duwamish Marine Center to inform them of public meetings and comment opportunities and important site activities. Ecology also may mail fact sheets about the progress of site activities.

Newspaper Display Ads

Ecology may place ads in the *Seattle Times* and other appropriate newspapers to announce public comment periods and public meetings or hearings for the site.

Ecology Press Releases

Ecology may release information to the *Seattle Times* and other appropriate press to announce public comment periods, public meetings, hearings, or other information for the site.

Public Participation Plan Update

This public participation plan may be updated as the project proceeds. If a substantial is necessary, the revised plan will be submitted to the public for comment.

Points of Contact

If you have questions or need more information about this plan or the Duwamish Marine Center site, please contact:

Victoria Sutton, Site Manager
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008
Tel: (425) 649-7219
Email: vsut461@ecy.wa.gov

Glossary

Agreed Order: A legal document issued by Ecology which formalizes an agreement between the department and potentially liable persons (PLPs) for the actions needed at a site. An agreed order is subject to public comment. If an order is substantially changed, an additional comment period is provided.

Carcinogen: Any substance or agent that produces or tends to produce cancer in humans.

Cleanup Action: Any remedial action, except interim actions, taken at a site to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with cleanup levels; utilizes permanent solutions to the maximum extent practicable; and includes adequate monitoring to ensure the effectiveness of the cleanup action.

Cleanup Action Plan: A document which identifies the cleanup action and specifies cleanup standards and other requirements for a particular site. After completion of a comment period on a Draft Cleanup Action Plan, Ecology will issue a final Cleanup Action Plan.

Cleanup Level: The concentration of a hazardous substance in soil, water, air or sediment that is determined to be protective of human health and the environment under specified exposure conditions.

Comment Period: A time period during which the public can review and comment on various documents and proposed actions. For example, a comment period may be provided to allow community members to review and comment on proposed cleanup action alternatives and proposed plans.

Cleanup Process: The process for identifying, investigating, and cleaning up hazardous waste sites.

Contaminant: Any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

Exposure: Subjection of an organism to the action, influence or effect of a hazardous substance (chemical agent) or physical agent.

Facility: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly-owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed or, placed, or otherwise come to be located.

Feasibility Study (FS): A study to evaluate alternative cleanup actions for a site. A comment period on the draft report is required. Ecology selects the preferred alternative after reviewing those documents.

Groundwater: Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater occurs in sufficient quantities that it can be used for drinking water, irrigation, and other purposes.

Hazardous Substance: Certain categories of substances defined by law and regulation that pose a threat to human health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

Hazardous Waste Site: Any facility where there has been a confirmation of a release or threatened release of a hazardous substance that requires remedial action.

Information Repository: A file containing current information, technical reports, and reference documents available for public review. The information repository is usually located in a public building that is convenient for local residents such as a public school, city hall, or library.

Interim Action: Any remedial action that partially addresses the cleanup of a site.

Model Toxics Control Act (MTCA): Washington State's law that governs the investigation, evaluation and cleanup of hazardous waste sites. Refers to RCW 70.105D. It was approved by voters at the November 1988 general election and known is as Initiative 97. The implementing regulation is WAC 173-340.

Monitoring Wells: Special wells drilled at specific locations on or off a hazardous waste site where groundwater can be sampled at selected depths and studied to determine the direction of groundwater flow and the types and amounts of contaminants present.

Natural Background: The concentration of hazardous substance consistently present in the environment which has not been influenced by localized human activities.

Owner or Operator: Any person with any ownership interest in the facility or who exercises any control over the facility; or in the case of an abandoned facility, any person who had owned or operated or exercised control over the facility any time before its abandonment.

Polycyclic Aromatic Hydrocarbon (PAH): A class of organic compounds, some of which are long-lasting and carcinogenic. These compounds are formed from the combustion of organic material and are ubiquitous in the environment. PAHs are commonly formed by forest fires and by the combustion of fossil fuels.

PCBs (polychlorinated biphenyls): A group of toxic, persistent chemicals. Due to their non-flammability, chemical stability, high boiling point and electrical insulating

properties, PCBs were used in hundreds of industrial and commercial applications including transformers and capacitors for insulating purposes, and in gas pipeline systems as a lubricant. PCBs are a serious threat to public health because they have been proven to cause cancer in animals. In 1977 they were made illegal to produce, yet large amounts still remain in the environment.

Potentially Liable Person (PLP): Any person whom Ecology finds, based on credible evidence, to be liable under authority of RCW 70.105D.040.

Public Participation Plan: A plan prepared under the authority of WAC 173-340-600 to encourage coordinated and effective public involvement tailored to the public's needs at a particular site.

Release: Any intentional or unintentional entry of any hazardous substance into the environment, including, but not limited to, the abandonment or disposal of containers of hazardous substances.

Remedial Action: Any action to identify, eliminate, or minimize any threat posed by hazardous substances to human health or the environment, including any investigative and monitoring activities of any release or threatened release of a hazardous substance and any health assessments or health effects studies.

Remedial Investigation (RI): A study to define the extent of problems at a site. When combined with a study to evaluate alternative cleanup actions it is referred to as a Remedial Investigation/Feasibility Study (RI/FS). In both cases, a comment period on the draft report is required.

Remedial Investigation/Feasibility Study: Two distinct but related studies. They are usually performed at the same time, and together referred to as the "RI/FS." They are intended to:

-Gather the data necessary to determine the type and extent of contamination;
-Establish criteria for cleaning up the site;
-Identify and screen cleanup alternatives for remedial action; and
-Analyze in detail the technology and costs of the alternatives.

Responsiveness Summary: A summary of oral and/or written public comments received by Ecology during a comment period on key documents, and Ecology's responses to those comments. The Responsiveness Summary is mailed, at a minimum, to those who provided comments and its availability is published in the Site Register.

Site: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product

in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.

Site Hazard Assessment (SHA): An assessment to gather information about a site to confirm whether a release has occurred and to enable Ecology to evaluate the relative potential hazard posed by the release. If further action is needed, an RI/FS is undertaken.

Site Register: Publication issued every two weeks of major activities conducted statewide related to the study and cleanup of hazardous waste sites under the Model Toxics Control Act. To receive this publication, please call (360) 407-7200.

Superfund: The federal government's program to clean up the nation's uncontrolled hazardous waste sites.

Surface Water: Lakes, rivers, ponds, streams, inland waters, salt waters, and all other non-underground waters and courses within the state of Washington or under the jurisdiction of the state of Washington.

Total Petroleum Hydrocarbons (TPH): A scientific measure of the sum of all petroleum hydrocarbons in a sample (without distinguishing one hydrocarbon from another). The "petroleum hydrocarbons" include compounds of carbon and hydrogen that are derived from naturally occurring petroleum sources or from manufactured petroleum products (such as refined oil, coal, and asphalt).

Underground Storage Tank (UST): An underground storage tank and connected underground piping as defined in the rules adopted under Chapter 90.76 RCW.

Zinc: Zinc is a metallic chemical element; it has a white color with a bluish tinge. It has a high resistance to atmospheric corrosion. A major use is as a protective coating for iron and steel sheet and wire. Excess zinc in the body interferes with the metabolism of other minerals in the body.

DRAFT

September 1, 2011

Mr. James Rasmussen
Duwamish River Cleanup Coalition
1620 18th Avenue #10
Seattle, WA 98122

Re: Comments on Duwamish Marine Center Agreed Order No. DE 8072 and Public Participation Plan

Dear Mr. Rasmussen:

Thank you for the comments on behalf of the Duwamish River Cleanup Coalition submitted on August 31, 2011. The Department of Ecology (Ecology) appreciates your time to review and provide input regarding the Duwamish Marine Center Agreed Order. This letter lists your comments and provides Ecology's response to each.

1. The Agreed Order should explicitly state that the Duwamish Marine Center site is part of the larger Lower Duwamish Waterway Superfund cleanup and source control effort.

Response: The Environmental Protection Agency and Ecology have divided work between the LDW Superfund site sediment cleanup (EPA) and source control work (Ecology). The LDW Superfund site consists of the sediments in the waterway, with the boundary recognized at the mean higher high water line. The Lower Duwamish Waterway Site Memorandum of Understanding between the United States Environmental Protection Agency and the Washington Department of Ecology, Updated April 2004, for this work states:

> *Ecology and EPA agree that the general dividing line for source control vs. sediment work is mean higher high water (MHHW; +12 feet) in the Lower Duwamish. Above MHHW, Ecology and the Source Control Work Group will be responsible for addressing source control issues. Below MHHW, EPA and the Lower Duwamish Waterway Group (or the appropriate PRP) will be responsible for addressing sediment issues. Both agencies recognize that there may be site specific exceptions to the MHHW agreement.*

The Duwamish Marine Center site is located partially within this general boundary, with the majority of the site as an upland within the watershed, adjacent to the LDW Superfund site. The Agreed Order notes that the site is adjacent to the LDW in Section V.D. and that the site requires investigation to determine whether contamination, and therefore the site, extends from the uplands into the LDW in Section V.E.

2. The Listing of Contaminants of Concern (COCs), does not include dioxins/furans. Dioxins are prevalent throughout the Duwamish Superfund Site, and have been confirmed present at

elevated levels in the Georgetown area. The Work Plan for the site must include sampling for dioxins.

and:

DRCC/TAG is especially concerned that ground water sources of all other COC's at the site be identified and controlled.

Response: The Agreed Order provides for the preparation of a Draft Remedial Investigation/Feasibility Study Work Plan due within 60 days of the effective date of the Agreed Order. The draft Work Plan will be required to contain a screening process for the available data and site contaminant source history for appropriate sampling and analyses. The screening process will assure that all COC's at the site, including dioxin/furans and COC's in groundwater, will be identified.

Ecology notes your request for testing of dioxins/furans, and testing for these constituents may be required should the site screening process confirm the need for these analytes. The Agreed Order requires sufficient sampling be done to define the nature and extent of contamination, define the site boundaries, and inform any appropriate cleanup decisions. Cleanup decisions will be determined to include controlling sources.

3. We also request that COC samples taken at Duwamish Marine Center be kept for two years or until the cleanup is completed.

Response: Samples collected during the investigation may be archived for possible later analysis, however, some samples have expiration dates (called "holding times") after which it will no longer yield accurate results. Archiving procedures for samples collected during this investigation will be determined during the Remedial Investigation/Feasibility Study Work Plan stage according to the appropriate needs of the project to obtain accurate data.

4. DRCC/TAG believes it is important to involve King County WTD because as the Michigan Street outfall is part of this site it needs to be clear to the community there is coordination between this clean up effort and King County WTD.

Response: Site boundaries will be determined based on data collected during the remedial investigation. Should the Michigan Street outfall be determined to be part of the site, or affect the site, Ecology will coordinate with the King County Wastewater Treatment Division (WTD).

5. The Duwamish Marine Center Public Participation Plan (PPP) needs to include outreach to the communities of Georgetown and South Park, which have been intensively engaged in the Duwamish River cleanup process. Both of these communities have monthly meetings and regularly receive updates about cleanups in and around the Duwamish River Superfund Site. The Georgetown Gazette and listserve as well the South Park listserve should be used to facilitate communication with these communities. For the larger Duwamish Valley area, the West Seattle Herald and the West Seattle Blog should be used to facilitate communication with the community.

DRAFT

Response: The Public Participation Plan (PPP) used by Ecology for sites in the Lower Duwamish Waterway area are written from a boilerplate document to assure consistency and provide for site-specific flexibility in decision-making on outreach during the project. Please note that the PPP describes outreach to be conducted in the LDW area in general. The site manager and public involvement coordinator determine the more specific areas as needed during public involvement activities.

Please note the following public involvement activities from the PPP and how they were utilitized during this public comment period:

- Document availability at local repository sites: One of the document repositories is specified to be located in Seattle Public Library South Park Branch, and documents were placed there for review.
- Mailing list: A site specific mailing list was compiled that included addresses in both Georgetown and South Park neighborhoods.
- Legal ad: Newspapers for advertisement are to be placed in the Seattle Times, as wells at other appropriate newspapers. The public comment period for the Duwamish Marine Center site was advertised in the Seattle Times.

In addition to the activities outlined in the PPP, we also:

- Sent out a news release to the greater Seattle area, including some of the Seattle neighborhood weekly papers (West Seattle Blog and the West Seattle Herald) and Ecology's subscribers to the news release listserv.
- Sent an announcement to the Georgetown and South Park blogs.

Ecology notes your request to include the listservs. Please send us a list of the listerves that you would like us to include on our distribution list and we will be happy to add them. We will also more clearly outline our enhanced public involvement activities in future PPPs.

Please contact me at any time at (425) 652-3213 or victoria.sutton@ecy.wa.gov if you have any further concerns or questions. Thank you again for your comments regarding this site.

Sincerely,

Victoria Sutton
Hydrogeologist
NWRO Toxics Cleanup Program

cc: Louise Bardy, Ecology
Central Files

DRAFT

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

September 2, 2011

Stephen Plowman
8048 NE 8th Street
Medina, WA 98039

Re: Effective Date of Agreed Order No. 8072
Remedial Investigation/Feasibility Study and draft Cleanup Action Plan
Duwamish Marine Center Site, Seattle, WA
Facility Site No. 21945598

Dear Mr. Plowman:

The thirty-day public comment period has ended for the draft Agreed Order (AO) for the Duwamish Marine Center Site located at 6365 1st Avenue South, Seattle, Washington. One public comment letter was received. Copies of the public comment letter and Ecology's response to the comments were provided to you via email on September 1, 2011.

Ecology signed the AO and it became effective on September 2, 2011. Two minor changes were made to the document for clarity. The changes were:

1) Change the word "by" to "at" in the top line
2) Add the site name to the top left box, "Duwamish Marine Center"

A printed copy of the final AO is enclosed for your records.

The rights and responsibilities of a Potentially Liable Person (PLP) are outlined in Chapter 70.105D RCW, and WAC 173-340. Exhibit C of the AO, Schedule of Deliverables, indicates that the first deliverable is the Draft Remedial Investigation/Feasibility (RI/FS) Work Plan which is due on November 1, 2011.

We look forward to working with the Duwamish Marine Center on this project. If you have any questions or need assistance, please contact the site manager, Victoria Sutton at 425-649-7219 or victoria.sutton@ecy.wa.gov.

Sincerely,

Robert W. Warren, P. Hg., MBA
Toxics Cleanup Section Manager

RBW:vs:tn
Enclosures

CERTIFIED MAIL
#7011 0110 0000 2095 5022

cc: Central Files, Ecology
Ivy Anderson, Attorney General's Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action at:	AGREED ORDER
James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust; Duwamish Marine Center Site	No. DE 8072

TO: James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust
c/o Filter Engineering Co.
16 S. Michigan St.
Seattle, WA 98108

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EXHIBIT B. Scope of Work
EXHIBIT C. Schedule of Deliverables

I. INTRODUCTION

The mutual objective of the State of Washington, Department of Ecology (Ecology) and James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust (Gilmur Trustees) under this Agreed Order (Order) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires the Gilmur Trustees to complete a Remedial Investigation (RI), Feasibility Study (FS), and prepare a Draft Cleanup Action Plan (DCAP) for the site. Ecology believes the actions required by this Order are in the public interest.

II. JURISDICTION

This Agreed Order is issued pursuant to the Model Toxics Control Act (MTCA), RCW 70.105D.050(1).

III. PARTIES BOUND

This Agreed Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such party to comply with this Order. The Gilmur Trustees agree to undertake all actions required by the terms and conditions of this Order. No change in ownership or corporate status shall alter the Gilmur Trustees' responsibility under this Order. The Gilmur Trustees shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

IV. DEFINITIONS

Unless otherwise specified herein, the definitions set forth in RCW 70.105D and WAC 173-340 shall control the meanings of the terms in this Order.

A. Site: The Site is referred to as Duwamish Marine Center, Ecology Facility Site Number 21945598 and is generally located at 6365 1st Avenue S., Seattle, King County, Washington. The Site is defined by the extent of contamination caused by the release of hazardous substances at the Site. Based upon factors currently known to Ecology, the Site is

more particularly described in the Site Diagram (Exhibit A). The Site constitutes a Facility under RCW 70.105D.020(5).

B. Parties: Refers to the State of Washington, Department of Ecology and the Gilmur Trustees.

C. Potentially Liable Person (PLP): Refers to PLPs named for the site: the Gilmur Trustees and the S & JA Hale Family Limited Partnership. The S & JA Hale Family Limited Partnership, while named PLP, is not a party to this Agreed Order.

D. Agreed Order or Order: Refers to this Order and each of the exhibits to this Order. All exhibits are integral and enforceable parts of this Order. The terms "Agreed Order" or "Order" shall include all exhibits to this Order.

V. FINDINGS OF FACT

Ecology makes the following findings of fact, without any express or implied admissions of such facts by the Gilmur Trustees:

A. The Gilmur Trustees have an ownership interest in tax parcels 5367204565, 5367203415, and 5367203447 generally located at 6365 1st Avenue S., Seattle.

B. The S & JA Hale Family Limited Partnership has an ownership interest in tax parcel 5367204565 generally located at 6365 1st Avenue S., Seattle.

C. The site has been the subject of environmental investigations in the past. These investigations and cleanups are documented in the reports:

> *Lower Duwamish Waterway, RM 1.7 to 2.0 East (Slip 2 to Slip 3), Summary of Existing Information and Data Gaps, SAIC*, February 2009.
>
> *Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington, Pacific Crest Environmental*, May 2009
>
> *The Riley Group, Inc. 2000. Preliminary Phase II Subsurface Investigation, Duwamish Marine Center Property. Prepared by The Riley Group, Inc. for Jim Gilmur, Duwamish Marine Center*, September 13, 2000.
>
> *Farallon Consulting. 2002d. Site Closure Report, Gilmur/Hale Family Trust Site, 6365 First Avenue South, Seattle, Washington. Prepared by Lauren Carroll, Farallon Consulting, for Jim Gilmur*, September 25, 2002.
>
> *Farallon Consulting. 2004. Report of Compliance Monitoring and Request for No Further Action Determination for Groundwater and Soil, Gilmur/Hale Family Trust Site. Prepared by Farallon Consulting*, December 8, 2004.

Ecology. 2000a. Sediment quality in Puget Sound. Year 2 – Central Puget Sound. Washington Department of Ecology, Olympia, WA.

SEA. 2000b. PSDDA Sediment Characterization of Duwamish River Navigation Channel: FY2000 Operations and Maintenance Dredging Data Report. Prepared for U.S. Army Corps of Engineers, Seattle District.

Weston (Roy F. Weston, Inc.). 1999. Site inspection report: Lower Duwamish River, RM 2.5-11.5, Volume 1 – Report and appendices. Prepared by Roy F. Weston, Inc., for U.S. Environmental Protection Agency Region 10, Seattle, WA.

Windward. 2007a. Data Report: Subsurface Sediment Sampling for Chemical Analyses, Final. Prepared by Windward Environmental LLC for the Lower Duwamish Waterway Group, January 29, 2007.

D. Environmental investigations and independent cleanups at the site revealed releases of metals, volatile organic compounds, semi-volatile organic compounds, polychlorinated biphenyls (PCBs), and petroleum hydrocarbons in the soil and groundwater and PCBs, lead, phthalates, benzoic acid, PAHs, and dibenzofuran in the sediment in the Lower Duwamish Waterway (LDW) adjacent to the site. These contaminants are hazardous substances under WAC 173-340-200 and are found in several samples from the site and the adjacent LDW above the MTCA cleanup action levels and Sediment Management Standards, WAC 173-204, and pose a threat to human health and the environment.

E. The U.S. Environmental Protection Agency (EPA) added the LDW to the federal Superfund list on September 13, 2001. The LDW Superfund site is undergoing a Remedial Investigation (RI) under the Joint Administrative Order on Consent of April 2000. Ecology listed the LDW on the Confirmed and Suspected Contaminated Sites List (CSCSL) on February 26, 2002. The Duwamish Marine Center Site requires investigation to determine whether contamination, and therefore the Site, extends from the uplands to the LDW.

F. On the basis of the facts set forth herein, Ecology has determined that a release or threatened release of hazardous substances at the Site requires remedial actions to protect human health and the environment. This Order sets forth the measures that need to be taken to perform a RI/FS and DCAP for the Site.

VI. ECOLOGY DETERMINATIONS

A. The Gilmur Trustees are an "owner" as defined in RCW 70.105D.020(17) of a "facility" as defined in RCW 70.105D.020(5) because the Gilmur Trustees are not named in their personal or individual capactity, but are named in their capacity as Trustees for the James D. and Jacqueline H. Gilmur Living Trust and because the Gilmur Trustees have an ownership interest in the property generally located at 6365 1st Avenue S., Seattle, Washington.

B. The S & JA Hale Family Limited Partnership is an "owner" as defined in RCW 70.105D.020(17) of a "facility" as defined in RCW 70.105D.020(5) because the S & JA Hale Family Limited Partnership has an ownership interest in the property generally located at 6365 1st Avenue S., Seattle, Washington.

C. Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70.105D.020(25) and RCW 70.105D.020(10), respectively, has occurred at the Site.

D. Based upon credible evidence, Ecology issued a PLP status letter to the Gilmur Trustees dated August 31, 2010 pursuant to RCW 70.105D.040, -.020(21) and WAC 173-340-500. After providing for notice and opportunity for comment, reviewing any comments submitted, and concluding that credible evidence supported a finding of potential liability, Ecology issued a determination that the Gilmur Trustees are a PLP under RCW 70.105D.040 and notified the Gilmur Trustees of this determination by letter dated October 26, 2010.

E. Based upon credible evidence, Ecology issued a PLP status letter to the S & JA Hale Family Limited Partnership dated August 31, 2010 pursuant to RCW 70.105D.040, -.020(21) and WAC 173-340-500. After providing for notice and opportunity for comment, reviewing any comments submitted, and concluding that credible evidence supported a finding of potential liability, Ecology issued a determination that the S & JA Hale Family Limited Partnership is a PLP under RCW 70.105D.040 and notified the S & JA Hale Family Limited Partnership of this determination by letter dated November 1, 2010.

F. Pursuant to RCW 70.105D.030(1) and RCW 70.105D.050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or

threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial actions required by this Order are in the public interest.

G. Under WAC 173-340-430, an interim action is a remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance, that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed, or that is needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study or design of a cleanup action. Ecology, with input from the Gilmur Trustees, will determine if interim actions are warranted, including those that reduce or eliminate sources of contamination into the adjacent LDW.

VII. WORK TO BE PERFORMED

Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the Gilmur Trustees take the following remedial actions at the Site and that these actions be conducted in accordance with WAC 173-340 unless otherwise specifically provided for herein:

A. The Gilmur Trustees shall prepare and implement a Work Plan to conduct a Remedial Investigation (RI) and Feasibility Study (FS). After completing approved reports for the RI and FS, the Gilmur Trustees will prepare a Draft Cleanup Action Plan (DCAP) in accordance with WAC 173-304-350 through 173-340-390 and WAC 173-204. A scope of work for the RI, FS, and DCAP is more particularly described in Exhibit B, "Scope of Work" and is incorporated by reference as an enforceable part of this Order.

B. The schedule of work performance and list of deliverables is described in Exhibit C, "Schedule of Deliverables" and is incorporated by reference as an enforceable part of this Order.

C. Should an interim action be determined necessary under Section VI.E., the Gilmur Trustees will prepare and implement an Interim Action Work Plan as specified in Task 3 of Exhibit B, Scope of Work. The public notice and comment period will be in accordance with the Public Participation Plan.

D. The Gilmur Trustees shall submit Monthly Progress Reports. Progress reports shall be submitted to Ecology until satisfaction of the AO in accordance with Section IX of the AO. Progress Reports shall be submitted to the Ecology project coordinator by the 15th of the month following the reporting month. If this day is a weekend or holiday, deliverables will be submitted to Ecology on the next business day. At a minimum, progress reports shall contain the following information regarding the preceding reporting period:

- A description of the actions which have been taken to comply with the AO.
- Summaries of sampling and testing reports and other data reports received by the Gilmur Trustees.
- Summaries of deviations from approved work plans.
- Summaries of contacts with representatives of the local community, public interest groups, press, and federal, state, or tribal governments.
- Summaries of problems or anticipated problems in meeting the schedule or objectives set forth in the SOW and Work Plan.
- Summaries of solutions developed and implemented or planned to address any actual or anticipated problems or delays.
- Changes in key personnel.
- A description of work planned for the next reporting period.

E. If, at any time after the first exchange of comments on drafts, Ecology determines that insufficient progress is being made in the preparation of any of the deliverables required by this Section, Ecology may complete and issue the final deliverable.

VII. TERMS AND CONDITIONS OF ORDER

A. Public Notice

RCW 70.105D.030(2)(a) requires that, at a minimum, this Order be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this Order should public comment disclose facts or considerations which indicate to Ecology that this Order is inadequate or improper in any respect.

B. Remedial Action Costs

The Gilmur Trustees shall pay to Ecology costs incurred by Ecology pursuant to this Order and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or its contractors for, or on, the Site under RCW 70.105D, including remedial actions and Order preparation, negotiation, oversight, and administration. These costs shall include work performed both prior to and subsequent to the issuance of this Order. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Ecology has accumulated $11,937.19 in remedial action costs related to this facility as of November 30, 2010. Payment for this amount shall be submitted within thirty (30) days of the effective date of this Order. For all costs incurred subsequent to November 30, 2010, the Gilmur Trustees shall pay the required amount within thirty (30) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly.

In addition to other available relief pursuant to RCW 19.16.500, Ecology may utilize a collection agency and/or, pursuant to RCW 70.105D.055, file a lien against real property subject to the remedial actions to recover unreimbursed remedial action costs.

C. Implementation of Remedial Action

If Ecology determines that the Gilmur Trustees have failed without good cause to implement the remedial action, in whole or in part, Ecology may, after notice to the Gilmur Trustees, perform any or all portions of the remedial action that remain incomplete. If Ecology performs all or portions of the remedial action because of the Gilmur Trustees' failure to comply with its obligations under this Order, the Gilmur Trustees shall reimburse Ecology for the costs of doing such work in accordance with Section VIII.B. (Remedial Action Costs), provided that

the Gilmur Trustees are not obligated under this Section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of this Order.

Except where necessary to abate an emergency situation, the Gilmur Trustees shall not perform any remedial actions at the Site outside those remedial actions required by this Order, unless Ecology concurs, in writing, with such additional remedial actions.

D. Designated Project Coordinators

The project coordinator for Ecology is:

Victoria Sutton
Washington Department of Ecology
Northwest Regional Office
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, Washington 98008
Telephone: (425) 649-7219
Fax: (425) 649-7161
Email: vsut461@ecy.wa.gov

The project coordinator for the Gilmur Trustees is:

Stephen Plowman
8048 NE 8th Street
Medina, WA 98039
Telphone: (425) 233-0321
Fax: (425) 968-1390
sjplowman@gmail.com

Each project coordinator shall be responsible for overseeing the implementation of this Order. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and the Gilmur Trustees, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the work to be performed required by this Order.

Any party may change its respective project coordinator. Written notification shall be given to the other party at least ten (10) calendar days prior to the change.

E. Performance

All geologic and hydrogeologic work performed pursuant to this Order shall be under the supervision and direction of a geologist licensed in the State of Washington or under the direct supervision of an engineer registered in the State of Washington, except as otherwise provided for by RCW 18.220 and RCW 18.43.

All engineering work performed pursuant to this Order shall be under the direct supervision of a professional engineer registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Order shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrologic or engineering work shall be under the seal of an appropriately licensed professional as required by RCW 18.220 or RCW 18.43.130.

The Gilmur Trustees shall notify Ecology in writing of the identity of any engineer(s) and geologist(s), contractor(s) and subcontractor(s), and others to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

F. Access

Ecology or any Ecology authorized representative shall have the full authority to enter and freely move about all property at the Site that the Gilmur Trustees either owns, controls, or has access rights to at all reasonable times for the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the Gilmur Trustees' progress in carrying out the terms of this Order; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the Gilmur Trustees. The Gilmur Trustees shall make all reasonable efforts to secure access rights for those properties within the Site not owned or controlled by the Gilmur Trustees where remedial activities or investigations will be performed

pursuant to this Order. Ecology or any Ecology authorized representative shall give reasonable notice before entering any Site property owned or controlled by the Gilmur Trustees unless an emergency prevents such notice. All persons who access the Site pursuant to this Section shall comply with any applicable Health and Safety Plan(s). Ecology employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

G. Sampling, Data Submittal, and Availability

With respect to the implementation of this Order, the Gilmur Trustees shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section VII (Work to be Performed), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, the Gilmur Trustees shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by the Gilmur Trustees pursuant to implementation of this Order. The Gilmur Trustees shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow the Gilmur Trustees and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order, provided that doing so does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section VIII.F. (Access), Ecology shall notify the Gilmur Trustees prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under WAC 173-50 for the specific analyses to be conducted, unless otherwise approved by Ecology.

H. Public Participation

A Public Participation Plan is required for this Site. Ecology shall review any existing Public Participation Plan to determine its continued appropriateness and whether it requires

amendment, or if no plan exists, Ecology shall develop a Public Participation Plan alone or in conjunction with the Gilmur Trustees.

Ecology shall maintain the responsibility for public participation at the Site. However, the Gilmur Trustees shall cooperate with Ecology, and shall:

1. If agreed to by Ecology, develop appropriate mailing list, prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings.

2. Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before major meetings with the interested public and local governments. Likewise, Ecology shall notify the Gilmur Trustees prior to the issuance of all press releases and fact sheets, and before major meetings with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by the Gilmur Trustees that do not receive prior Ecology approval, the Gilmur Trustees shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

3. When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions or as a presenter.

4. When requested by Ecology, arrange and/or continue information repositories to be located at the following locations:

a. Seattle Public Library - South Park Branch
8604 Eight Ave S. at South Cloverdale St.
Seattle, WA 98108

b. Ecology's Northwest Regional Office
3190 160th Avenue SE
Bellevue, Washington 98008

At a minimum, copies of all public notices, fact sheets, and press releases; all quality assured monitoring data; remedial action plans and reports, supplemental remedial planning

documents, and all other similar documents relating to performance of the remedial action required by this Order shall be promptly placed in these repositories.

I. Retention of Records

During the pendency of this Order, and for ten (10) years from the date of completion of work performed pursuant to this Order, the Gilmur Trustees shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors. Upon request of Ecology, the Gilmur Trustees shall make all records available to Ecology and allow access for review within a reasonable time.

J. Resolution of Disputes

1. In the event a dispute arises as to an approval, disapproval, proposed change, or other decision or action by Ecology's project coordinator, or an itemized billing statement under Section VIII.B. (Remedial Action Costs), the Parties shall utilize the dispute resolution procedure set forth below.

a. Upon receipt of Ecology's project coordinator's written decision or the itemized billing statement, the Gilmur Trustees have fourteen (14) days within which to notify Ecology's project coordinator in writing of its objection to the decision or itemized statement.

i. The Gilmur Trustees shall include in the written objection sufficient detail to allow Ecology to evaluate the merits of the dispute.

ii. Such detail shall include the specific Ecology determination or direction or itemized statement in dispute and shall include specific argument(s) documenting the basis for invoking the dispute resolution procedure.

iii. Clarification of Ecology directions or determinations shall not be handled through the dispute resolution procedure. The Ecology Project Coordinator will make such clarifications in a manner and time they deem appropriate to expedite to the maximum extent practicable the work performed under this order.

b. The Parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

c. The Gilmur Trustees may then request regional management review of the decision. This request shall be submitted in writing to the NWRO Region Toxics Cleanup Section Manager within seven (7) days of receipt of Ecology's project coordinator's written decision.

d. The Section Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within thirty (30) days of the Gilmur Trustees's request for review. The Section Manager's decision shall be Ecology's final decision on the disputed matter.

2. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

3. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

K. Extension of Schedule

1. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify:

a. The deadline that is sought to be extended.

b. The length of the extension sought.

c. The reason(s) for the extension.

d. Any related deadline or schedule that would be affected if the extension were granted.

2. The burden shall be on the Gilmur Trustees to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

a. Circumstances beyond the reasonable control and despite the due diligence of the Gilmur Trustees including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by the Gilmur Trustees;

b. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

c. Endangerment as described in Section VIII.M. (Endangerment).

However, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of the Gilmur Trustees.

3. Ecology shall act upon any written request for extension in a timely fashion. Ecology shall give the Gilmur Trustees written notification of any extensions granted pursuant to this Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section VIII.L. (Amendment of Order) when a schedule extension is granted.

4. An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

a. Delays in the issuance of a necessary permit which was applied for in a timely manner.

b. Other circumstances deemed exceptional or extraordinary by Ecology.

c. Endangerment as described in Section VIII.M. (Endangerment).

L. Amendment of Order

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section VIII.N. (Reservation of Rights), substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and the Gilmur Trustees. The Gilmur Trustees shall submit a written request for amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request for amendment is received. If the amendment to this Order represents a substantial change, Ecology will provide public notice and opportunity to comment. Reasons for the disapproval of a proposed amendment to this Order shall be stated in writing. If Ecology does not agree to a proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section VIII.J. (Resolution of Disputes).

M. Endangerment

In the event Ecology determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct the Gilmur Trustees to cease such activities for such period of time as it deems necessary to abate the danger. The Gilmur Trustees shall immediately comply with such direction.

In the event the Gilmur Trustees determine that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment, the Gilmur Trustees may cease such activities. The Gilmur Trustees shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction, the Gilmur Trustees shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with the Gilmur Trustees cessation of activities, it may direct the Gilmur Trustees to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to Section VIII.M., the Gilmur Trustees obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended in accordance with Section VIII.K. (Extension of Schedule) for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

N. Reservation of Rights

This Order is not a settlement under RCW 70.105D. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any of Ecology's rights or authority. Ecology will not, however, bring an action against the Gilmur Trustees to recover remedial action costs paid to and received by Ecology under this Order. In addition, Ecology will not take additional enforcement actions against the Gilmur Trustees regarding remedial actions required by this Order, provided the Gilmur Trustees complies with this Order.

Ecology nevertheless reserves its rights under RCW 70.105D, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health and the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

O. Transfer of Interest in Property

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by the Gilmur Trustees without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to the Gilmur Trustees transfer of any interest in all or any portion of the Site, and during the effective period of this Order, the Gilmur Trustees shall provide a copy of this Order to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and,

at least thirty (30) days prior to any transfer, the Gilmur Trustees shall notify Ecology of said transfer. Upon transfer of any interest, the Gilmur Trustees shall restrict uses and activities to those consistent with this Order and notify all transferees of the restrictions on the use of the property.

P. Compliance with Applicable Laws

1. All actions carried out by the Gilmur Trustees pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in RCW 70.105D.090. At this time, no federal, state or local requirements have been identified as being applicable to the actions required by this Order**.**

2. Pursuant to RCW 70.105D.090(1), the Gilmur Trustees are exempt from the procedural requirements of RCW 70.94, RCW 70.95, RCW 70.105, RCW 77.55, RCW 90.48, and RCW 90.58 and of any laws requiring or authorizing local government permits or approvals. However, the Gilmur Trustees shall comply with the substantive requirements of such permits or approvals. At this time, no state or local permits or approvals have been identified as being applicable but procedurally exempt under this Section**.**

The Gilmur Trustees have a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or the Gilmur Trustees determine that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other party of its determination. Ecology shall determine whether Ecology or the Gilmur Trustees shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the Gilmur Trustees shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the Gilmur Trustees and on how the Gilmur Trustees must meet those requirements. Ecology shall inform

the Gilmur Trustees in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The Gilmur Trustees shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

3. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency that is necessary for the State to administer any federal law, the exemption shall not apply and the Gilmur Trustees shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits.

Q. Indemnification

The Gilmur Trustees agree to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property to the extent arising from or on account of acts or omissions of the Gilmur Trustees, its officers, employees, agents, or contractors in entering into and implementing this Order. However, the Gilmur Trustees shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Order.

VIII. SATISFACTION OF ORDER

The provisions of this Order shall be deemed satisfied upon the Gilmur Trustees' receipt of written notification from Ecology that the Gilmur Trustees have completed the remedial activity required by this Order, as amended by any modifications, and that the Gilmur Trustees have complied with all other provisions of this Agreed Order.

IX. ENFORCEMENT

Pursuant to RCW 70.105D.050, this Order may be enforced as follows:

A. The Attorney General may bring an action to enforce this Order in a state or federal court.

B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.

C. In the event the Gilmur Trustees refuse, without sufficient cause, to comply with any term of this Order, the Gilmur Trustees will be liable for:

a. Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply; and

b. Civil penalties of up to twenty-five thousand dollars ($25,000) per day for each day it refuses to comply.

D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: ~~(8-2-11)~~ RCW SEPTEMBER 2, 2011

JAMES D. GILMUR, TRUSTEE

James D. Gilmur
Trustee of the James D. and Jacqueline H. Gilmur Living Trust
Seattle, Washington
(206) 390-4039

JACQUELINE H. GILMUR, TRUSTEE

Jacqueline H. Gilmur
Trustee of the James D. and Jacqueline H. Gilmur Living Trust
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STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY

Robert W. Warren, P.Hg., MBA
Section Manager
Toxics Cleanup Program
NWRO Regional Office
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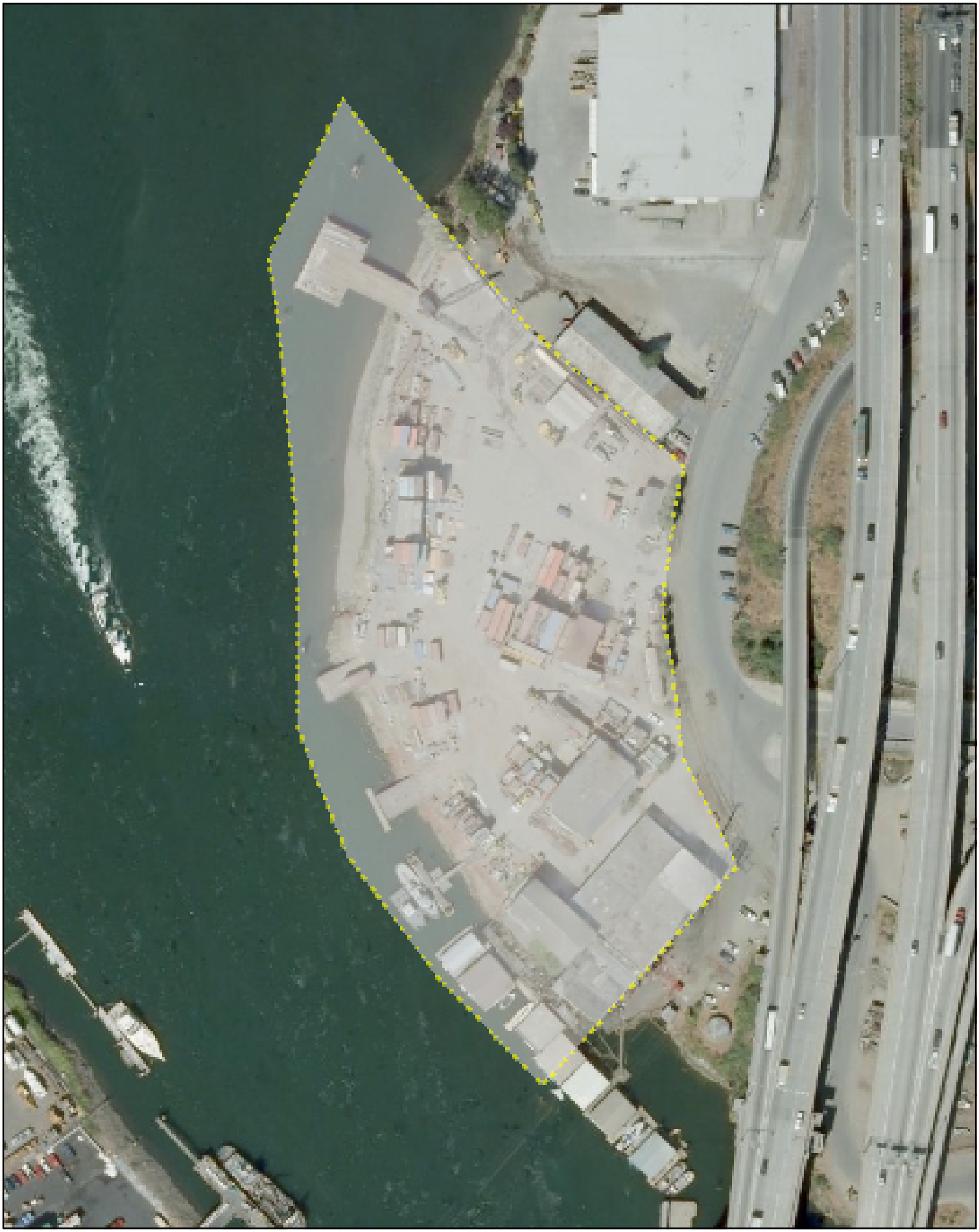

Duwamish Marine Center
Exhibit A

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DEPARTMENT OF ECOLOGY
State of Washington

EXHIBIT B – SCOPE OF WORK (SOW)
Duwamish Marine Center

PURPOSE

The work under this Agreed Order (AO) involves conducting a Remedial Investigation (RI) and Feasibility Study (FS), conducting interim actions if required or agreed to by Ecology, and preparing a Draft Cleanup Action Plan (DCAP) to select a cleanup alternative. The purpose of this RI, FS, and DCAP for the Duwamish Marine Center Site (the Site) is to provide sufficient data, analysis, and evaluations to enable Ecology to select a cleanup alternative for the Site.

The SOW is divided into six major tasks as follows:

Task 1. RI/FS Work Plan
Task 2. Remedial Investigation
Task 3. Interim Actions (if required)
Task 4. Feasibility Study
Task 5. SEPA Compliance
Task 6. Public Participation
Task 7. DCAP
Task 8. Progress Reports

TASK 1. RI/FS WORK PLAN

James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust (hereinafter referred to as the PLPs) shall prepare a Remedial Investigation/Feasibility Study Work Plan (Work Plan). The Work Plan shall include an overall description and schedule of all RI/FS activities. The Work Plan shall clearly describe the project management strategy for implementing and reporting on RI/FS activities. The responsibility and authority of all organizations and key personnel involved in conducting the RI/FS will be outlined.

The Work Plan shall describe general facility information; site history and conditions; including previous operations; past field investigations, including any data collection and analysis of soils, air, groundwater, surface water, and sediments; a conceptual site model showing contaminants, migration pathways in all environmental media, and potential receptors; geology and groundwater system characteristics; past, current, and future land use; identification of natural resources and ecological receptors; hazardous substances and their sources, etc., in compliance with WAC 173-340-350 and WAC 173-204-560.

As part of the project background, existing environmental data on site soil, groundwater, surface water, and sediments will be compiled and evaluated for data gaps. The data gaps will be used as the basis for conducting additional site investigations. The Work

Plan will also identify specific data collection procedures in a Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) as part of the Work Plan in compliance with WAC 173-340-820 and WAC 173-204-600 for defining the nature and extent of contamination.

The SAP identifies the proposed number and location of all environmental samples and methods, including soil borings, groundwater monitoring wells, soil, groundwater, stormwater, seep, catch basin and sediment samples, approximate depths, and includes a quality assurance project plan. The SAP will describe the sampling objectives, the rationale for the sampling approach (based upon the identified data gaps), and plans for data use, and shall provide a detailed description of sampling tasks. The SAP shall describe specifications for sample identifiers; sampling equipment; the type, number, and location of samples to be collected; the analyses to be performed; descriptions of sampling equipment and methods to be used; sample documentation; sample containers, collection and handling; data and records management; and schedule.

The Quality Assurance Project Plan (QAPP) will be prepared in accordance with the Guidance for Preparation of Quality Assurance Project Plans, EPA Region 10, Quality Data Management Program, QA/R-5 and requirements of the EPA Contract Laboratory Program. The QAPP will also follow Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (July 2004) [1]and Sediment Sampling and Analysis Plan Appendix (February 2008).[2] Laboratories must meet the accreditation standards established in WAC 173-50. Data quality objectives will reflect the criteria or threshold values used for the source control evaluation.

The SAP, including the QAPP, will be submitted to Ecology for review and approval. As with all environmental work at the site, work may not begin without written approval from Ecology. The plan shall provide seven (7) days notice to Ecology prior to beginning sampling. Ecology may obtain split samples.

The PLPs or their contractors shall submit all new sampling data generated under this SAP and any other recently collected data to Ecology for entry into the Environmental Information Management System (EIM) in accordance with WAC 173-340-840(5) and Ecology's Toxics Cleanup Program Policy 840: Data Submittal Requirements. Only validated data will be entered into the EIM database within 30 days of submittal.

RI/FS tasks and subtasks will include the following:

- Sampling and analysis of soil, groundwater, and seeps;
- Sampling and analysis of surface and subsurface sediments;
- Sampling and analysis of stormwater and catch basin solids to determine whether the stormwater system is a source of contamination to sediments;

[1] Found at http://www.ecy.wa.gov/biblio/0403030.html
[2] Found at http://www.ecy.wa.gov/biblio/qapp.html

- Evaluate the potential to contaminate or recontaminate sediments, including analysis of the following pathways:
    - Direct discharges
    - Stormwater discharges
    - Overland flow
    - Groundwater discharges and seeps
    - Soil erosion
    - Site operations
    - Spills, dumping, leaks, housekeeping, and management practices;

The FS portion of the Work Plan will provide a detailed analysis of each remedial alternative according to the applicable requirements of WAC 173-340-350, MTCA Remedial Investigation and Feasibility Study, and WAC 173-204-560, SMS Cleanup Study. The remedial alternatives will be evaluated for compliance with the applicable requirements of WAC 173-340-360, Selection of Cleanup Actions, and WAC 173-204-560(4).

The Work Plan shall not be implemented until approved by Ecology. Once approved by Ecology, The PLPs will implement the Work Plan according to the schedule contained in Exhibit C.

The PLPs shall coordinate with Ecology throughout the development of the RI/FS and DCAP and shall keep Ecology informed of changes to the Work Plan and other project plans and of issues and problems as they develop.

The PLPs shall prepare two (2) copies of the Draft RI/FS Work Plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and comment. After addressing Ecology's comments on the Draft Work Plan and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Work Plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology.

TASK 2. REMEDIAL INVESTIGATION

The PLPs shall conduct an RI that meets the requirements of WAC 173-340-350(7) and WAC 173-204-560 according to the Work Plan as approved by Ecology. The RI will determine the nature and extent of contamination exceeding Model Toxics Control Act (MTCA) cleanup levels, Sediment Management Standards (SMS) cleanup standards, and other regulatory requirements. The RI must provide sufficient data and information to define the nature and extent of contamination.

Field sampling and analysis will be completed in general accordance with the SAP and QAPP. Deviation(s) from the approved SAP and QAPP must be communicated to Ecology immediately and documented as required by Ecology.

The PLPs shall provide interim data reports and updates to Ecology as new site data and information become available. Laboratory analysis data shall also be provided in electronic format when it has been validated. Raw laboratory data will be provided to Ecology upon request.

The PLPs shall compile the results of the Site investigation into a Draft RI Report. The PLPs shall prepare two (2) copies of the Draft RI Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and comment.

After addressing Ecology's comments on the Draft Report, The PLPs shall prepare five (5) copies of a Final RI Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment. Electronic survey data for monitoring locations, electronic lab data, and GIS maps of contaminant distribution shall also be provided for both the Draft and Final Reports.

If the data collected during this investigation is insufficient to define the full nature and extent of contamination, an additional phase of investigation shall be conducted to define the extent of contamination.

TASK 3. INTERIM ACTIONS (if required)

Remedial actions implemented prior to completion of the RI/FS

- that are technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance;
- that correct a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed; or
- that are needed to provide for completion of the remedial investigation/feasibility study or design of the cleanup action

will be considered interim actions, will be implemented in accordance with WAC 173-340-430 and the AO, and will be designed in a manner that will not foreclose reasonable alternatives for any final cleanup action that may be required. Remedial actions for contaminated sediments will be designated partial cleanup actions and will be implemented pursuant to WAC 173-204-550(3)(d).

If required by Ecology, or if proposed by The PLPs and approved by Ecology, The PLPs will implement an interim action. Based upon information in the Draft RI report, interim action(s) may be needed to expedite control of releases to sediments or other environmental media pursuant to WAC 173-340-430.

The scope of the interim actions may include, but not be limited to, typical source control or containment elements such as:

- Soil or sediment removal
- Groundwater remediation
- Repair, slip lining, replacement, or closure of stormwater conveyances or other structures such as conduit, vaults, catch basins, etc.
- Removal of underground storage tanks and pipes
- Removal of old drain fields or former surface impoundments
- Proper abandonment of old wells
- Removal of contaminated building or other structural material
- Construction of a treatment facility
- Shoreline stabilization such as bulkhead repair, erosion or seepage control, and grading or clearing.

If an interim action is to be performed, The PLPs will prepare and submit for Ecology approval a Draft Interim Action Work Plan (IAWP) with detail commensurate with the work to be performed. The Draft IAWP shall include, as appropriate:

- Description of the interim action including its purpose, general requirements, and relationship to the (final) cleanup action (to the extent known);
- Summary of relevant RI/FS information, including at a minimum existing site conditions and alternative interim actions considered;
- Information regarding design and construction requirements, including a proposed schedule and personnel roles and responsibilities;
- Compliance Monitoring Plan;
- SAP/QAPP.

The PLPs will also submit a copy of the Health and Safety Plan for the project. The PLPs will be responsible for complying with the State Environmental Policy Act (SEPA) Rules including preparing and submitting an environmental checklist for the interim action, and will assist Ecology with presentations at any additional meetings or hearings that might be necessary for SEPA compliance or as part of the Public Participation Plan.

Once approved by Ecology, The PLPs will implement the interim action according to the schedule contained in the IAWP.

The PLPs shall prepare two (2) copies of the Draft Interim Action Work Plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and approval. After the public notice and comment period, addressing Ecology's and the public's comments on the Draft Interim Action Work Plan and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Interim Action Work Plan submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

Upon successful completion of the work, a Draft Interim Action Report will be prepared as a separate deliverable. The PLPs shall prepare two (2) copies of the Draft Interim Action Report and submit them, including one electronic copy each in Word (.doc) and

Adobe (.pdf) formats, to Ecology for review and approval. After addressing Ecology's comments on the Draft Interim Action Report and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Interim Action Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology.

TASK 4. FEASIBILITY STUDY

The PLPs shall use the information obtained in the RI to prepare a Draft Feasibility Study (FS) that meets the applicable requirements of WAC 173-340-350(8) according to the approved Work Plan and Schedule (Exhibit C).

The Draft FS will evaluate remedial alternatives for site cleanup, consistent with MTCA and SMS requirements to ensure protection of human health and the environment by eliminating, reducing, or otherwise controlling risk posed through each exposure pathway and migration route.

The Draft FS will provide a detailed analysis of each remedial alternative according to the applicable requirements of WAC 173-340-350, MTCA Remedial Investigation and Feasibility Study, and WAC 173-204-560, SMS Cleanup Study. The remedial alternatives will be evaluated for compliance with the applicable requirements of WAC 173-340-360, Selection of Cleanup Actions, and WAC 173-204-560(4), including a detailed evaluation of remedial alternatives relative to the following criteria:

- Compliance with Cleanup Standards and Applicable Laws
- Protection of Human Health
- Protection of the Environment
- Provision for a Reasonable Restoration Time Frame
- Use of Permanent Solutions to the Maximum Extent Practicable
- The Degree to which Recycling, Reuse, and Waste Minimization are Employed
- Short-term Effectiveness
- Long-Term Effectiveness
- Net Environmental Benefit
- Implementability
- Provision for Compliance Monitoring
- Cost-Effectiveness
- Prospective Community Acceptance

The remedial alternative that is judged to best satisfy the evaluation criteria will be identified. Justification for the selection will be provided, and the recommended remedial alternative further developed, in the FS Report.

The PLPs shall prepare two (2) copies of the Draft FS Report and submit them, including one electronic copy in Word (.doc) and Adobe (.pdf) formats, to Ecology for review.

After addressing Ecology's comments on the Draft Report and after Ecology approval, The PLPs shall prepare five (5) copies of the Draft Final FS Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment.

TASK 5. SEPA COMPLIANCE

The PLPs shall be responsible for complying with the State Environmental Policy Act (SEPA) Rules including preparing and submitting an environmental checklist. If the result of the threshold determination is a determination of significance (DS), The PLPs shall be responsible for the preparation of Draft and final environmental impact statements. The PLPs shall assist Ecology with coordinating SEPA public involvement requirements with MTCA public involvement requirements whenever possible, such that public comment periods and meetings or hearings can be held concurrently.

TASK 6. PUBLIC PARTICIPATION

The PLPs shall support Ecology in presenting the Final RI and a Draft Final FS Reports and SEPA evaluations at one public meeting or hearing. The PLPs will assist Ecology with presentations at any additional meetings or hearings that might be necessary for SEPA compliance or as part of the Public Participation Plan.

After the public comment periods are completed, The PLPs shall prepare a Draft Responsiveness Summary that addresses public comments and prepare a second Draft Final FS Report that addresses public comments. The PLPs shall prepare two (2) copies of the Draft Responsiveness Summary and second Draft Final FS Report and submit them to Ecology for review and approval, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment.

After addressing Ecology's comments and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Responsiveness Summary and Final FS Report after public comments are incorporated and submit them to Ecology for distribution, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

TASK 7. DRAFT CLEANUP ACTION PLAN

Upon Ecology approval of the Final Remedial Investigation and Draft Feasibility Study Report, The PLPs shall prepare a Draft Cleanup Action Plan (DCAP) in accordance with WAC 173-340-380 that provides a proposed remedial action to address the contamination present on the Site. Where contaminated sediments are included in the remedial action, the cleanup plan will comply with WAC 173-204-580, in addition to the MTCA requirements cited above. The DCAP shall include a general description of the proposed remedial actions, cleanup standards developed from the Remedial Investigation/Feasibility Study and rationale regarding their selection, a schedule for implementation, description of any institutional controls proposed, and a summary of applicable local, state, and federal laws pertinent to the proposed cleanup actions.

The PLPs will submit a Draft Cleanup Action Plan (DCAP) for Ecology's review and approval. The DCAP will include, but not be limited to, the information listed under WAC 173-340-380. The PLPs shall prepare two (2) copies of the DCAP and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and approval.

After receiving Ecology's comments on the DCAP, if any, The PLPs shall revise the DCAP to address Ecology's comments and submit five (5) copies of the DCAP including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

TASK 8. PROGRESS REPORTS

The PLPs shall submit Progress Reports monthly. Progress Reports shall be submitted to Ecology until satisfaction of the AO in accordance with Section IX of the AO. Progress Reports shall be submitted to the Ecology project coordinator by the 15th of the month following the reporting month. If this day is a weekend or holiday, deliverables will be submitted to Ecology on the next business day. At a minimum, Progress Reports shall contain the following information regarding the preceding reporting period:

- A description of the actions which have been taken to comply with the AO.
- Summaries of sampling and testing reports and other data reports received by the PLPs
- Summaries of deviations from approved Work Plans
- Summaries of contacts with representatives of the local community, public interest groups, press, and federal, state, or tribal governments
- Summaries of problems or anticipated problems in meeting the schedule or objectives set forth in the SOW and Work Plan
- Summaries of solutions developed and implemented or planned to address any actual or anticipated problems or delays
- Changes in key personnel
- A description of work planned for the next reporting period.

EXHIBIT C – SCHEDULE OF DELIVERABLES

Duwamish Marine Center

The schedule for deliverables described in Exhibit B of this Agreed Order is presented below. If at any time during the Remedial Investigation (RI), Feasibility Study (FS), and Draft Cleanup Action Plan (DCAP) process unanticipated conditions or changed circumstances are discovered which might result in a schedule delay, James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust, shall bring such information to the attention of Ecology. Ecology will determine whether a schedule extension is warranted under the terms of the Agreed Order, Section VIII.K. (Extension of Schedule). Any completion times that fall on a holiday or weekend will be extended to the next working day.

RI/FS Deliverables	**Completion Times**
Draft RI/FS Work Plan	60 calendar days following effective date of the Agreed Order
Final RI/FS Work Plan and Draft Sampling and Analysis Plan (SAP), and Quality Assurance Project Plan (QAPP)	60 calendar days following receipt of Ecology comments on draft RI/FS Work Plan
Final SAP, QAPP and HSP	45 calendar days following receipt of Ecology comments on draft SAP and QAPP
Completion of RI Field Work	12 months following completion of the Final SAP, QAPP and HSP
Draft RI Report	90 days following receipt of laboratory data
Final RI Report	45 calendar days following receipt of Ecology comments on draft RI report
Draft FS Report	90 days following completion of Final RI Report
Draft Final FS Report	45 calendar days following receipt of Ecology's review comments
2nd Draft Final FS Report	60 calendar days following receipt of Ecology responses to public comments
Final FS Report and Responsiveness Summary	45 calendar days following receipt of Ecology's review comments
Draft Cleanup Action Plan (DCAP)	90 calendar days following completion of the Final FS Report and Responsiveness Summary
Progress Reports	15th of every month beginning after the completion of the first full month after the effective date of the AO

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

In the Matter of Remedial Action at:	AGREED ORDER
James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust; Duwamish Marine Center Site	No. DE 8072

TO: James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust
c/o Filter Engineering Co.
16 S. Michigan St.
Seattle, WA 98108

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EXHIBIT A. Site Diagram
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I. INTRODUCTION

The mutual objective of the State of Washington, Department of Ecology (Ecology) and James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust (Gilmur Trustees) under this Agreed Order (Order) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires the Gilmur Trustees to complete a Remedial Investigation (RI), Feasibility Study (FS), and prepare a Draft Cleanup Action Plan (DCAP) for the site. Ecology believes the actions required by this Order are in the public interest.

II. JURISDICTION

This Agreed Order is issued pursuant to the Model Toxics Control Act (MTCA), RCW 70.105D.050(1).

III. PARTIES BOUND

This Agreed Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such party to comply with this Order. The Gilmur Trustees agree to undertake all actions required by the terms and conditions of this Order. No change in ownership or corporate status shall alter the Gilmur Trustees' responsibility under this Order. The Gilmur Trustees shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

IV. DEFINITIONS

Unless otherwise specified herein, the definitions set forth in RCW 70.105D and WAC 173-340 shall control the meanings of the terms in this Order.

A. Site: The Site is referred to as Duwamish Marine Center, Ecology Facility Site Number 21945598 and is generally located at 6365 1st Avenue S., Seattle, King County, Washington. The Site is defined by the extent of contamination caused by the release of hazardous substances at the Site. Based upon factors currently known to Ecology, the Site is

more particularly described in the Site Diagram (Exhibit A). The Site constitutes a Facility under RCW 70.105D.020(5).

B. Parties: Refers to the State of Washington, Department of Ecology and the Gilmur Trustees.

C. Potentially Liable Person (PLP): Refers to PLPs named for the site: the Gilmur Trustees and the S & JA Hale Family Limited Partnership. The S & JA Hale Family Limited Partnership, while named PLP, is not a party to this Agreed Order.

D. Agreed Order or Order: Refers to this Order and each of the exhibits to this Order. All exhibits are integral and enforceable parts of this Order. The terms "Agreed Order" or "Order" shall include all exhibits to this Order.

V. FINDINGS OF FACT

Ecology makes the following findings of fact, without any express or implied admissions of such facts by the Gilmur Trustees:

A. The Gilmur Trustees have an ownership interest in tax parcels 5367204565, 5367203415, and 5367203447 generally located at 6365 1st Avenue S., Seattle.

B. The S & JA Hale Family Limited Partnership has an ownership interest in tax parcel 5367204565 generally located at 6365 1st Avenue S., Seattle.

C. The site has been the subject of environmental investigations in the past. These investigations and cleanups are documented in the reports:

> *Lower Duwamish Waterway, RM 1.7 to 2.0 East (Slip 2 to Slip 3), Summary of Existing Information and Data Gaps, SAIC*, February 2009.
>
> *Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington, Pacific Crest Environmental*, May 2009
>
> *The Riley Group, Inc. 2000. Preliminary Phase II Subsurface Investigation, Duwamish Marine Center Property. Prepared by The Riley Group, Inc. for Jim Gilmur, Duwamish Marine Center*, September 13, 2000.
>
> *Farallon Consulting. 2002d. Site Closure Report, Gilmur/Hale Family Trust Site, 6365 First Avenue South, Seattle, Washington. Prepared by Lauren Carroll, Farallon Consulting, for Jim Gilmur*, September 25, 2002.
>
> *Farallon Consulting. 2004. Report of Compliance Monitoring and Request for No Further Action Determination for Groundwater and Soil, Gilmur/Hale Family Trust Site. Prepared by Farallon Consulting*, December 8, 2004.

Ecology. 2000a. Sediment quality in Puget Sound. Year 2 – Central Puget Sound. Washington Department of Ecology, Olympia, WA.

SEA. 2000b. PSDDA Sediment Characterization of Duwamish River Navigation Channel: FY2000 Operations and Maintenance Dredging Data Report. Prepared for U.S. Army Corps of Engineers, Seattle District.

Weston (Roy F. Weston, Inc.). 1999. Site inspection report: Lower Duwamish River, RM 2.5-11.5, Volume 1 – Report and appendices. Prepared by Roy F. Weston, Inc., for U.S. Environmental Protection Agency Region 10, Seattle, WA.

Windward. 2007a. Data Report: Subsurface Sediment Sampling for Chemical Analyses, Final. Prepared by Windward Environmental LLC for the Lower Duwamish Waterway Group, January 29, 2007.

D. Environmental investigations and independent cleanups at the site revealed releases of metals, volatile organic compounds, semi-volatile organic compounds, polychlorinated biphenyls (PCBs), and petroleum hydrocarbons in the soil and groundwater and PCBs, lead, phthalates, benzoic acid, PAHs, and dibenzofuran in the sediment in the Lower Duwamish Waterway (LDW) adjacent to the site. These contaminants are hazardous substances under WAC 173-340-200 and are found in several samples from the site and the adjacent LDW above the MTCA cleanup action levels and Sediment Management Standards, WAC 173-204, and pose a threat to human health and the environment.

E. The U.S. Environmental Protection Agency (EPA) added the LDW to the federal Superfund list on September 13, 2001. The LDW Superfund site is undergoing a Remedial Investigation (RI) under the Joint Administrative Order on Consent of April 2000. Ecology listed the LDW on the Confirmed and Suspected Contaminated Sites List (CSCSL) on February 26, 2002. The Duwamish Marine Center Site requires investigation to determine whether contamination, and therefore the Site, extends from the uplands to the LDW.

F. On the basis of the facts set forth herein, Ecology has determined that a release or threatened release of hazardous substances at the Site requires remedial actions to protect human health and the environment. This Order sets forth the measures that need to be taken to perform a RI/FS and DCAP for the Site.

VI. ECOLOGY DETERMINATIONS

A. The Gilmur Trustees are an "owner" as defined in RCW 70.105D.020(17) of a "facility" as defined in RCW 70.105D.020(5) because the Gilmur Trustees are not named in their personal or individual capactity, but are named in their capacity as Trustees for the James D. and Jacqueline H. Gilmur Living Trust and because the Gilmur Trustees have an ownership interest in the property generally located at 6365 1st Avenue S., Seattle, Washington.

B. The S & JA Hale Family Limited Partnership is an "owner" as defined in RCW 70.105D.020(17) of a "facility" as defined in RCW 70.105D.020(5) because the S & JA Hale Family Limited Partnership has an ownership interest in the property generally located at 6365 1st Avenue S., Seattle, Washington.

C. Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70.105D.020(25) and RCW 70.105D.020(10), respectively, has occurred at the Site.

D. Based upon credible evidence, Ecology issued a PLP status letter to the Gilmur Trustees dated August 31, 2010 pursuant to RCW 70.105D.040, -.020(21) and WAC 173-340-500. After providing for notice and opportunity for comment, reviewing any comments submitted, and concluding that credible evidence supported a finding of potential liability, Ecology issued a determination that the Gilmur Trustees are a PLP under RCW 70.105D.040 and notified the Gilmur Trustees of this determination by letter dated October 26, 2010.

E. Based upon credible evidence, Ecology issued a PLP status letter to the S & JA Hale Family Limited Partnership dated August 31, 2010 pursuant to RCW 70.105D.040, -.020(21) and WAC 173-340-500. After providing for notice and opportunity for comment, reviewing any comments submitted, and concluding that credible evidence supported a finding of potential liability, Ecology issued a determination that the S & JA Hale Family Limited Partnership is a PLP under RCW 70.105D.040 and notified the S & JA Hale Family Limited Partnership of this determination by letter dated November 1, 2010.

F. Pursuant to RCW 70.105D.030(1) and RCW 70.105D.050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or

threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial actions required by this Order are in the public interest.

G. Under WAC 173-340-430, an interim action is a remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance, that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed, or that is needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study or design of a cleanup action. Ecology, with input from the Gilmur Trustees, will determine if interim actions are warranted, including those that reduce or eliminate sources of contamination into the adjacent LDW.

VII. WORK TO BE PERFORMED

Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the Gilmur Trustees take the following remedial actions at the Site and that these actions be conducted in accordance with WAC 173-340 unless otherwise specifically provided for herein:

A. The Gilmur Trustees shall prepare and implement a Work Plan to conduct a Remedial Investigation (RI) and Feasibility Study (FS). After completing approved reports for the RI and FS, the Gilmur Trustees will prepare a Draft Cleanup Action Plan (DCAP) in accordance with WAC 173-304-350 through 173-340-390 and WAC 173-204. A scope of work for the RI, FS, and DCAP is more particularly described in Exhibit B, "Scope of Work" and is incorporated by reference as an enforceable part of this Order.

B. The schedule of work performance and list of deliverables is described in Exhibit C, "Schedule of Deliverables" and is incorporated by reference as an enforceable part of this Order.

C. Should an interim action be determined necessary under Section VI.E., the Gilmur Trustees will prepare and implement an Interim Action Work Plan as specified in Task 3 of Exhibit B, Scope of Work. The public notice and comment period will be in accordance with the Public Participation Plan.

D. The Gilmur Trustees shall submit Monthly Progress Reports. Progress reports shall be submitted to Ecology until satisfaction of the AO in accordance with Section IX of the AO. Progress Reports shall be submitted to the Ecology project coordinator by the 15th of the month following the reporting month. If this day is a weekend or holiday, deliverables will be submitted to Ecology on the next business day. At a minimum, progress reports shall contain the following information regarding the preceding reporting period:

- A description of the actions which have been taken to comply with the AO.
- Summaries of sampling and testing reports and other data reports received by the Gilmur Trustees.
- Summaries of deviations from approved work plans.
- Summaries of contacts with representatives of the local community, public interest groups, press, and federal, state, or tribal governments.
- Summaries of problems or anticipated problems in meeting the schedule or objectives set forth in the SOW and Work Plan.
- Summaries of solutions developed and implemented or planned to address any actual or anticipated problems or delays.
- Changes in key personnel.
- A description of work planned for the next reporting period.

E. If, at any time after the first exchange of comments on drafts, Ecology determines that insufficient progress is being made in the preparation of any of the deliverables required by this Section, Ecology may complete and issue the final deliverable.

VII. TERMS AND CONDITIONS OF ORDER

A. Public Notice

RCW 70.105D.030(2)(a) requires that, at a minimum, this Order be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this Order should public comment disclose facts or considerations which indicate to Ecology that this Order is inadequate or improper in any respect.

B. Remedial Action Costs

The Gilmur Trustees shall pay to Ecology costs incurred by Ecology pursuant to this Order and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or its contractors for, or on, the Site under RCW 70.105D, including remedial actions and Order preparation, negotiation, oversight, and administration. These costs shall include work performed both prior to and subsequent to the issuance of this Order. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Ecology has accumulated $11,937.19 in remedial action costs related to this facility as of November 30, 2010. Payment for this amount shall be submitted within thirty (30) days of the effective date of this Order. For all costs incurred subsequent to November 30, 2010, the Gilmur Trustees shall pay the required amount within thirty (30) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly.

In addition to other available relief pursuant to RCW 19.16.500, Ecology may utilize a collection agency and/or, pursuant to RCW 70.105D.055, file a lien against real property subject to the remedial actions to recover unreimbursed remedial action costs.

C. Implementation of Remedial Action

If Ecology determines that the Gilmur Trustees have failed without good cause to implement the remedial action, in whole or in part, Ecology may, after notice to the Gilmur Trustees, perform any or all portions of the remedial action that remain incomplete. If Ecology performs all or portions of the remedial action because of the Gilmur Trustees' failure to comply with its obligations under this Order, the Gilmur Trustees shall reimburse Ecology for the costs of doing such work in accordance with Section VIII.B. (Remedial Action Costs), provided that

the Gilmur Trustees are not obligated under this Section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of this Order.

Except where necessary to abate an emergency situation, the Gilmur Trustees shall not perform any remedial actions at the Site outside those remedial actions required by this Order, unless Ecology concurs, in writing, with such additional remedial actions.

D. Designated Project Coordinators

The project coordinator for Ecology is:

Victoria Sutton
Washington Department of Ecology
Northwest Regional Office
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, Washington 98008
Telephone: (425) 649-7219
Fax: (425) 649-7161
Email: vsut461@ecy.wa.gov

The project coordinator for the Gilmur Trustees is:

Stephen Plowman
8048 NE 8th Street
Medina, WA 98039
Telphone: (425) 233-0321
Fax: (425) 968-1390
sjplowman@gmail.com

Each project coordinator shall be responsible for overseeing the implementation of this Order. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and the Gilmur Trustees, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the work to be performed required by this Order.

Any party may change its respective project coordinator. Written notification shall be given to the other party at least ten (10) calendar days prior to the change.

E. Performance

All geologic and hydrogeologic work performed pursuant to this Order shall be under the supervision and direction of a geologist licensed in the State of Washington or under the direct supervision of an engineer registered in the State of Washington, except as otherwise provided for by RCW 18.220 and RCW 18.43.

All engineering work performed pursuant to this Order shall be under the direct supervision of a professional engineer registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Order shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrologic or engineering work shall be under the seal of an appropriately licensed professional as required by RCW 18.220 or RCW 18.43.130.

The Gilmur Trustees shall notify Ecology in writing of the identity of any engineer(s) and geologist(s), contractor(s) and subcontractor(s), and others to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

F. Access

Ecology or any Ecology authorized representative shall have the full authority to enter and freely move about all property at the Site that the Gilmur Trustees either owns, controls, or has access rights to at all reasonable times for the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the Gilmur Trustees' progress in carrying out the terms of this Order; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the Gilmur Trustees. The Gilmur Trustees shall make all reasonable efforts to secure access rights for those properties within the Site not owned or controlled by the Gilmur Trustees where remedial activities or investigations will be performed

pursuant to this Order. Ecology or any Ecology authorized representative shall give reasonable notice before entering any Site property owned or controlled by the Gilmur Trustees unless an emergency prevents such notice. All persons who access the Site pursuant to this Section shall comply with any applicable Health and Safety Plan(s). Ecology employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

G. Sampling, Data Submittal, and Availability

With respect to the implementation of this Order, the Gilmur Trustees shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section VII (Work to be Performed), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, the Gilmur Trustees shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by the Gilmur Trustees pursuant to implementation of this Order. The Gilmur Trustees shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow the Gilmur Trustees and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order, provided that doing so does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section VIII.F. (Access), Ecology shall notify the Gilmur Trustees prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under WAC 173-50 for the specific analyses to be conducted, unless otherwise approved by Ecology.

H. Public Participation

A Public Participation Plan is required for this Site. Ecology shall review any existing Public Participation Plan to determine its continued appropriateness and whether it requires

amendment, or if no plan exists, Ecology shall develop a Public Participation Plan alone or in conjunction with the Gilmur Trustees.

Ecology shall maintain the responsibility for public participation at the Site. However, the Gilmur Trustees shall cooperate with Ecology, and shall:

1. If agreed to by Ecology, develop appropriate mailing list, prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings.

2. Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before major meetings with the interested public and local governments. Likewise, Ecology shall notify the Gilmur Trustees prior to the issuance of all press releases and fact sheets, and before major meetings with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by the Gilmur Trustees that do not receive prior Ecology approval, the Gilmur Trustees shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

3. When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions or as a presenter.

4. When requested by Ecology, arrange and/or continue information repositories to be located at the following locations:

a. Seattle Public Library - South Park Branch
8604 Eight Ave S. at South Cloverdale St.
Seattle, WA 98108

b. Ecology's Northwest Regional Office
3190 160th Avenue SE
Bellevue, Washington 98008

At a minimum, copies of all public notices, fact sheets, and press releases; all quality assured monitoring data; remedial action plans and reports, supplemental remedial planning

documents, and all other similar documents relating to performance of the remedial action required by this Order shall be promptly placed in these repositories.

I. Retention of Records

During the pendency of this Order, and for ten (10) years from the date of completion of work performed pursuant to this Order, the Gilmur Trustees shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors. Upon request of Ecology, the Gilmur Trustees shall make all records available to Ecology and allow access for review within a reasonable time.

J. Resolution of Disputes

1. In the event a dispute arises as to an approval, disapproval, proposed change, or other decision or action by Ecology's project coordinator, or an itemized billing statement under Section VIII.B. (Remedial Action Costs), the Parties shall utilize the dispute resolution procedure set forth below.

a. Upon receipt of Ecology's project coordinator's written decision or the itemized billing statement, the Gilmur Trustees have fourteen (14) days within which to notify Ecology's project coordinator in writing of its objection to the decision or itemized statement.

i. The Gilmur Trustees shall include in the written objection sufficient detail to allow Ecology to evaluate the merits of the dispute.

ii. Such detail shall include the specific Ecology determination or direction or itemized statement in dispute and shall include specific argument(s) documenting the basis for invoking the dispute resolution procedure.

iii. Clarification of Ecology directions or determinations shall not be handled through the dispute resolution procedure. The Ecology Project Coordinator will make such clarifications in a manner and time they deem appropriate to expedite to the maximum extent practicable the work performed under this order.

b. The Parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

c. The Gilmur Trustees may then request regional management review of the decision. This request shall be submitted in writing to the NWRO Region Toxics Cleanup Section Manager within seven (7) days of receipt of Ecology's project coordinator's written decision.

d. The Section Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within thirty (30) days of the Gilmur Trustees's request for review. The Section Manager's decision shall be Ecology's final decision on the disputed matter.

2. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

3. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

K. Extension of Schedule

1. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify:

a. The deadline that is sought to be extended.

b. The length of the extension sought.

c. The reason(s) for the extension.

d. Any related deadline or schedule that would be affected if the extension were granted.

2. The burden shall be on the Gilmur Trustees to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

a. Circumstances beyond the reasonable control and despite the due diligence of the Gilmur Trustees including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by the Gilmur Trustees;

b. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

c. Endangerment as described in Section VIII.M. (Endangerment).

However, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of the Gilmur Trustees.

3. Ecology shall act upon any written request for extension in a timely fashion. Ecology shall give the Gilmur Trustees written notification of any extensions granted pursuant to this Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section VIII.L. (Amendment of Order) when a schedule extension is granted.

4. An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

a. Delays in the issuance of a necessary permit which was applied for in a timely manner.

b. Other circumstances deemed exceptional or extraordinary by Ecology.

c. Endangerment as described in Section VIII.M. (Endangerment).

L. Amendment of Order

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section VIII.N. (Reservation of Rights), substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and the Gilmur Trustees. The Gilmur Trustees shall submit a written request for amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request for amendment is received. If the amendment to this Order represents a substantial change, Ecology will provide public notice and opportunity to comment. Reasons for the disapproval of a proposed amendment to this Order shall be stated in writing. If Ecology does not agree to a proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section VIII.J. (Resolution of Disputes).

M. Endangerment

In the event Ecology determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct the Gilmur Trustees to cease such activities for such period of time as it deems necessary to abate the danger. The Gilmur Trustees shall immediately comply with such direction.

In the event the Gilmur Trustees determine that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment, the Gilmur Trustees may cease such activities. The Gilmur Trustees shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction, the Gilmur Trustees shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with the Gilmur Trustees cessation of activities, it may direct the Gilmur Trustees to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to Section VIII.M., the Gilmur Trustees obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended in accordance with Section VIII.K. (Extension of Schedule) for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

N. Reservation of Rights

This Order is not a settlement under RCW 70.105D. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any of Ecology's rights or authority. Ecology will not, however, bring an action against the Gilmur Trustees to recover remedial action costs paid to and received by Ecology under this Order. In addition, Ecology will not take additional enforcement actions against the Gilmur Trustees regarding remedial actions required by this Order, provided the Gilmur Trustees complies with this Order.

Ecology nevertheless reserves its rights under RCW 70.105D, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health and the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

O. Transfer of Interest in Property

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by the Gilmur Trustees without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to the Gilmur Trustees transfer of any interest in all or any portion of the Site, and during the effective period of this Order, the Gilmur Trustees shall provide a copy of this Order to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and,

at least thirty (30) days prior to any transfer, the Gilmur Trustees shall notify Ecology of said transfer. Upon transfer of any interest, the Gilmur Trustees shall restrict uses and activities to those consistent with this Order and notify all transferees of the restrictions on the use of the property.

P. Compliance with Applicable Laws

1. All actions carried out by the Gilmur Trustees pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in RCW 70.105D.090. At this time, no federal, state or local requirements have been identified as being applicable to the actions required by this Order**.**

2. Pursuant to RCW 70.105D.090(1), the Gilmur Trustees are exempt from the procedural requirements of RCW 70.94, RCW 70.95, RCW 70.105, RCW 77.55, RCW 90.48, and RCW 90.58 and of any laws requiring or authorizing local government permits or approvals. However, the Gilmur Trustees shall comply with the substantive requirements of such permits or approvals. At this time, no state or local permits or approvals have been identified as being applicable but procedurally exempt under this Section**.**

The Gilmur Trustees have a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or the Gilmur Trustees determine that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other party of its determination. Ecology shall determine whether Ecology or the Gilmur Trustees shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the Gilmur Trustees shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the Gilmur Trustees and on how the Gilmur Trustees must meet those requirements. Ecology shall inform

the Gilmur Trustees in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The Gilmur Trustees shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

3. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency that is necessary for the State to administer any federal law, the exemption shall not apply and the Gilmur Trustees shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits.

Q. Indemnification

The Gilmur Trustees agree to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property to the extent arising from or on account of acts or omissions of the Gilmur Trustees, its officers, employees, agents, or contractors in entering into and implementing this Order. However, the Gilmur Trustees shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Order.

VIII. SATISFACTION OF ORDER

The provisions of this Order shall be deemed satisfied upon the Gilmur Trustees' receipt of written notification from Ecology that the Gilmur Trustees have completed the remedial activity required by this Order, as amended by any modifications, and that the Gilmur Trustees have complied with all other provisions of this Agreed Order.

IX. ENFORCEMENT

Pursuant to RCW 70.105D.050, this Order may be enforced as follows:

A. The Attorney General may bring an action to enforce this Order in a state or federal court.

B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.

C. In the event the Gilmur Trustees refuse, without sufficient cause, to comply with any term of this Order, the Gilmur Trustees will be liable for:

a. Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply; and

b. Civil penalties of up to twenty-five thousand dollars ($25,000) per day for each day it refuses to comply.

D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: ~~(8-2-11)~~ RCW SEPTEMBER 2, 2011

JAMES D. GILMUR, TRUSTEE

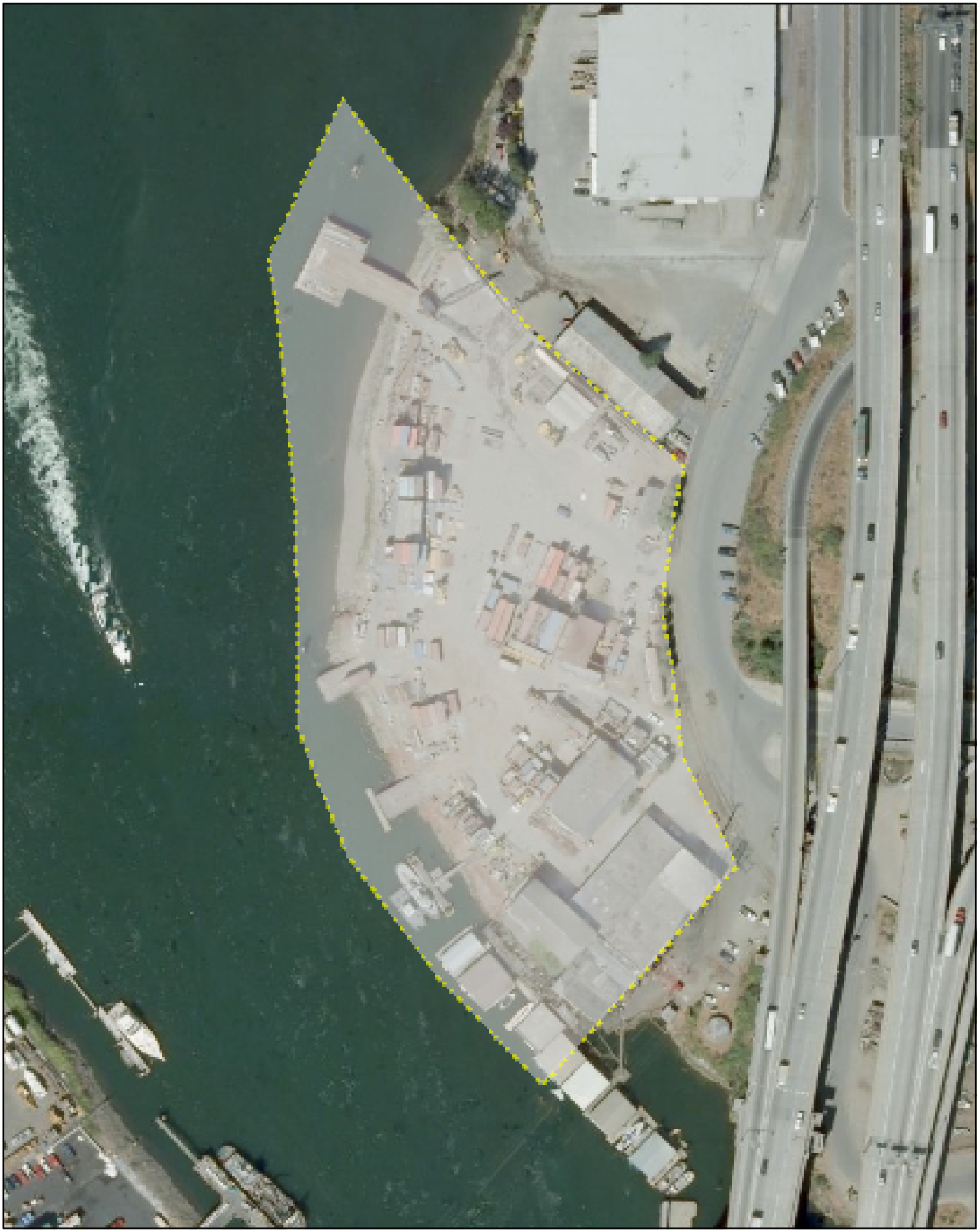
James D. Gilmur
Trustee of the James D. and Jacqueline H. Gilmur Living Trust
Seattle, Washington
(206) 390-4039

JACQUELINE H. GILMUR, TRUSTEE

Jacqueline H. Gilmur
Trustee of the James D. and Jacqueline H. Gilmur Living Trust
Seattle, Washington
(206) 390-4039

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY

Robert W. Warren, P.Hg., MBA
Section Manager
Toxics Cleanup Program
NWRO Regional Office
Telephone: 425 649-7054



Duwamish Marine Center
Exhibit A

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DEPARTMENT OF ECOLOGY
State of Washington

EXHIBIT B – SCOPE OF WORK (SOW)
Duwamish Marine Center

PURPOSE

The work under this Agreed Order (AO) involves conducting a Remedial Investigation (RI) and Feasibility Study (FS), conducting interim actions if required or agreed to by Ecology, and preparing a Draft Cleanup Action Plan (DCAP) to select a cleanup alternative. The purpose of this RI, FS, and DCAP for the Duwamish Marine Center Site (the Site) is to provide sufficient data, analysis, and evaluations to enable Ecology to select a cleanup alternative for the Site.

The SOW is divided into six major tasks as follows:

Task 1. RI/FS Work Plan
Task 2. Remedial Investigation
Task 3. Interim Actions (if required)
Task 4. Feasibility Study
Task 5. SEPA Compliance
Task 6. Public Participation
Task 7. DCAP
Task 8. Progress Reports

TASK 1. RI/FS WORK PLAN

James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust (hereinafter referred to as the PLPs) shall prepare a Remedial Investigation/Feasibility Study Work Plan (Work Plan). The Work Plan shall include an overall description and schedule of all RI/FS activities. The Work Plan shall clearly describe the project management strategy for implementing and reporting on RI/FS activities. The responsibility and authority of all organizations and key personnel involved in conducting the RI/FS will be outlined.

The Work Plan shall describe general facility information; site history and conditions; including previous operations; past field investigations, including any data collection and analysis of soils, air, groundwater, surface water, and sediments; a conceptual site model showing contaminants, migration pathways in all environmental media, and potential receptors; geology and groundwater system characteristics; past, current, and future land use; identification of natural resources and ecological receptors; hazardous substances and their sources, etc., in compliance with WAC 173-340-350 and WAC 173-204-560.

As part of the project background, existing environmental data on site soil, groundwater, surface water, and sediments will be compiled and evaluated for data gaps. The data gaps will be used as the basis for conducting additional site investigations. The Work

Plan will also identify specific data collection procedures in a Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) as part of the Work Plan in compliance with WAC 173-340-820 and WAC 173-204-600 for defining the nature and extent of contamination.

The SAP identifies the proposed number and location of all environmental samples and methods, including soil borings, groundwater monitoring wells, soil, groundwater, stormwater, seep, catch basin and sediment samples, approximate depths, and includes a quality assurance project plan. The SAP will describe the sampling objectives, the rationale for the sampling approach (based upon the identified data gaps), and plans for data use, and shall provide a detailed description of sampling tasks. The SAP shall describe specifications for sample identifiers; sampling equipment; the type, number, and location of samples to be collected; the analyses to be performed; descriptions of sampling equipment and methods to be used; sample documentation; sample containers, collection and handling; data and records management; and schedule.

The Quality Assurance Project Plan (QAPP) will be prepared in accordance with the Guidance for Preparation of Quality Assurance Project Plans, EPA Region 10, Quality Data Management Program, QA/R-5 and requirements of the EPA Contract Laboratory Program. The QAPP will also follow Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (July 2004) [1]and Sediment Sampling and Analysis Plan Appendix (February 2008).[2] Laboratories must meet the accreditation standards established in WAC 173-50. Data quality objectives will reflect the criteria or threshold values used for the source control evaluation.

The SAP, including the QAPP, will be submitted to Ecology for review and approval. As with all environmental work at the site, work may not begin without written approval from Ecology. The plan shall provide seven (7) days notice to Ecology prior to beginning sampling. Ecology may obtain split samples.

The PLPs or their contractors shall submit all new sampling data generated under this SAP and any other recently collected data to Ecology for entry into the Environmental Information Management System (EIM) in accordance with WAC 173-340-840(5) and Ecology's Toxics Cleanup Program Policy 840: Data Submittal Requirements. Only validated data will be entered into the EIM database within 30 days of submittal.

RI/FS tasks and subtasks will include the following:

- Sampling and analysis of soil, groundwater, and seeps;
- Sampling and analysis of surface and subsurface sediments;
- Sampling and analysis of stormwater and catch basin solids to determine whether the stormwater system is a source of contamination to sediments;

[1] Found at http://www.ecy.wa.gov/biblio/0403030.html
[2] Found at http://www.ecy.wa.gov/biblio/qapp.html

- Evaluate the potential to contaminate or recontaminate sediments, including analysis of the following pathways:
    - Direct discharges
    - Stormwater discharges
    - Overland flow
    - Groundwater discharges and seeps
    - Soil erosion
    - Site operations
    - Spills, dumping, leaks, housekeeping, and management practices;

The FS portion of the Work Plan will provide a detailed analysis of each remedial alternative according to the applicable requirements of WAC 173-340-350, MTCA Remedial Investigation and Feasibility Study, and WAC 173-204-560, SMS Cleanup Study. The remedial alternatives will be evaluated for compliance with the applicable requirements of WAC 173-340-360, Selection of Cleanup Actions, and WAC 173-204-560(4).

The Work Plan shall not be implemented until approved by Ecology. Once approved by Ecology, The PLPs will implement the Work Plan according to the schedule contained in Exhibit C.

The PLPs shall coordinate with Ecology throughout the development of the RI/FS and DCAP and shall keep Ecology informed of changes to the Work Plan and other project plans and of issues and problems as they develop.

The PLPs shall prepare two (2) copies of the Draft RI/FS Work Plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and comment. After addressing Ecology's comments on the Draft Work Plan and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Work Plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology.

TASK 2. REMEDIAL INVESTIGATION

The PLPs shall conduct an RI that meets the requirements of WAC 173-340-350(7) and WAC 173-204-560 according to the Work Plan as approved by Ecology. The RI will determine the nature and extent of contamination exceeding Model Toxics Control Act (MTCA) cleanup levels, Sediment Management Standards (SMS) cleanup standards, and other regulatory requirements. The RI must provide sufficient data and information to define the nature and extent of contamination.

Field sampling and analysis will be completed in general accordance with the SAP and QAPP. Deviation(s) from the approved SAP and QAPP must be communicated to Ecology immediately and documented as required by Ecology.

The PLPs shall provide interim data reports and updates to Ecology as new site data and information become available. Laboratory analysis data shall also be provided in electronic format when it has been validated. Raw laboratory data will be provided to Ecology upon request.

The PLPs shall compile the results of the Site investigation into a Draft RI Report. The PLPs shall prepare two (2) copies of the Draft RI Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and comment.

After addressing Ecology's comments on the Draft Report, The PLPs shall prepare five (5) copies of a Final RI Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment. Electronic survey data for monitoring locations, electronic lab data, and GIS maps of contaminant distribution shall also be provided for both the Draft and Final Reports.

If the data collected during this investigation is insufficient to define the full nature and extent of contamination, an additional phase of investigation shall be conducted to define the extent of contamination.

TASK 3. INTERIM ACTIONS (if required)

Remedial actions implemented prior to completion of the RI/FS

- that are technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance;
- that correct a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed; or
- that are needed to provide for completion of the remedial investigation/feasibility study or design of the cleanup action

will be considered interim actions, will be implemented in accordance with WAC 173-340-430 and the AO, and will be designed in a manner that will not foreclose reasonable alternatives for any final cleanup action that may be required. Remedial actions for contaminated sediments will be designated partial cleanup actions and will be implemented pursuant to WAC 173-204-550(3)(d).

If required by Ecology, or if proposed by The PLPs and approved by Ecology, The PLPs will implement an interim action. Based upon information in the Draft RI report, interim action(s) may be needed to expedite control of releases to sediments or other environmental media pursuant to WAC 173-340-430.

The scope of the interim actions may include, but not be limited to, typical source control or containment elements such as:

- Soil or sediment removal
- Groundwater remediation
- Repair, slip lining, replacement, or closure of stormwater conveyances or other structures such as conduit, vaults, catch basins, etc.
- Removal of underground storage tanks and pipes
- Removal of old drain fields or former surface impoundments
- Proper abandonment of old wells
- Removal of contaminated building or other structural material
- Construction of a treatment facility
- Shoreline stabilization such as bulkhead repair, erosion or seepage control, and grading or clearing.

If an interim action is to be performed, The PLPs will prepare and submit for Ecology approval a Draft Interim Action Work Plan (IAWP) with detail commensurate with the work to be performed. The Draft IAWP shall include, as appropriate:

- Description of the interim action including its purpose, general requirements, and relationship to the (final) cleanup action (to the extent known);
- Summary of relevant RI/FS information, including at a minimum existing site conditions and alternative interim actions considered;
- Information regarding design and construction requirements, including a proposed schedule and personnel roles and responsibilities;
- Compliance Monitoring Plan;
- SAP/QAPP.

The PLPs will also submit a copy of the Health and Safety Plan for the project. The PLPs will be responsible for complying with the State Environmental Policy Act (SEPA) Rules including preparing and submitting an environmental checklist for the interim action, and will assist Ecology with presentations at any additional meetings or hearings that might be necessary for SEPA compliance or as part of the Public Participation Plan.

Once approved by Ecology, The PLPs will implement the interim action according to the schedule contained in the IAWP.

The PLPs shall prepare two (2) copies of the Draft Interim Action Work Plan and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and approval. After the public notice and comment period, addressing Ecology's and the public's comments on the Draft Interim Action Work Plan and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Interim Action Work Plan submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

Upon successful completion of the work, a Draft Interim Action Report will be prepared as a separate deliverable. The PLPs shall prepare two (2) copies of the Draft Interim Action Report and submit them, including one electronic copy each in Word (.doc) and

Adobe (.pdf) formats, to Ecology for review and approval. After addressing Ecology's comments on the Draft Interim Action Report and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Interim Action Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology.

TASK 4. FEASIBILITY STUDY

The PLPs shall use the information obtained in the RI to prepare a Draft Feasibility Study (FS) that meets the applicable requirements of WAC 173-340-350(8) according to the approved Work Plan and Schedule (Exhibit C).

The Draft FS will evaluate remedial alternatives for site cleanup, consistent with MTCA and SMS requirements to ensure protection of human health and the environment by eliminating, reducing, or otherwise controlling risk posed through each exposure pathway and migration route.

The Draft FS will provide a detailed analysis of each remedial alternative according to the applicable requirements of WAC 173-340-350, MTCA Remedial Investigation and Feasibility Study, and WAC 173-204-560, SMS Cleanup Study. The remedial alternatives will be evaluated for compliance with the applicable requirements of WAC 173-340-360, Selection of Cleanup Actions, and WAC 173-204-560(4), including a detailed evaluation of remedial alternatives relative to the following criteria:

- Compliance with Cleanup Standards and Applicable Laws
- Protection of Human Health
- Protection of the Environment
- Provision for a Reasonable Restoration Time Frame
- Use of Permanent Solutions to the Maximum Extent Practicable
- The Degree to which Recycling, Reuse, and Waste Minimization are Employed
- Short-term Effectiveness
- Long-Term Effectiveness
- Net Environmental Benefit
- Implementability
- Provision for Compliance Monitoring
- Cost-Effectiveness
- Prospective Community Acceptance

The remedial alternative that is judged to best satisfy the evaluation criteria will be identified. Justification for the selection will be provided, and the recommended remedial alternative further developed, in the FS Report.

The PLPs shall prepare two (2) copies of the Draft FS Report and submit them, including one electronic copy in Word (.doc) and Adobe (.pdf) formats, to Ecology for review.

After addressing Ecology's comments on the Draft Report and after Ecology approval, The PLPs shall prepare five (5) copies of the Draft Final FS Report and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment.

TASK 5. SEPA COMPLIANCE

The PLPs shall be responsible for complying with the State Environmental Policy Act (SEPA) Rules including preparing and submitting an environmental checklist. If the result of the threshold determination is a determination of significance (DS), The PLPs shall be responsible for the preparation of Draft and final environmental impact statements. The PLPs shall assist Ecology with coordinating SEPA public involvement requirements with MTCA public involvement requirements whenever possible, such that public comment periods and meetings or hearings can be held concurrently.

TASK 6. PUBLIC PARTICIPATION

The PLPs shall support Ecology in presenting the Final RI and a Draft Final FS Reports and SEPA evaluations at one public meeting or hearing. The PLPs will assist Ecology with presentations at any additional meetings or hearings that might be necessary for SEPA compliance or as part of the Public Participation Plan.

After the public comment periods are completed, The PLPs shall prepare a Draft Responsiveness Summary that addresses public comments and prepare a second Draft Final FS Report that addresses public comments. The PLPs shall prepare two (2) copies of the Draft Responsiveness Summary and second Draft Final FS Report and submit them to Ecology for review and approval, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for distribution and public comment.

After addressing Ecology's comments and after Ecology approval, The PLPs shall prepare five (5) copies of the Final Responsiveness Summary and Final FS Report after public comments are incorporated and submit them to Ecology for distribution, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

TASK 7. DRAFT CLEANUP ACTION PLAN

Upon Ecology approval of the Final Remedial Investigation and Draft Feasibility Study Report, The PLPs shall prepare a Draft Cleanup Action Plan (DCAP) in accordance with WAC 173-340-380 that provides a proposed remedial action to address the contamination present on the Site. Where contaminated sediments are included in the remedial action, the cleanup plan will comply with WAC 173-204-580, in addition to the MTCA requirements cited above. The DCAP shall include a general description of the proposed remedial actions, cleanup standards developed from the Remedial Investigation/Feasibility Study and rationale regarding their selection, a schedule for implementation, description of any institutional controls proposed, and a summary of applicable local, state, and federal laws pertinent to the proposed cleanup actions.

The PLPs will submit a Draft Cleanup Action Plan (DCAP) for Ecology's review and approval. The DCAP will include, but not be limited to, the information listed under WAC 173-340-380. The PLPs shall prepare two (2) copies of the DCAP and submit them, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats, to Ecology for review and approval.

After receiving Ecology's comments on the DCAP, if any, The PLPs shall revise the DCAP to address Ecology's comments and submit five (5) copies of the DCAP including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

TASK 8. PROGRESS REPORTS

The PLPs shall submit Progress Reports monthly. Progress Reports shall be submitted to Ecology until satisfaction of the AO in accordance with Section IX of the AO. Progress Reports shall be submitted to the Ecology project coordinator by the 15th of the month following the reporting month. If this day is a weekend or holiday, deliverables will be submitted to Ecology on the next business day. At a minimum, Progress Reports shall contain the following information regarding the preceding reporting period:

- A description of the actions which have been taken to comply with the AO.
- Summaries of sampling and testing reports and other data reports received by the PLPs
- Summaries of deviations from approved Work Plans
- Summaries of contacts with representatives of the local community, public interest groups, press, and federal, state, or tribal governments
- Summaries of problems or anticipated problems in meeting the schedule or objectives set forth in the SOW and Work Plan
- Summaries of solutions developed and implemented or planned to address any actual or anticipated problems or delays
- Changes in key personnel
- A description of work planned for the next reporting period.

EXHIBIT C – SCHEDULE OF DELIVERABLES

Duwamish Marine Center

The schedule for deliverables described in Exhibit B of this Agreed Order is presented below. If at any time during the Remedial Investigation (RI), Feasibility Study (FS), and Draft Cleanup Action Plan (DCAP) process unanticipated conditions or changed circumstances are discovered which might result in a schedule delay, James D. Gilmur and Jacqueline H. Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust, shall bring such information to the attention of Ecology. Ecology will determine whether a schedule extension is warranted under the terms of the Agreed Order, Section VIII.K. (Extension of Schedule). Any completion times that fall on a holiday or weekend will be extended to the next working day.

RI/FS Deliverables	**Completion Times**
Draft RI/FS Work Plan	60 calendar days following effective date of the Agreed Order
Final RI/FS Work Plan and Draft Sampling and Analysis Plan (SAP), and Quality Assurance Project Plan (QAPP)	60 calendar days following receipt of Ecology comments on draft RI/FS Work Plan
Final SAP, QAPP and HSP	45 calendar days following receipt of Ecology comments on draft SAP and QAPP
Completion of RI Field Work	12 months following completion of the Final SAP, QAPP and HSP
Draft RI Report	90 days following receipt of laboratory data
Final RI Report	45 calendar days following receipt of Ecology comments on draft RI report
Draft FS Report	90 days following completion of Final RI Report
Draft Final FS Report	45 calendar days following receipt of Ecology's review comments
2nd Draft Final FS Report	60 calendar days following receipt of Ecology responses to public comments
Final FS Report and Responsiveness Summary	45 calendar days following receipt of Ecology's review comments
Draft Cleanup Action Plan (DCAP)	90 calendar days following completion of the Final FS Report and Responsiveness Summary
Progress Reports	15th of every month beginning after the completion of the first full month after the effective date of the AO

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

September 2, 2011

Stephen Plowman
8048 NE 8th Street
Medina, WA 98039

Re: Effective Date of Agreed Order No. 8072
Remedial Investigation/Feasibility Study and draft Cleanup Action Plan
Duwamish Marine Center Site, Seattle, WA
Facility Site No. 21945598

Dear Mr. Plowman:

The thirty-day public comment period has ended for the draft Agreed Order (AO) for the Duwamish Marine Center Site located at 6365 1st Avenue South, Seattle, Washington. One public comment letter was received. Copies of the public comment letter and Ecology's response to the comments were provided to you via email on September 1, 2011.

Ecology signed the AO and it became effective on September 2, 2011. Two minor changes were made to the document for clarity. The changes were:

1) Change the word "by" to "at" in the top line
2) Add the site name to the top left box, "Duwamish Marine Center"

A printed copy of the final AO is enclosed for your records.

The rights and responsibilities of a Potentially Liable Person (PLP) are outlined in Chapter 70.105D RCW, and WAC 173-340. Exhibit C of the AO, Schedule of Deliverables, indicates that the first deliverable is the Draft Remedial Investigation/Feasibility (RI/FS) Work Plan which is due on November 1, 2011.

We look forward to working with the Duwamish Marine Center on this project. If you have any questions or need assistance, please contact the site manager, Victoria Sutton at 425-649-7219 or victoria.sutton@ecy.wa.gov.

Sincerely,

Robert W. Warren, P. Hg., MBA
Toxics Cleanup Section Manager

RBW:vs:tn
Enclosures

CERTIFIED MAIL
#7011 0110 0000 2095 5022

cc: Central Files, Ecology
Ivy Anderson, Attorney General's Office

DRAFT

September 1, 2011

Mr. James Rasmussen
Duwamish River Cleanup Coalition
1620 18th Avenue #10
Seattle, WA 98122

Re: Comments on Duwamish Marine Center Agreed Order No. DE 8072 and Public Participation Plan

Dear Mr. Rasmussen:

Thank you for the comments on behalf of the Duwamish River Cleanup Coalition submitted on August 31, 2011. The Department of Ecology (Ecology) appreciates your time to review and provide input regarding the Duwamish Marine Center Agreed Order. This letter lists your comments and provides Ecology's response to each.

1. The Agreed Order should explicitly state that the Duwamish Marine Center site is part of the larger Lower Duwamish Waterway Superfund cleanup and source control effort.

Response: The Environmental Protection Agency and Ecology have divided work between the LDW Superfund site sediment cleanup (EPA) and source control work (Ecology). The LDW Superfund site consists of the sediments in the waterway, with the boundary recognized at the mean higher high water line. The Lower Duwamish Waterway Site Memorandum of Understanding between the United States Environmental Protection Agency and the Washington Department of Ecology, Updated April 2004, for this work states:

> *Ecology and EPA agree that the general dividing line for source control vs. sediment work is mean higher high water (MHHW; +12 feet) in the Lower Duwamish. Above MHHW, Ecology and the Source Control Work Group will be responsible for addressing source control issues. Below MHHW, EPA and the Lower Duwamish Waterway Group (or the appropriate PRP) will be responsible for addressing sediment issues. Both agencies recognize that there may be site specific exceptions to the MHHW agreement.*

The Duwamish Marine Center site is located partially within this general boundary, with the majority of the site as an upland within the watershed, adjacent to the LDW Superfund site. The Agreed Order notes that the site is adjacent to the LDW in Section V.D. and that the site requires investigation to determine whether contamination, and therefore the site, extends from the uplands into the LDW in Section V.E.

2. The Listing of Contaminants of Concern (COCs), does not include dioxins/furans. Dioxins are prevalent throughout the Duwamish Superfund Site, and have been confirmed present at

elevated levels in the Georgetown area. The Work Plan for the site must include sampling for dioxins.

and:

DRCC/TAG is especially concerned that ground water sources of all other COC's at the site be identified and controlled.

Response: The Agreed Order provides for the preparation of a Draft Remedial Investigation/Feasibility Study Work Plan due within 60 days of the effective date of the Agreed Order. The draft Work Plan will be required to contain a screening process for the available data and site contaminant source history for appropriate sampling and analyses. The screening process will assure that all COC's at the site, including dioxin/furans and COC's in groundwater, will be identified.

Ecology notes your request for testing of dioxins/furans, and testing for these constituents may be required should the site screening process confirm the need for these analytes. The Agreed Order requires sufficient sampling be done to define the nature and extent of contamination, define the site boundaries, and inform any appropriate cleanup decisions. Cleanup decisions will be determined to include controlling sources.

3. We also request that COC samples taken at Duwamish Marine Center be kept for two years or until the cleanup is completed.

Response: Samples collected during the investigation may be archived for possible later analysis, however, some samples have expiration dates (called "holding times") after which it will no longer yield accurate results. Archiving procedures for samples collected during this investigation will be determined during the Remedial Investigation/Feasibility Study Work Plan stage according to the appropriate needs of the project to obtain accurate data.

4. DRCC/TAG believes it is important to involve King County WTD because as the Michigan Street outfall is part of this site it needs to be clear to the community there is coordination between this clean up effort and King County WTD.

Response: Site boundaries will be determined based on data collected during the remedial investigation. Should the Michigan Street outfall be determined to be part of the site, or affect the site, Ecology will coordinate with the King County Wastewater Treatment Division (WTD).

5. The Duwamish Marine Center Public Participation Plan (PPP) needs to include outreach to the communities of Georgetown and South Park, which have been intensively engaged in the Duwamish River cleanup process. Both of these communities have monthly meetings and regularly receive updates about cleanups in and around the Duwamish River Superfund Site. The Georgetown Gazette and listserve as well the South Park listserve should be used to facilitate communication with these communities. For the larger Duwamish Valley area, the West Seattle Herald and the West Seattle Blog should be used to facilitate communication with the community.

DRAFT

Response: The Public Participation Plan (PPP) used by Ecology for sites in the Lower Duwamish Waterway area are written from a boilerplate document to assure consistency and provide for site-specific flexibility in decision-making on outreach during the project. Please note that the PPP describes outreach to be conducted in the LDW area in general. The site manager and public involvement coordinator determine the more specific areas as needed during public involvement activities.

Please note the following public involvement activities from the PPP and how they were utilitized during this public comment period:

- Document availability at local repository sites: One of the document repositories is specified to be located in Seattle Public Library South Park Branch, and documents were placed there for review.
- Mailing list: A site specific mailing list was compiled that included addresses in both Georgetown and South Park neighborhoods.
- Legal ad: Newspapers for advertisement are to be placed in the Seattle Times, as wells at other appropriate newspapers. The public comment period for the Duwamish Marine Center site was advertised in the Seattle Times.

In addition to the activities outlined in the PPP, we also:

- Sent out a news release to the greater Seattle area, including some of the Seattle neighborhood weekly papers (West Seattle Blog and the West Seattle Herald) and Ecology's subscribers to the news release listserv.
- Sent an announcement to the Georgetown and South Park blogs.

Ecology notes your request to include the listservs. Please send us a list of the listerves that you would like us to include on our distribution list and we will be happy to add them. We will also more clearly outline our enhanced public involvement activities in future PPPs.

Please contact me at any time at (425) 652-3213 or victoria.sutton@ecy.wa.gov if you have any further concerns or questions. Thank you again for your comments regarding this site.

Sincerely,

Victoria Sutton
Hydrogeologist
NWRO Toxics Cleanup Program

cc: Louise Bardy, Ecology
Central Files

DRAFT

Louise
FYI

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

August 11, 2009

Mr. Jim Gilmur
c/o Duwamish Metal Fabricators
16 South Michigan Street
Seattle, WA 98108

Re: Opinion on *May 11, 2009, Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington,* for the following Site:

- **Site Name:** Duwamish Marine Center
- **Site Address:** 6365 First Avenue South
- **Facility/Site No.:** 21945598
- **VCP Project No.:** NW 1646

Dear Mr. Gilmur:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Duwamish Marine Center facility (Site), also referred to as the Gilmur/Hale Trust property (the property). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding a review of submitted documents/reports pursuant to requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site:

- Arsenic, cadmium, copper, lead, mercury, nickel, polychlorinated biphenyls (PCBs), diesel- and oil-range petroleum hydrocarbons, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) into the Soil

- Arsenic, cadmium, copper, lead, mercury, nickel, zinc, PCBs, diesel- and oil-range petroleum hydrocarbons, and cPAHs into the Ground Water

- These same compounds and metals may have been released to Surface Water and Sediment

The Site is defined by the extent of contamination caused by the releases listed above. The Remedial Investigation (RI) report referenced below suggests the extent of contamination (i.e., the Site) be defined as areas within the Gilmur/Hale Trust property impacted by releases from on-property activities and by the placement of contaminated fill derived from off-property

locations. While these areas are certainly part of the Site, there may be other off-property areas also included within the Site. Specifically, these include areas of potential sediment contamination in the Duwamish Waterway and impacted areas within adjoining upland property.

Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding your proposed remedial action(s):

This opinion is based on the information contained in the following documents:

1. 2009, May 11, *Remedial Investigation Report, Gilmur/Hale Family Trust, 6365 First Avenue South, Seattle, Washington,* report prepared by Pacific Crest Environmental, LLC.

This document is kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. You can make an appointment by calling the NWRO resource contact, Sally Perkins, at 425 649-9190.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Based on a review of supporting documentation listed above, pursuant to **requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing the following release(s) at the Site, Ecology has determined:**

1. The Remedial Investigation is not sufficient to allow cleanup levels to be established and a cleanup action to be selected, because the RI report does not present the necessary characterization information in a manner which allows these issues to be settled:

   - A characterization of "natural" conditions at the Site and in the surrounding area has not been presented. Specifically, sections on geology, surface water, ground water, and natural resources are missing or inadequately developed. These sections, based on a synthesis of RI data and previously collected data, are needed to provide the foundation for understanding site contamination.

- The lateral and vertical extent of contamination in soil and ground water is not presented in sufficient detail to understand distributions across the property. Although Figures 4, 5, and 6 provide a clear visual interpretation of the lateral extent of soil contaminant groupings, these figures lack data supporting the boundary lines.

A revised RI report will therefore need to be submitted. To assist in that revision, an outline of the elements to be included is attached in Enclosure A. Note that the suggested outline is organized around the premise that the body of an RI should focus on interpretation and synthesis, with supporting details and methodology included in the appendices. For example, only a synopsis of the current RI and former pre-RI investigations scopes of work are needed in the body of the report, with most of the information being conveyed on tables and figures. There is no need to weave together an extended discussion of scope and methodology together with findings in the same section of the report. The findings should go in a later section, and investigation details are best placed in an appendix. The main purpose of a scope of work section is to acquaint the reader with the data points (RI and pre-RI) that are available to understand site conditions (i.e., exploration locations, chemical analyses, monitoring).

2. The Remedial Investigation report does not address potential sediment contamination, based on a discussion with Ecology that this issue be set aside until it can be addressed within the context of the Lower Duwamish Waterway Superfund cleanup. Nevertheless, river sediment should be considered part of the "Site" and some discussion of former and current mechanisms for sediment contamination discussed in the revised RI. The revised RI should also explicitly state that sediment evaluation is needed for full characterization of the Site, and, though not included in the RI, will be addressed at a later date.

3. The discussion of cleanup levels in the RI is fairly thorough, but needs to be reorganized along the lines of media/exposure scenario or media/pathway. In addition, the RI needs to incorporate exposure pathways outlined in the November 5, 2007 draft Remedial Investigation report for the Lower Duwamish Waterway (LDW) (a revised draft document is currently being reviewed by the agencies involved, and it is expected that the document will be finalized in the near future). Specifically, each of the exposure pathways listed below needs to be evaluated as to whether an associated cleanup level is appropriate for this Site, and the most stringent of the applicable levels selected as the soil or ground water cleanup level for the Site.

Human Health Cleanup Levels

Soil: On-Site workers – Direct contact and ingestion

Ground Water: Potable use

Surface Water: Recreational use – Direct contact and ingestion
Associated cleanup levels:
- Soil protective of leaching to surface water
- Ground water protective of surface water

Surface Water: Fish consumption
Associated cleanup levels:
- Soil protective of leaching to surface water
- Soil protective of leaching to ground water
- Ground water protective of surface water

River Sediment: Workers – Direct contact and ingestion

River Sediment: Fish consumption
Associated Site cleanup levels:
- Soil protective of sediment
- Ground water protective of sediment

Ecological Health Cleanup Levels

The draft LDW Remedial Investigation report also includes an ecological risk assessment which identifies 10 receptors of concern (ROCs) in and along the Duwamish Waterway. Each of the ROCs is a species selected to represent a larger group of animals, and cleanup standards were identified for each. Soil and ground water cleanup levels protective of ROCs exposed to river sediment must be included in the revised evaluation of cleanup levels for the Site.

Note that a detailed review of the RI report was not completed, pending submittal of a revised version incorporating the elements discussed above.

This opinion does not represent a determination by Ecology that a proposed remedial action will be sufficient to characterize and address the specified contamination at the Site. To obtain this opinion, you must submit appropriate documentation to Ecology and request such an opinion under the VCP. **This letter also does not provide an opinion regarding the sufficiency of any other remedial action proposed for or conducted at the Site.**

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion, and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or conducted at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me at 425 649-7107.

Sincerely,

Mark Adams
NWRO Toxics Cleanup Program

ma/kp

Enclosures: A

cc: William Carroll, Pacific Crest Environmental, LLC

Remedial Investigation Outline
July 2009

The following annotated outline is a suggested schematic for elements to be included in a Remedial Investigation report. It is not intended to replace MTCA's specific requirements as presented in 173-340-350(7) WAC.

The main purpose of the outline is to facilitate the preparation of a document that is clear, comprehensive, and to the point. A secondary, but important, purpose is to make document preparation and review more efficient.

INTRODUCTION
(*concise, bulleted if possible*)

- Site name,VCP number, Name, address, and phone number of project consultant, Current owner/operator
- Purpose of document *(very brief restatement of what an RI is for, reference the WAC)*

SITE IDENTIFICATION AND LOCATION
(*focus on defining the site in the context of its' location*)

- Site discovery and regulatory status (*describe how the site was identified and where it is in the MTCA process)*
- Site and property location/definition (*define actual MTCA site location relative to property or study area*)
- Neighborhood setting

Figure – Vicinity Map (*preferably with topography*)
Figure – Property/Site Map (*preferably with topography*)

Appendix – Legal description of property, present owner and operator, chronological listing of past owners and operators

ENVIRONMENTAL INVESTIGATION/INTERIM ACTION SUMMARY
(*Concise summary presentation of the investigations that have been done at the site, along with prior remedial actions. Focused mostly on figures and tables. Details of and methods used in former investigations and remediation in appendices*)

- Constituents of Concern (*brief discussion about which specific compounds were chosen for analysis and why)*
- Soil
- Surface water
- Ground water
- Sediment
- Air/soil vapor

- Natural resources/wildlife
- Cultural history/archeology
- Interim actions (*brief intro to prior remediation activities*)

Figure – Soil investigation data points (*show potential source areas*)
Figure – Surface water/groundwater investigation data points (*show potential source areas*)
Figure – Air investigation data points (*show potential source areas*)
Figure – Prior remediation activities

Table – Exploration Summary
Table – Analytical Schedule per media (*include analytical methods and reporting limits,as possible)*

Appendix – Previous Investigations (*detailed discussion goes here)*
Appendix - Exploration and sampling methodology (*may combine with Previous Investigations)*
Appendix – Boring/ Well logs
Appendix - Prior Interim Actions

PROPERTY DEVELOPMENT AND HISTORY

(*this section focuses on the built environment, both current and historical, and presents the sources of contamination and release mechanisms*)

- Past site uses and facilities
- Current site use and facilities
- Proposed or potential future site uses
- Zoning (*if appropriate)*
- Transportation/roads
- Utilities, water supply
- Potential sources of site contamination
- Potential sources of contamination from neighboring properties (*discuss nearby sources if known)*

Figure – Historical site features (*may be combined with Figure 2*)
Figure – Potential contaminant sources
Figure – Utilities (*may be combined with Figure 2*)

Table – Potential Contaminants

NATURAL CONDITIONS

- Physiographic setting/topography

- Geology
  (*focus on interpretation*)

  - Regional Setting (*brief*)
  - Property Geologic Conditions (*synthesis, not regurgitation of boring logs, provide cross sections*)
  - Physical Properties (*unlikely to need this section, but in some cases may be useful to present data on soil adsorptive capacity, organic content, strength, etc.)*

  Figure – Plan view of geologic unit distribution (*if helpful*)
  Figure - Cross section A-A' (*show borings, wells, screened intervals, water levels*)
  Figure – Cross section B-B' (*if necessary*)

- Surface Water
  (*brief description of the surface water system*)

  - Property drainage
  - Area surface water/floodplain issues
  - Regulatory classifications, if any (*e.g surface water classification)*

  Figure – Surface water Conditions (*only if information not already in a prior figure*)

- Ground Water
  (*focus on interpretation, show on cross sections*)

  - Occurrence (*aquifers, water levels, confinement, geometry, continuity, physical properties*)
  - Movement (*directions, gradient if important, seasonal fluctuations, tidal influence*)
  - Discharge
  - Recharge (*if significant for site*)
  - Regulatory classifications, if any (*e.g. sole source aquifer*)

  Figure – Cross section with ground water information (*if not already included above*)
  Figure – Water table/potentiometric surface maps (*for various seasons or tidal conditions, show surface water*)

  Appendix – Ground water elevation data (*a table)*

- Natural Resources and Ecological Receptors
  (*preparatory to a TEE*)

  - Greenbelts and other natural habitat
  - Wildlife
  - Other Information required to conduct evaluations under -7491, -7492, or if necessary -7493

  Figure – showing natural areas, as appropriate

CONTAMINANT OCCURRENCE AND MOVEMENT

(*very little text, mostly figures and tables, main point is to provide easy-to-understand figures showing the depth and breadth of contamination*)

- Waste Material (*sludges, fluids, stockpiles)*
- Soil
- Surface Water
- Ground Water
- Sediment
- Air/Soil Vapor

  Figures – Cross sections showing soil contamination with depth
  Figures – Plan views showing soil contamination across site (*relative to releases if known*)
  Figures – Cross section showing ground water contamination with depth (*if appropriate*)
  Figures – Plan views showing ground water contamination in each aquifer (*relative to soil contamination and P-head map*)
  Figures – XY plots of specific contaminants with time (*as appropriate*)
  Figures – Others as appropriate to show the distribution of surface water, ground water, or air data

  Tables – All of the analytical data against final cleanup levels (*exceedances highlighted, no need to develop screening levels*)
  Tables – Summary of exceedances (*if helpful*)

  Appendix – QA report
  Appendix – Analytical lab reports

CONCEPTUAL MODEL

(*putting the whole story together, graphic illustrations are best*)

- Contaminant release/fate and transport/potential or actual receptors
- Data gaps (*is anything missing)*

CLEANUP STANDARDS

(*developing appropriate cleanup standards based on receptors and pathways*)

- Soil
  - Reasonable maximum exposure
  - Cleanup levels protective of contact, ground water, inhalation, terrestrial species, surface water, sediment
  - Points of compliance
  - Regulatory classifications (*classification of soil as dangerous or solid waste*)
- Ground Water
  - Highest beneficial use/reasonable maximum exposure
  - Cleanup levels protective of potable use, inhalation, surface water, sediment
  - Points of compliance
- Other Media as appropriate
  - Cleanup levels protective of ....
  - Points of compliance

Table – Cleanup Levels (*all potentially applicable values with final selected cleanup level noted*)

AREAS REQUIRING CLEANUP

(*the final story detailing where the contamination exceeds an applicable cleanup standard, brief text, mostly tables, figures*)

- Constitutuents of Concern (*a brief summary of compounds that exceed cleanup levels or "indicator hazardous substances" under MTCA. For most service station sites, the COCs should be the same)*
- Soil – vertical and lateral
- Ground water – vertical and later
- Sediment –
- Surface Water
- Soil Vapor/air

Figures – Plan view and vertical sections of areas requiring cleanup

REFERENCES

Adams, Mark (ECY)

From: Adams, Mark (ECY)
Sent: Monday, April 07, 2008 7:01 AM
To: 'William Carroll'
Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Bill:

Yes the work plan is approved with the inclusion of the amended scope in the email. Please forward a revised final Work Plan for our records.

Thanks.

Mark Adams

Toxics Cleanup Program
Northwest Regional Office
WA Department of Ecology
3190 160th Ave SE
Bellevue, WA 98008
---
ph (425) 6497107
fax (425) 649-7098
MADA461@ecy.wa.gov

From: William Carroll [mailto:wcarroll@arrowenv.com]
Sent: Friday, April 04, 2008 2:23 PM
To: Adams, Mark (ECY)
Cc: 'Lauren Carroll'; 'Chuck Wolfe'
Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Mark:

I understand your qualifications and appreciate that some issues continue to be in flux. With regard to the issue of PCBs, we did include analysis of PCB in soil, catch basin sediment and groundwater samples collected as part of the proposed scope of work. Previous investigations also analyzed samples for PCBs.

Does your email mean that the Work Plan is approved and we can proceed with the scope as amended in the email?

William Carroll | Tel: (425) 888-4990| Fax: (425) 888-4994
Arrow Environmental |1531 Bendigo Blvd, North Bend, WA 98045

From: Adams, Mark (ECY) [mailto:MADA461@ECY.WA.GOV]
Sent: Tuesday, March 25, 2008 4:18 PM
To: William Carroll
Cc: Lauren Carroll; Chuck Wolfe

Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

William:

The proposed changes to the scope of work are fine, but please take the following into account:

- I am often more optimistic than others here in Ecology about what can be done, so my belief in the possibility of an NFA should be interpreted accordingly.
- The final form of the property-specific letters has not been set, so we can't be entirely certain whether they will be applicable (I believe, however, they are very very close to being issued, so we should know soon).
- I should have said "the one key characterization issue", because there will be other key (or knotty) issues once you get beyond the characterization phase. For example, you will need to demonstrate that a capping/covenant cleanup action meets the criteria under Section -360.
- You indicated the purpose of the email is to obtain concurrence that the proposed approach meets the substantive requirements of MTCA. In my opinion the proposed work is on the way to meeting the substantive requirements of MTCA, which as you know includes a lot of territory.

Finally a question - I don't have the original SAP in front of me, so I can't recall whether PCBs have been checked or whether the SAP includes PCB analyses.

Best Regards.
Mark Adams

From: William Carroll [mailto:wcarroll@arrowenv.com]
Sent: Thu 3/20/2008 2:27 PM
To: Adams, Mark (ECY)
Cc: 'Lauren Carroll'; 'Chuck Wolfe'
Subject: RE: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Mark:

We are encouraged that you believe it may be possible to get to an NFA with restrictive covenant for the upland portion of the property when the "property-specific NFA letter" that is currently being drafted by Ecology becomes available. The purpose of this e-mail is to obtain concurrence from Ecology that the approach proposed in the Compliance Sampling Plan (CSP) and revised in this e-mail meets the substantive requirements of MTCA.

We understand that it is Ecology's position that the one key issue that needs to be addressed before a property-specific NFA letter could be issued is that all of the current contaminant discharge pathways to the Duwamish River need to be understood. These include ground water discharge, stormwater runoff, and direct contact with riverbank fill. In light of this issue and your comments provided in the e-mail dated February 14, 2008, we propose the following amendments to the CSP:

Catch Basin Sediment Sampling: In addition to the analytes proposed in the CSP include lead (Pb), both Cr3 and Cr6, and VOCs. Eliminate the following analytes: antimony, beryllium, selenium, and thallium. Provide Ecology with a revised table that includes the target detection limits relative to applicable cleanup levels. Conduct reconnaissance of the Site during a rain event to identify runoff patterns.

Monitoring Well Installation - Install 4 additional groundwater monitoring wells to depths of approximately 30 feet. A site map that illustrates the proposed locations is attached. During installation of the monitoring wells collect one soil/fill sample from each boring for laboratory analysis of NWTPH-Dx, NWTPH-Gx, VOCs, SVOCs, PCBs, TOC, and metals (As, Cd, Cr(total), Cr+6, Pb, Cu, Hg, Ni, Zn). Due to the tidally influenced groundwater elevation fluctuations, soil samples will be collected from soil that is above the maximum high water level. Screen the wells between 30-ft bgs and
20-ft bgs.

Ground Water Sampling: Conduct one groundwater sampling event that includes existing and new groundwater monitoring wells. In addition to the analytes proposed in the CSP include VOCs by SW-846 Method 8260B and gasoline-range organics by Ecology Method NWTPH-Gx. Provide Ecology with a revised table that includes the target detection limits for groundwater analytes relative to applicable cleanup levels.

Tidal Study: Amend the scope of work to include the monitoring wells installed as part of the revised scope of work.

River bank sampling - Collect 5 samples from the river bank at low tide, near the high water mark, and analyze the samples for metals(As, Cd, Cr(total), Cr+6, Pb, Cu, Hg, Ni, Zn) and heavy end organics (NWTPH-Dx and SVOCs). A site map that illustrates the proposed locations is attached.

Please call if you have any questions or to discuss the proposed scope of work further.

Regards,

William Carroll
Pacific Crest|1531 Bendigo Blvd, North Bend, WA 98045
|Tel: (425) 888-4990| Fax: (425) 888-4994

From: Adams, Mark (ECY) [mailto:MADA461@ECY.WA.GOV]
Sent: Wednesday, February 13, 2008 9:31 AM
To: wcarroll@arrowenv.com
Subject: Review of September 19, 2007 Compliance Sampling Plan, Gilman/Hale Family Trust Property

Hi Bill:

I've had a chance to go over the file and wanted to get you my initial thoughts on the site and the referenced plan. As we discussed, I am approaching the site from the ground up, so to speak, with the recognition that Ecology has already provided input on a number of previous occasions. The most recent and relevant communication is the March 29, 2007 memorandum to the file by Mark Edens.

I'll start with my initial characterization conclusions, and then relate these to the scope of work proposed in the referenced plan.

1. Has the basic geologic/hydrogeologic framework been defined in light of areas of potential contamination and contaminant transport? No. Historical information indicates the property has been progressively filled with material of questionable quality. Part of the fill apparently comprises a thin(?) covering over native floodplain deposits and the rest comprises a thickened wedge along the Duwamish River. Investigations to date have been very shallow, with borings and test pits mostly 8 feet deep or less. Only a few deeper 15-foot borings have been drilled. As a result, the basic geometry and composition of the fill is undefined, as is the composition of the underlying floodplain deposits. Hydrogeologic conditions are also largely undefined, other than the obvious conclusion that ground water occurs at shallow depth within the fill and discharges to the river. The relationship between this shallow ground water and ground water present within the underlying native deposits is unknown, as is the discharge/recharge relationship between surface water and ground water.

2. Has the extent of contamination been defined in soil? No. It appears the primary investigation focus has been to define the impact of industrial operations on near surface soils on the "upland" portion of the site. While this may be a good approach for property originally underlain by "clean" soils, it is not appropriate by itself for sites underlain by fills of suspect quality. As a result of the sampling strategy, the vertical extent of contamination has not been defined. Furthermore, an extensive stretch of fill bordering the river in the south half of the site has not been investigated at all (the area between the current shoreline and the estimated 1924/1936 shoreline).

3. Has the nature of contamination in soil been adequately explored? Mostly, but soil analyses have not included gasoline-range hydrocarbons or volatile organics. The number of samples analyzed for PAHs has also been inadequate (6 out of 33) given the concentrations observed in these six samples.

4. Has the extent of contamination been defined in ground water? No. Ground water samples appear to have been collected without reference to tidal influences, and only the very top of the water table has been sampled. Ground water deeper in the fill or in the underlying sediments may be impacted.

5. Has the nature of contamination in ground water been adequately explored. Mostly, but the analyses to date have not included gasoline range hydrocarbons, volatile organics.

6. Has the nature and extent of contamination in Duwamish River sediment attributable to the site been defined? No.

7. Has the nature and extent of contamination on the Duwamish river bank been explored. Not fully. The river bank is a special case of fill contamination because at this location the soil is directly exposed to tidally influenced surface water. Some of the fill data collected from inland borings can be used to extrapolate conditions along the river bank. However, certain stretches of the river bank have no corresponding inland data.

8. Has the potential for contaminant movement in stormwater runoff been evaluated. No.

With all that being said, I believe it may be possible to get to an NFA with restrictive covenant for the upland portion of the property without necessarily doing all of the implied characterization work (assuming the property-specific letter becomes available). There is however, one key issue that needs to be addressed to get to that NFA - all of the current contaminant discharge pathways to the Duwamish River need to be understood. These include ground water discharge, stormwater runoff, and direct contact with riverbank fill.

Now let's take a look at the Compliance Sampling Plan in light of these issues.

1. Tidal Study: Good. This study will be helpful in defining ground water movement in response to tidal fluctuations.

2. Catch Basin Sediment Sampling: Good, but needs to include lead, both Cr3 and Cr6, and VOCs. The following metals can be eliminated - antimony, berylium, selenium, and thalium. The sampling and analysis plan should have a table with target detection limits relative to applicable cleanup levels (probably sediment standards) . Also I would suggest a reconnaisance be conducted during a heavy rainstorm to identify runoff patterns and confirm all runoff is captured in the catch basins.

3. Another Round of Ground Water Sampling: Good, but needs to include VOCs and gasoline-range hydrocarbons. Also the sampling and analysis should include a table with target detection limits relative to

applicable cleanup levels (both surface water and ground water).

Clearly the scope of work in the Compliance Sampling Plan does not address all of the issues raised by me or Mark Edens. So I suggest considering the following additions:

1. Three or four deeper borings drilled along the edge of the river to define the depth and nature of the fill, and completed as deeper ground water monitoring wells. At least one deep boring, also completed as a well, in the upland portion of the property to define the base of the fill and type of underlying native sediment. Soil/fill/ground water samples to be obtained for chemical analysis.

2. Including those deeper wells in the tidal study.

3. Sampling the river bank for a variety of analytes, principally metals and heavy-end organics.

The items that I don't think we need to address for the moment are sediment sampling in the river and a full vertical characterization of contamination in the upland soil. The whole sediment issue will likely need to be worked out over time as part of the ongoing Superfund cleanup. This part of the "site" would not, of course, be eligible for an NFA until such time as the sediment issue was resolved. The vertical characterization might also need to come back in later, if straight capping of the property can't be supported via the WAC 173-34-360 demonstrations.

I think that's it for now. Please call if you have any questions or to discuss things further.

Regards,
Mark Adams
NWRO TCP
425-649-7107
mada461@ecy.wa.gov

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

MEMORANDUM

TO: Site File

FROM: Mark Edens, TCP-NWRO

DATE: March 29, 2007

SUBJECT: Gilmur/Hale Family Trust Site (Duwamish Marine Center) VCP I.D. # NW1646

The purpose of this memorandum is to document the concerns regarding this site pursuant to reassignment to a new site reviewer. A draft opinion letter was prepared for this site, however after the applicant's representatives became aware of the contents of the letter they requested that it not be sent. This memorandum documents what was reviewed for this site and the opinions of the previous reviewer regarding additional site work that is needed.

Database information on this site is as follows:

- Name: Gilmur/Hale Family Trust Site
- Address: 6365 First Avenue South, Seattle, WA 98108
- Facility/Site No.: 21945598
- VCP No.: NW1646

The applicant requested an opinion letter regarding their proposed remedial action at the site. Their proposal included capping of the site and providing drainage controls. A restrictive covenant would also be executed to protect and maintain the cap and to prohibit the extraction of groundwater for potable uses

The site is located adjacent to the Lower Duwamish Waterway (LDW). Sediment in the LDW is currently undergoing cleanup as a CERCLA site with USEPA as the lead agency. Ecology is the lead agency for source control efforts to prevent continued contamination of LDW sediments from upland contaminated sites. Ecology's source control strategy identified four early action areas on the LDW. These areas have associated upland sites that have the highest priority for cleanup. The Gilmur/Hale Family Trust Site (the Site) has not been included among these high priority sites and the Site has been allowed to continue in the VCP. If the Site is found to be contributing significant levels of contamination to the LDW, it will be considered for formal site status.

The following information was reviewed to prepare the draft opinion letter:

1. Phase 1 Environmental Audit Three (3) Tax Parcels Covering a Total of Approximately 2.79 Acres, 6365 First Avenue South, Seattle, Washington 98108, prepared by Environmental Associates, Inc. on January 17, 2000.

2. Preliminary Phase II Subsurface Investigation, Duwamish Marine Center Property, 6365 First Avenue South, Seattle, Washington 98108, prepared by the Riley Group, Inc. on September 13, 2000.

3. Site Closure Report, Gilmur/Hale Family Trust Site, prepared by Farallon Consulting on September 25, 2002.

4. Site Closure Report Addendum – Response to Comments Gilmur/Hale Family Trust Site, prepared by Farallon Consulting on January 23, 2003.

5. Report of compliance Monitoring and Request for No Further Action Determination for Groundwater and Soil, Gilmur Hale Family Trust Site, prepared by Farallon Consulting on December 8, 2004.

6. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated October 28, 2002, providing comments on the Site Closure Report.

7. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated March 5, 2003, indicating that Ecology cannot issue a no further action letter for groundwater or sediments for the Site and requesting additional site information.

8. Letter from Lauren Carroll of Farallon Consulting to John Keeling of Ecology dated June 30, 2003, summarizing unresolved Site issues and requesting that Ecology conduct further review and evaluation of these issues to facilitate the issuing of a no further action letter for the Site.

9. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated August 11, 2003, indicating that Ecology was prepared to issue an NFA for the site following implementation of proposed capping and institutional controls, stating that area background in Duwamish sediments cannot be applied to Site soils, stating that monitoring well MW-3 is an acceptable point of compliance for groundwater flowing to surface water at the Site, stating that four consecutive quarters of groundwater monitoring at MW-3 would be adequate to show groundwater compliance, and stating that the use of the fats, oils, and grease test and limits would not be suitable for MTCA compliance at the site.

10. Letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated June 1, 2005, indicating that Ecology cannot issue an NFA for the Site

because of the complex nature of the Site, the inability of Ecology to issue an NFA for a portion of the Site, and the lack of characterization of riverbank soils.

11. Letter from Lauren Carroll of Pacific Crest Environmental, LLC to Mark Edens of Ecology dated April 28, 2006, requesting an advisory opinion from Ecology that proposed risk-based remedial actions are likely to be sufficient to meet the substantive requirements of MTCA.

12. Letter from John Keeling of Ecology to Mr. Jim Gilmur dated July 6, 2006, indicating that further action is necessary to address sediments at the site.

13. E-mail communication from Lauren Carroll of Pacific Crest Environmental, LLC to Dale Myers of Ecology dated July 11, 2006, requesting a meeting with Ecology, requesting that Ecology rescind the opinion letter issued by John Keeling on July 6, 2006, and requesting involvement of the Washington State Attorney General's office in reviewing Site issues.

Soil contamination on the Site includes total petroleum hydrocarbons (diesel and oil range; TPH-D and TPH-O, respectively), polychlorinated biphenyls (PCBs), cadmium, lead, and total carcinogenic polycyclic aromatic hydrocarbons (total cPAHs). Groundwater contamination on the Site includes TPH-D, TPH-O, arsenic, total cPAHs, benzo(a)pyrene, and PCBs. The total cPAHs, benzo(a)pyrene, and PCBs might have been detected in groundwater because the samples were turbid.

The proposed remedial action for the Site was determined to not likely be sufficient to meet the substantive requirements of MTCA. The Site needs to be adequately characterized in accordance with WAC 173-340-350 before a determination can be made regarding the adequacy of the proposed cleanup action. Additional necessary site characterization includes:

1. **Riverbank** – Sampling and testing of the riverbank has not been done and the composition of the riverbank has not been determined. A plan for sampling and testing soils along the riverbank and for characterizing the riverbank needs to be developed and implemented. Riverbank sampling, testing, and characterization needs to include areas that are owned by the Gilmur/Hale Family Trust and areas that are or were associated with Site activities.

2. **Sediment** – No sampling and testing has been done of sediment in the LDW, Slip 2, or in catch basins located on the Site. A plan for sampling and testing sediments needs to be developed and implemented. Sediment sampling and testing needs to include sediment areas that are owned by the Gilmur/Hale Family Trust and sediment areas that are or were associated with Site activities. The existing surface water system including piping, catch basins, and outfall needs to be mapped. If the outfall for this system is in the LDW or Slip 2, all of the catch basins need to be sampled and tested and the sediment in the vicinity of the outfall needs to be sampled and tested.

3. **Groundwater** – Previous communications from Ecology (letter from John Keeling of Ecology to Lauren Carroll of Farallon Consulting dated August 11, 2003) indicated that groundwater monitoring well MW-3 would be an acceptable point of compliance and that four quarters of clean groundwater sampling and testing in MW-3 would be sufficient to demonstrate compliance. Unfortunately this opinion did not consider the fact that groundwater sampling was performed at high tide. This previous opinion also did not consider the initial detections of TPH-D, TPH-O, arsenic, benzo(a)pyrene, total cPAHs, and PCBs in monitoring well MW-2 or the initial detection of TPH-O in monitoring well MW-4. A tidal study needs to be completed on all Site monitoring wells to determine when optimum groundwater flow occurs from the Site to the LDW or Slip 2. Additional groundwater monitoring in all down gradient monitoring wells during optimum groundwater flow conditions is necessary to demonstrate compliance with MTCA cleanup levels.

4. **Upland Soils** – Some areas of the Site were not sampled and tested because they are not owned by the Gilur/Hale Family Trust. Rights-of-way and properties that were or are part of operations may be considered part of the Site, depending on where contamination has come to be located. These areas need to be identified and appropriate sampling and testing needs to be planned and implemented. The proposed cleanup action includes capping of the site with institutional control. The institutional control would include a restrictive covenant that protects and maintains the cap and that prohibits the extraction of groundwater for potable uses. The proposed capping of the site does not include removal of soils contaminated with PCBs, TPH-D, TPH-O, cadmium, chromium, and total cPAHs. Cleanup standards for these contaminants cannot be determined until the additional investigations of the riverbank, sediments, and groundwater are completed. When cleanup standards are established, some of these contaminants might be found to exceed the standards. Further, WAC 173-340-360(2)(e)(iii) states that cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of a site. To leave soil contaminants on the site in excess of cleanup standards, it will be necessary to demonstrate that it is not technically feasible to cleanup the contaminated soils or it will be necessary to complete a disproportionate cost analysis in accordance with WAC 173-340-360(3)(e).

Site conditions and the proposed cleanup were evaluated by the NWRO Toxics Cleanup Program Section Manager and by staff who are involved in LDW sediment cleanup and source control efforts. This evaluation was done to determine if the Site should remain in the VCP or if it should be managed as a formal site under an agreed order. The Section Manager and staff agreed that since there was no current sediment or riverbank information available for the site, that there was not enough information available at this time to make a determination. When additional Site sediment and riverbank sampling and testing becomes available, the information should be reevaluated by the LDW team to determine if this Site may remain in the VCP or must be managed as a formal site.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

July 6, 2006

Mr. Jim Gilmur
16 South Michigan Street
Seattle, WA 98108

Dear Mr. Gilmur:

Re: Further Action Determination under WAC 173-340-515(5) for the following Hazardous Waste Site:

- Name: Gilmur/Hale Family Trust (Duwamish Marine Center)
- Address: 6365 First Avenue South, Seattle, Washington 98108
- Facility/Site No.: 21945598
- VCP No.: NW0892

Thank you for submitting your independent remedial action report for the Gilmur/Hale Family Trust (Duwamish Marine Center) facility (Site) for review by the State of Washington Department of Ecology (Ecology) under the Voluntary Cleanup Program (VCP). Ecology appreciates your initiative in pursuing this administrative option for cleaning up hazardous waste sites under the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

This letter constitutes an advisory opinion regarding whether further remedial action is necessary at the Site to meet the substantive requirements of MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC. Ecology is providing this advisory opinion under the specific authority of RCW 70.105D.030(1)(i) and WAC 173-340-515(5).

This opinion does not resolve a person's liability to the state under MTCA or protect a person from contribution claims by third parties for matters addressed by the opinion. The state does not have the authority to settle with any person potentially liable under MTCA except in accordance with RCW 70.105D.040(4). The opinion is advisory only and not binding on Ecology.

Ecology's Toxics Cleanup Program has reviewed the following information regarding the Site:

1. Phase / Environmental Audit, dated January 17, 2000, prepared by Environmental Associates, Incorporated;

2. Preliminary Phase II Subsurface Investigation, dated September 13, 2000, prepared by The Riley Group, Inc.;

3. Site Closure Report for the Gilmur/Hale Property, dated September 25, 2002, prepared by Farallon Consulting, LLC (Farallon);

4. Site Closure Report Addendum, dated January 23, 2003, prepared by Farallon

5. Report of Compliance Monitoring and Request for No Further Action Determination for Groundwater and Soil dated December 8, 2004, prepared by Farallon.

The documents listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Appointments can be made by calling the NWRO resource contact at 425-649-7190.

The Site is defined by the extent of contamination caused by the following release(s):

- PCBs in Soil
- Heavy Metals in Soil

The Site is more particularly described in Enclosure A to this letter, which includes a detailed Site diagram. The description of the Site is based solely on the information contained in the documents listed above.

Based on a review of the independent remedial action report and supporting documentation listed above, **Ecology has determined that the independent remedial action(s) performed at the Site are not sufficient to meet the substantive requirements contained in MTCA and its implementing regulations, Chapter 70.105D RCW and Chapter 173-340 WAC, for characterizing and addressing any of the contamination at the Site.** Therefore, pursuant to WAC 173-340-515(5), Ecology is issuing this opinion that **further remedial action is necessary** at the Site under MTCA.

An interim action has been taken to remove lead contaminated soils. Soil and groundwater has been sampled. No sediment sampling or cleanup activities have occurred. The primary reason Ecology feels that further action is necessary is because of the sediments. Sediments are governed by Chapter 173-204 WAC, the Sediment Management Standards in addition to Chapter 173-340, the Model Toxics Control Act. The Sediment Management Standards do not allow Ecology to issue No Further Action letters under the Voluntary Cleanup Program. Additionally, Ecology considers it likely that it will take further action under Chapter 173-204 WAC for the sediments portion of the site.

Please note that this opinion is based solely on the information contained in the documents listed above. Therefore, if any of the information contained in those documents is materially false or misleading, then this opinion will automatically be rendered null and void.

The state, Ecology, and its officers and employees make no guarantees or assurances by providing this opinion and no cause of action against the state, Ecology, its officers or employees may arise from any act or omission in providing this opinion.

Again, Ecology appreciates your initiative in conducting independent remedial action and requesting technical consultation under the VCP. As the cleanup of the Site progresses, you may request additional consultative services under the VCP, including assistance in identifying applicable regulatory requirements and opinions regarding whether remedial actions proposed for or performed at the Site meet those requirements.

If you have any questions regarding this opinion, please contact me at 425-649-7052.

Sincerely,

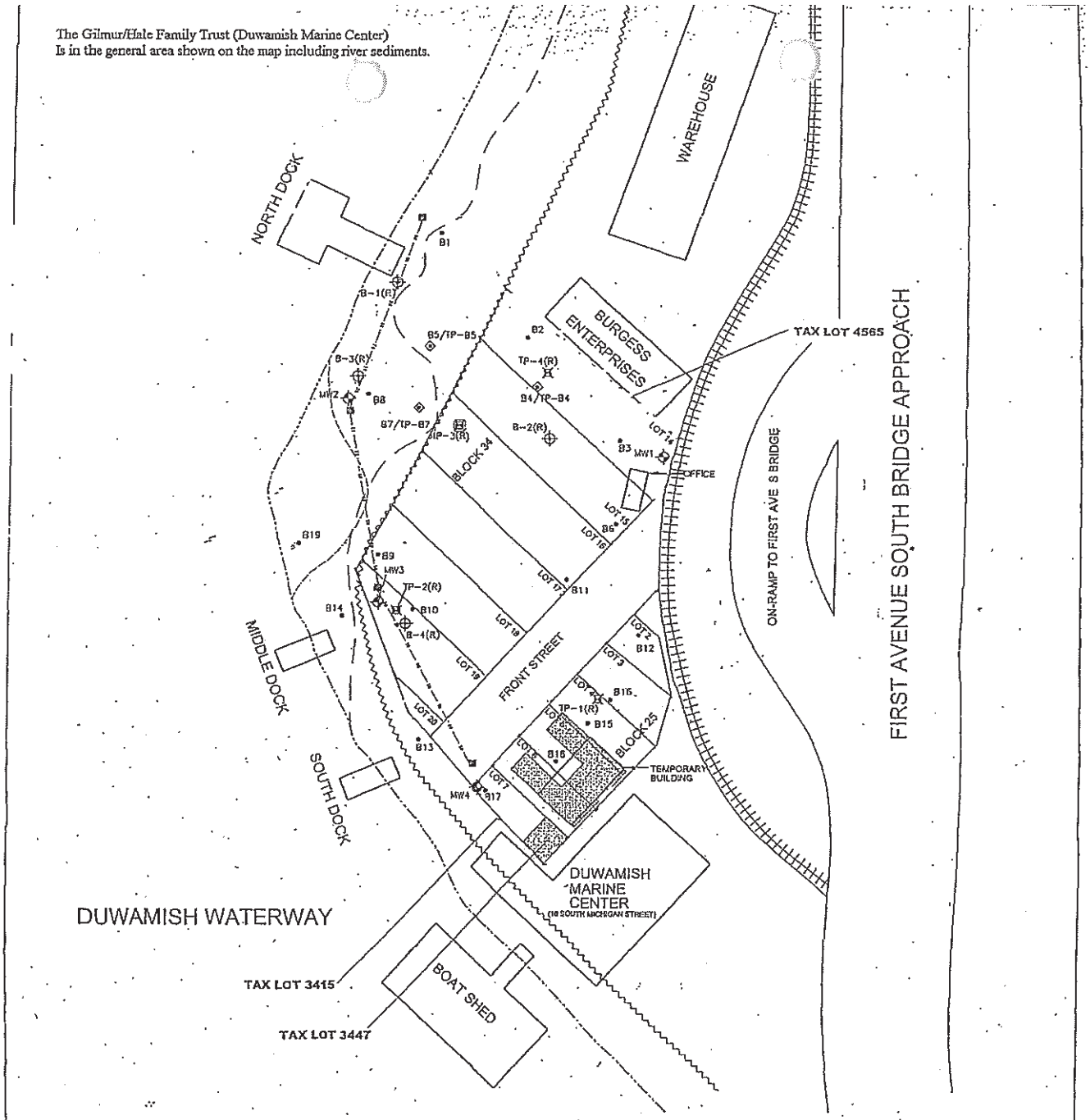
John Keeling
NWRO Toxics Cleanup Program

JK:nr

Enclosures

cc: Mark Edens, Department of Ecology
Dale Myers, Department of Ecology
Lauren G. Carroll, Pacific Crest Environmental, LLC

The Gilmur/Hale Family Trust (Duwamish Marine Center)
Is in the general area shown on the map including river sediments.



LEGEND

TP-1(R) — TEST PIT 7/17/2000 (THE RILEY GROUP)	CONCRETE PADS
B-1(R) — BORING 8/3/2000 (THE RILEY GROUP)	CATCH BASIN AND DRAINAGE LINE
B1 — BORING 3/13-14/2002 (FARALLON)	
MW-4 — MONITORING WELL 3/18/2002 (FARALLON)	APPROXIMATE CURRENT SHORELINE
TP-B7 — TEST PIT 5/13/02 (FARALLON)	APPROXIMATE SHORELINE 1982
TP-3(R) — TEST PIT IN AREA EXCAVATED FOR INTERIM ACTION	APPROXIMATE SHORELINE 1966
AREA EXCAVATED FOR INTERIM ACTION MAY 2002	APPROXIMATE SHORELINE 1924/1936
	LOT 19 — LOT BOUNDARY AND LOT NUMBER

Taken From Figure 2
By Farallon Consulting
10/28/03

0 100 200
APPROXIMATE SCALE IN FEET

N

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

June 1, 2005

Ms. Loren Carroll
Senior Hydrologist
Farralon Consulting
320 3rd. Avenue NE Suite 200
Issaquah, WA 98027

Dear Ms. Carroll,

RE: Duwamish Marine, Gilmur/Hale Trust Site

The Department cannot issue a No Further Action (NFA) letter for Duwamish Marine. From your first submission it has been clear that Duwamish Marine is a very difficult site. That is partially because it is on the Duwamish River and within the boundary of the Lower Duwamish River Superfund Site. Another and probably more important reason is that, except for the lead, there is no clear source of the contaminants found on Duwamish Marine's property. A site is defined in the Model Toxics Control Act (WAC 173-340-200) as where a hazardous substance has come to be located. Without a good idea of how the contaminants were released, it is impossible to determine the extent of the site, except perhaps by a truly exhaustive sampling regime. Also, the definition cited above prevents the Department from dividing a site and issuing a NFA for a portion of a site. In any case, it seems likely that contamination is present in adjacent Duwamish River sediments, and the Department cannot give NFA Letters for Sediments. River bank soils have not, for the most part, been characterized. Cleanup criteria for river bank soils depend on the carbon content of adjacent sediments which is unknown.

It has been suggested that the contamination could have arrived on the site as part of a river dredging and straightening project. The date of early dredging is given as 1927. PCBs were not in wide use at that time. If the contaminants arrived in later dredge materials, then the size of the site could be truly huge.

Sincerely,

John Keeling
Toxics Cleanup Program

JK:cu



DRAFT PUBLIC PARTICIPATION PLAN

DUWAMISH MARINE CENTER
SEATTLE, WASHINGTON

Prepared by
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

August 2011

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Introduction

The Washington State Department of Ecology (Ecology) developed this public participation plan according to the Model Toxics Control Act (MTCA). This plan is designed to promote meaningful community involvement during the investigation and cleanup of the Duwamish Marine Center. The site is located in Seattle, Washington next to the Lower Duwamish Waterway (LDW). This plan describes the tools Ecology will use to inform the public about site cleanup activities, and the ways the community can become involved in this process.

Ecology and the potentially liable persons (PLPs), James and Jacqueline Gilmur, as Trustees of the James D. and Jacqueline H. Gilmur Living Trust, have negotiated a legal agreement called an Agreed Order that formally describes their working relationship. Under the Agreed Order the PLPs will conduct a Remedial Investigation (RI) and Feasibility Study (FS) and prepare a Draft Cleanup Action Plan (CAP) at the site. The Remedial Investigation/Feasibility Study (RI/FS) is required under WAC 173-340-350 and is part of the cleanup process for this site. The RI will determine the nature and extent of contamination in the upland area soil, groundwater, stormwater and stormwater solids, and seeps. The Feasibility Study will use the results of the RI to evaluate and select cleanup action alternatives for the site.

Cleanup actions might be identified during this RI or FS process that will eliminate or minimize current releases of contamination to the Lower Duwamish Waterway (LDW) or actions that are necessary to prevent an imminent threat to human health or the environment. Ecology will consider implementing such cleanup actions as interim actions under the existing Agreed Order.

Project Description

Location

This site is located at 6365 1st Avenue S in Seattle, Washington on the east bank of the Lower Duwamish Waterway (see figure on page seven). The site is bordered on the

north by Lone Star Investors Property, on the east by First Avenue S, and on the south and west by the Duwamish River, and by Slip 2 on the northwest. The final site boundaries will be defined by the extent of contamination determined during the RI.

Site Background

Duwamish Marine Center leases portions of the property to other companies. Samson Tug and Barge operates in the northern portion of the Duwamish Marine Center, and Duwamish Metal Fabricators operates on the southern portion of the property. Burgess Enterprises formerly operated in the area now occupied by Samson.

There are three docks at the Duwamish Marine Center, which are known as the north, middle, and south docks. An approximately 80-foot-wide strip of land that runs between the docks and the parcel boundaries is owned by the Port of Seattle. A series of boathouses with moorage for 12 to 15 boats is located along the shoreline near the Duwamish Metal Fabricators facility.

Historically, the site has been the location of a marine shipyard, railyard, junk dealer, various construction services companies, and a barge shipping terminal. A marine railway was located adjacent to the southwestern shoreline from 1940 to the mid-1970s.

Contaminants of Concern

Contamination at this site is due to historical use. The contaminants of concern in the soil are:

- Metals
- Polynuclear aromatic hydrocarbons (PAHs)
- Petroleum hydrocarbons
- Polychlorinated biphenyls (PCBs)

The contaminants of concern in the groundwater are:

- Metals
- PAHs
- Pentachlorophenol
- Tetrachloroethene
- Petroleum hydrocarbons

The contaminants of concern in the sediments adjacent to the site are:

- PCBs
- PAHs

Previous Cleanup Work

Several environmental investigations have been conducted at the Duwamish Marine Center. In 2000, soil and groundwater samples were collected from the site. Petroleum hydrocarbons, metals, PCBs, and PAHs were detected above cleanup action levels in soil. Petroleum hydrocarbons were detected above cleanup action levels in groundwater.

A soil and groundwater investigation was performed at the property in 2002. The goal of the study was to determine the vertical and lateral extent of contaminants that had been identified in the previous investigation. Nineteen soil borings were placed at depths between 4 and 12 feet below ground surface and four groundwater monitoring wells were installed at the property. Petroleum hydrocarbons, metals, PCBs, and PAHs were above cleanup levels in soil and groundwater, and the groundwater also contained solvents.

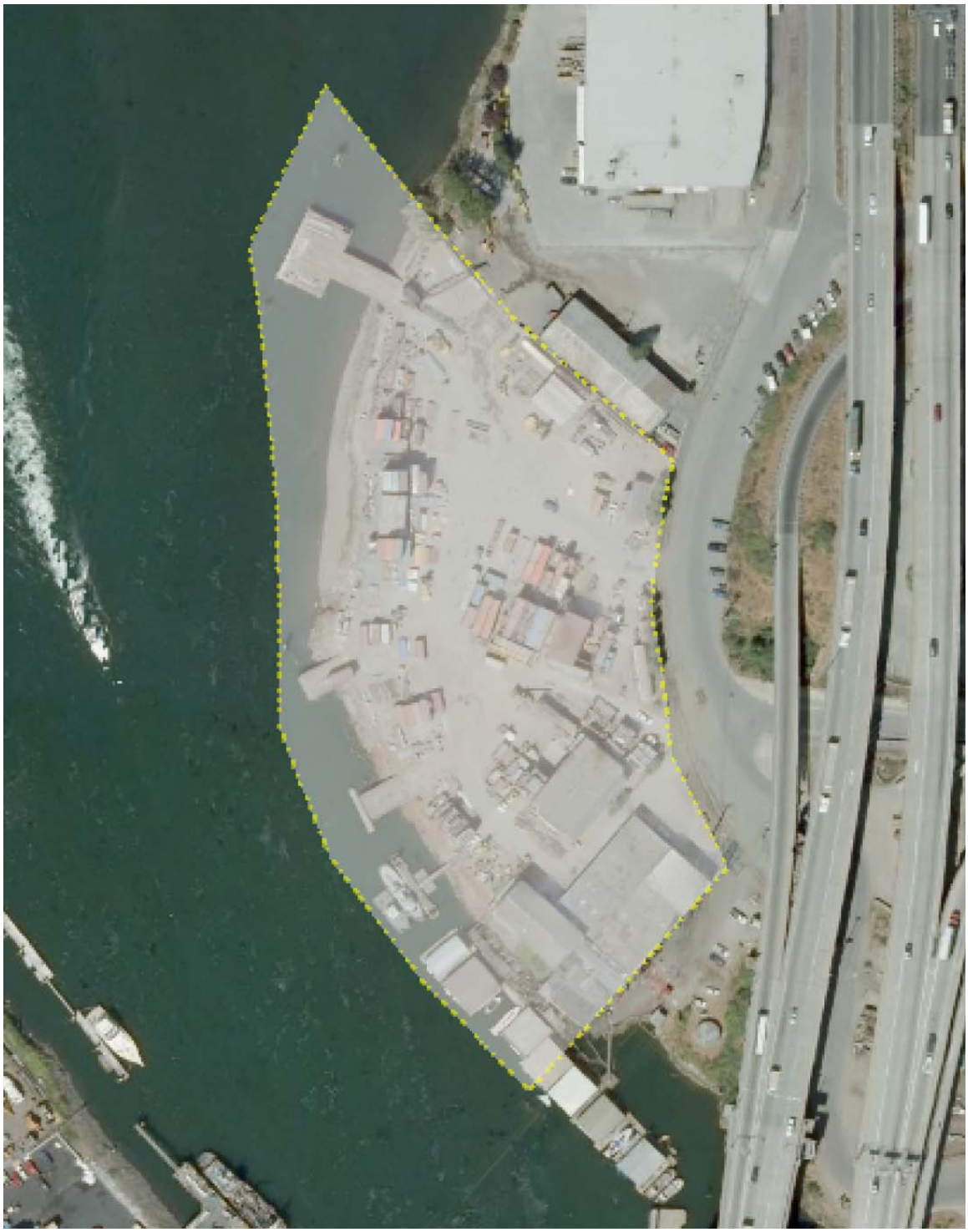
Approximately 50 cubic yards of soil containing lead above hazardous waste levels was excavated and removed from the central area of the site. Confirmation samples collected from the bottom and sidewalls of the excavation indicated that all soil containing lead above the hazardous waste levels was removed from the property.

Groundwater was sampled at one of the wells at the Duwamish Marine Center in November 2003 and February, May, and August 2004. Total mercury and petroleum hydrocarbons were detected in groundwater above levels of concern.

Current Activity

The Agreed Order requires that Duwamish Marine Center complete a

- Work Plan
- Remedial Investigation (RI)
- Feasibility Study (FS), and
- A draft Cleanup Action Plan (CAP).



Duwamish Marine Center

Lower Duwamish Waterway (LDW) Site Cleanup

The Duwamish Marine Center is located adjacent to the LDW site and within the LDW source control study area. The LDW site is a Superfund site that consists of the 5.5 mile stretch of the Duwamish River that flows north into Elliot Bay at the south end of Harbor Island. The LDW site is designated as a contaminated site under both state and federal law due to contaminants in the river and intertidal sediments. The site is one of several sites near the LDW that will be cleaned up to reduce the threat to human health and the environment from releases of hazardous substances, and to assist in preventing recontamination of the sediments after the LDW site cleanup is complete.

The sediments in the LDW site contain a wide range of contaminants due to years of industrial activity and runoff from urban areas. Ecology and EPA are working together to clean up contaminated sediments in the LDW site and to control sources of recontamination from nearby areas.

In 2000, EPA and Ecology entered into an Administrative Order on Consent with King County, the Port of Seattle, the City of Seattle, and The Boeing Company. This legal agreement requires these four parties perform a Remedial Investigation (RI) and Feasibility Study (FS) of sediment contamination in the waterway. Information about the RI/FS for the LDW site is located at http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish.

EPA is leading the RI/FS work, and Ecology is leading source control efforts. The source control efforts will prevent recontamination of the waterway after cleanup. Source control is the process of finding and then stopping or reducing releases of pollution to the river from various sources such as direct discharges via piped outfalls, bank erosion from adjacent properties, surface runoff from adjacent properties, groundwater discharge, air deposition, and spills. It includes identifying and managing sources of contamination to waterway sediments in coordination with sediment cleanups.

Ecology is coordinating these source control efforts with the City of Seattle, King County, the Port of Seattle, the City of Tukwila, and EPA. Ecology partners with these other agencies through the Source Control Work Group. Their work includes a business inspection program; monitoring sediments from storm drain systems; permitting to prevent direct discharges to the waterway; contaminated site cleanups; and testing various household products/materials to determine if they contain chemicals found in waterway sediments.

As part of these source control efforts, Ecology is developing Source Control Action Plans (SCAPs) for the 24 subbasins (or source control areas) that drain to the LDW site. The SCAPS identify potential contamination sources and the actions needed to keep sediments from being contaminated again after cleanup occurs. In addition, the SCAPs describe source control actions that are planned or currently underway, and sampling and monitoring activities that will be conducted to identify additional sources.

A SCAP has been completed for the source control area where the Duwamish Marine Center is located and is known as the River Mile (RM) 1.7-2.0 East (Slip 2 to Slip 3). The SCAP was based on a thorough review of information pertinent to sediment recontamination in this source control area. This SCAP is located on Ecology's website: http://www.ecy.wa.gov/pubs/0909085.pdf

The Duwamish River Cleanup Coalition

The Duwamish River Cleanup Coalition (DRCC) is an advisory group to EPA and Ecology and works with the South Park and Georgetown neighborhoods and other stakeholders to ensure a Duwamish River cleanup that is accepted by and benefits the community and is also protective of aquatic life, wildlife and human health.

DRCC was formed by an alliance of community, environmental, tribal, and small business groups affected by ongoing pollution and cleanup plans for the LDW. The coalition members include: Community Coalition for Environmental Justice, the Duwamish Tribe, I'M A PAL Foundation, Environmental Coalition of South Seattle,

Georgetown Community Council, People for Puget Sound, Puget Soundkeeper Alliance, South Park Neighborhood Association, Washington Toxics Coalition, and Waste Action Project.

DRCC is a formal "community advisory group" recognized by EPA and representing the interests of the community toward the cleanup work along the LDW. DRCC receives public participation grant funding from Ecology. They also receive technical assistance grants from EPA for technical advisors to review all LDW Superfund cleanup related studies and plans. They are involved in many aspects of the proposed Superfund cleanup and related MTCA cleanups. DRCC is working with Ecology to ensure that the cleanup and source control measures meet community standards.

Enhanced Public Participation

Ecology will work with EPA and stakeholders according to the enhanced public participation efforts that occur for the LDW Superfund site. Ecology site managers and community involvement coordinators may participate in community meetings and events as needed. Ecology will coordinate with the DRCC throughout the public involvement process. This may include such activities as coordination for public meetings and sharing drafts of documents with DRCC for review, as appropriate.

Ecology's goal is to be transparent to the community and all other stakeholders. This will be done by posting electronic documents on Ecology's website for stakeholder review at key points in the Duwamish Marine Center cleanup process. The stakeholders will be able to see the planned schedule for the next phase of work at the site by reviewing the Agreed Order for the site.

Community Profile

For decades much of the land along to the LDW has been industrialized. Current commercial and industrial operations include cargo handling and storage, marine

construction, boat manufacturing, marina operations, concrete manufacturing, paper and metals fabrication, food processing, and airplane parts manufacturing.

Although the LDW is viewed primarily as an industrial corridor, two residential neighborhoods border the banks of the river: South Park and Georgetown. The South Park neighborhood is on the western shore of the LDW, and the Georgetown neighborhood is on the eastern side of the Duwamish Waterway. The residents of the community are well known for their commitment to neighborhood issues particularly related to the ongoing site cleanups along the LDW. A description of these communities is provided below.

South Park Community Description

The South Park neighborhood is located in South Seattle, on the west bank of the LDW. Native Americans of the Duwamish Tribe were the first residents of South Park who lived on the shores of the Duwamish River for thousands of years. This area was once a small farming town composed of Italian and Japanese farmers who supplied fresh produce to Seattle's Pike Place Market. South Park became part of the City of Seattle in 1907. By 1920 the Duwamish River was straightened out into a straight, deep channel that would accept ocean-going ships and barges. This change in the Duwamish greatly impacted South Park. The curving meanders had been straightened, which made it easier for industry to develop along the banks of the waterway.

In the mid 1960s, South Park was rezoned as industrial. Over 4,000 people complained and the City of Seattle changed the zoning to low-density residential. The City of Seattle built the South Park Community Center in 1989 which remains a vital resource within the community. The South Park Community Center offers a wide variety of free and low cost programs and special events. Special events include free breakfasts and family events. The community center provides before and after-school programs and school break camps for students. They also offer adult classes ranging from yoga to technology to English classes. South Park is also served by the City-owned neighborhood center, managed by the South Park Neighborhood Association. The neighborhood center houses

several non-profit and city services including the South Park Food Bank, City-sponsored South Park Action Agenda, and the Environmental Coalition of South Seattle.

The Seattle Public Library opened the new South Park branch at 8604 Eighth Avenue South (at Cloverdale Street) in September 2006. This new branch is 5,019 square feet and has the capacity to hold 18,700 books and materials (about one-third of the collection is Spanish-language, including bilingual children's materials and Spanish Language fiction and non-fiction). The library also has bilingual staff on hand to answer questions and to help patrons.

The South Park neighborhood is comprised of about 3,717 people of various ethnicities: 37% Hispanic, 34% white, 14% Asian, 7 % Black, 5% multiracial, 2% American Indian, 1% Native Hawaiian/Pacific Islander. The average age is 31 years old and the average income is $20,917 (based on records from 2005). A variety of retail and service businesses are located along 14th Avenue South. Data from the Seattle Office of Economic Development lists the primary categories of employment in South Park as wholesale trade, transportation and utilities; construction/resources; manufacturing; and services.

Georgetown Community Description

The Georgetown neighborhood is located in South Seattle, on the east side of the LDW across the river from South Park. Georgetown is Seattle's oldest neighborhood, settled by Luther Collins in 1851. It was incorporated as the City of Georgetown from 1904-1910, and later annexed by the City of Seattle.

According to records from 2005, just over 1,100 people live in Georgetown. The largest local employers in Georgetown are in the arts, entertainment, and recreation industries. The Georgetown neighborhood is home to large employers such as The Boeing Company and King County International Airport.

The community is host to local events such as art walks, an annual Arts and Garden Tour. The neighborhood is home to historic buildings such as the Old Georgetown City Hall, and the Georgetown Steam Plant. The South Seattle Community College has recently revitalized its Georgetown Campus and is home to the Puget Sound Industrial Excellence Center Apprenticeship and Education Center. The campus offers more than 25 apprenticeship programs including masonry, meat cutters, electricians, iron workers, and cosmetology. The neighborhood is also home to The Georgetown Community Council which meets once a month and is very active in the community.

Key Community Concerns and Issues

Ecology and EPA conducted interviews with community members, environmental organizations, and community organizations in October 2002 for the LDW site Community Involvement Plan. The Duwamish Marine Center is located within the larger LDW site. Ecology conducted an abbreviated version of community interviews in 2006 and determined that the concerns raised in 2002 were still pertinent. In 2008 stakeholder groups provided comments to EPA and Ecology on the LDW Remedial Investigation Draft Report developed for the LDW Superfund site. Although these comments are directed to the entire Superfund site, they are relevant for the Duwamish Marine Center because it is part of the larger Superfund site. The stakeholder comments indicated that their concerns have remained constant with the concerns outlined below.

There is clear interest in this cleanup process along the LDW. The following is representative of significant concerns and issues expressed during the community interviews. Ecology will work to respond to community concerns through the cleanup process and through coordination with EPA, other organizations, such as state and local health agencies, and the community advisory group that has been established for the site.

- **Health:** Stakeholders are concerned that living close to the LDW could affect their health. They expressed concern about consumption of all bottom fish and parts of other fish, as well as contamination from chemicals, bacteria and viruses. There is concern about exposure to contaminated sediments through contact at public access

parks, employment at industries on the waterway, restoration work, and other cleanup work. Some said that there should be limited access to the river if there is a health risk.

- **Wildlife:** Stakeholders expressed concern for fish and wildlife. Sea lions, salmon, bottom fish, crabs, mussels, clams, shrimp, opossums, squirrels, ducks and other birds were mentioned, as well as concern about the disappearance of herons and for herons on Kellogg Island in the Duwamish Waterway.

- **Domestic animals:** There is concern about dogs eating garbage from the river and horses being on a greenbelt above the river.

- **River and groundwater contamination:** There is concern that the river is dying and that it contains contaminants, including PCBs and mercury. There is concern about the effect of septic systems near the river; sewer overflows; surface water runoff, including oil, antifreeze and fertilizers; unreported spills and illegal dumping; and pumping of waste into the river or groundwater. There is concern that permits for discharges to the river are not being enforced or will be revised to be less strict. There is concern that sources of PCBs are not being addressed and that calculated cleanup levels for many contaminants will not be strict enough. There is also concern that the current efforts to control ongoing sources of pollution will not be enough to actually control the sources.

- **Economics:** Some people interviewed are concerned about contamination lowering property values. Others are concerned that businesses will leave the area due to the designation of the LDW as a Superfund site.

- **Cleanup:** Some people are concerned that South Park and the businesses on the water will be affected by cleanup activities, such as increased truck or barge traffic and potential accidents. There are concerns about the costs of damages to natural resources and the possibility that parties responsible for contamination will do some

early cleanup activities but nothing more.

- **Information:** Several people expressed concern about a lack of warning signs for fishermen and recreational users and suggested that such signs should be installed. People are concerned about whether adequate information reaches the Spanish-speaking and other non-English-speaking communities and whether the average person and immigrants understand the risks.

- **Image:** While some people described the LDW neighborhood as an industrial area, others are concerned that it is perceived as a dumping ground.

- **Tribal Rights:** Some community members are concerned that the tribal rights to harvest fish and shellfish in the LDW are not being honored at a level protective of these treaty rights.

Other public concerns may be identified over the course of the cleanup through: public comment periods; further community interviews; surveys; meetings; and other contacts with individuals, community groups, or organizations.

Ecology will work to respond to community concerns through the cleanup process and coordination with other regulatory agencies and property owners as necessary.

Public Participation Activities and Responsibilities

The purpose of this Public Participation Plan is to promote public understanding and participation in the MTCA activities planned for this site. This section of the plan addresses how Ecology will share information and receive public comments and community input on the site activities.

Public Participation Activities

Ecology uses a variety of activities to facilitate public participation in the investigation and cleanup of MTCA sites. Ecology will integrate this input into its decisions as much as is feasible.

The following is a list of the public involvement activities that Ecology will use, their purposes, and descriptions of when and how they will be used during this site's investigation and cleanup.

Formal Public Comment Periods

Comment periods are the primary method Ecology uses to get feedback from the public on proposed investigation and cleanup decisions. Comment periods usually last 30 days and are required at key points during the investigation and cleanup process before final decisions are made.

During a comment period, the public can submit comments in writing, orally, and via e-mail. After formal comment periods, Ecology reviews all comments received and may respond in a document called a Responsiveness Summary.

Ecology will consider the need for changes or revisions based on input from the public. If significant changes are made, then a second comment period may be held. If no significant changes are made, then the draft document(s) will be accepted and finalized.

Future public comment periods will be held for other documents and legal agreements that are developed for the site.

Public Meetings and Hearings

Public meetings may be held at key points during the investigation and cleanup process. Public comment is accepted during public meetings. Ecology also may offer public meetings for actions expected to be of particular interest to the community. These meetings will be held at locations convenient to the community.

Information Repositories

Information repositories are places where the public may read and review site information, including documents that are the subject of public comment.

Ecology has established two repositories for the Duwamish Marine Center site.

- Washington State Department of Ecology, 3190 160th Avenue SE, Bellevue, WA 98008, (425) 649-7190. Please call for an appointment.
- Seattle Public Library, South Park Branch, 8604 Eight Ave S. at Cloverdale St. Seattle, WA

Site information also will be posted on Ecology's web site at:
https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=4146

Site Register

Ecology's Toxics Cleanup Program uses its bimonthly *Site Register* to announce all of its public meetings and comment periods, as well as many other activities. To receive the *Site Register* in electronic or hard copy format, contact Seth Preston at (360) 407-6848 or by e-mail at seth.preston@ecy.wa.gov. It is also available on Ecology's web site at:
http://www.ecy.wa.gov/programs/tcp/pub_inv/pub_inv2.html

Mailing List

Ecology has compiled a mailing list for the site. The list includes individuals, groups, public agencies, elected officials, private businesses, potentially affected parties, and other known interested parties. The list will be maintained at Ecology's Northwest Regional Office and will be updated as needed.

To have your address added or deleted from this mailing list, please contact the Ecology Victoria Sutton at (425) 649-7219 or vsut461@ecy.wa.gov.

Fact Sheets

Ecology will mail fact sheets to persons and organizations interested in the Duwamish Marine Center to inform them of public meetings and comment opportunities and important site activities. Ecology also may mail fact sheets about the progress of site activities.

Newspaper Display Ads

Ecology may place ads in the *Seattle Times* and other appropriate newspapers to announce public comment periods and public meetings or hearings for the site.

Ecology Press Releases

Ecology may release information to the *Seattle Times* and other appropriate press to announce public comment periods, public meetings, hearings, or other information for the site.

Public Participation Plan Update

This public participation plan may be updated as the project proceeds. If a substantial is necessary, the revised plan will be submitted to the public for comment.

Points of Contact

If you have questions or need more information about this plan or the Duwamish Marine Center site, please contact:

Victoria Sutton, Site Manager
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008
Tel: (425) 649-7219
Email: vsut461@ecy.wa.gov

Glossary

Agreed Order: A legal document issued by Ecology which formalizes an agreement between the department and potentially liable persons (PLPs) for the actions needed at a site. An agreed order is subject to public comment. If an order is substantially changed, an additional comment period is provided.

Carcinogen: Any substance or agent that produces or tends to produce cancer in humans.

Cleanup Action: Any remedial action, except interim actions, taken at a site to eliminate, render less toxic, stabilize, contain, immobilize, isolate, treat, destroy, or remove a hazardous substance that complies with cleanup levels; utilizes permanent solutions to the maximum extent practicable; and includes adequate monitoring to ensure the effectiveness of the cleanup action.

Cleanup Action Plan: A document which identifies the cleanup action and specifies cleanup standards and other requirements for a particular site. After completion of a comment period on a Draft Cleanup Action Plan, Ecology will issue a final Cleanup Action Plan.

Cleanup Level: The concentration of a hazardous substance in soil, water, air or sediment that is determined to be protective of human health and the environment under specified exposure conditions.

Comment Period: A time period during which the public can review and comment on various documents and proposed actions. For example, a comment period may be provided to allow community members to review and comment on proposed cleanup action alternatives and proposed plans.

Cleanup Process: The process for identifying, investigating, and cleaning up hazardous waste sites.

Contaminant: Any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

Exposure: Subjection of an organism to the action, influence or effect of a hazardous substance (chemical agent) or physical agent.

Facility: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly-owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed or, placed, or otherwise come to be located.

Feasibility Study (FS): A study to evaluate alternative cleanup actions for a site. A comment period on the draft report is required. Ecology selects the preferred alternative after reviewing those documents.

Groundwater: Water found beneath the earth's surface that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater occurs in sufficient quantities that it can be used for drinking water, irrigation, and other purposes.

Hazardous Substance: Certain categories of substances defined by law and regulation that pose a threat to human health and/or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

Hazardous Waste Site: Any facility where there has been a confirmation of a release or threatened release of a hazardous substance that requires remedial action.

Information Repository: A file containing current information, technical reports, and reference documents available for public review. The information repository is usually located in a public building that is convenient for local residents such as a public school, city hall, or library.

Interim Action: Any remedial action that partially addresses the cleanup of a site.

Model Toxics Control Act (MTCA): Washington State's law that governs the investigation, evaluation and cleanup of hazardous waste sites. Refers to RCW 70.105D. It was approved by voters at the November 1988 general election and known is as Initiative 97. The implementing regulation is WAC 173-340.

Monitoring Wells: Special wells drilled at specific locations on or off a hazardous waste site where groundwater can be sampled at selected depths and studied to determine the direction of groundwater flow and the types and amounts of contaminants present.

Natural Background: The concentration of hazardous substance consistently present in the environment which has not been influenced by localized human activities.

Owner or Operator: Any person with any ownership interest in the facility or who exercises any control over the facility; or in the case of an abandoned facility, any person who had owned or operated or exercised control over the facility any time before its abandonment.

Polycyclic Aromatic Hydrocarbon (PAH): A class of organic compounds, some of which are long-lasting and carcinogenic. These compounds are formed from the combustion of organic material and are ubiquitous in the environment. PAHs are commonly formed by forest fires and by the combustion of fossil fuels.

PCBs (polychlorinated biphenyls): A group of toxic, persistent chemicals. Due to their non-flammability, chemical stability, high boiling point and electrical insulating

properties, PCBs were used in hundreds of industrial and commercial applications including transformers and capacitors for insulating purposes, and in gas pipeline systems as a lubricant. PCBs are a serious threat to public health because they have been proven to cause cancer in animals. In 1977 they were made illegal to produce, yet large amounts still remain in the environment.

Potentially Liable Person (PLP): Any person whom Ecology finds, based on credible evidence, to be liable under authority of RCW 70.105D.040.

Public Participation Plan: A plan prepared under the authority of WAC 173-340-600 to encourage coordinated and effective public involvement tailored to the public's needs at a particular site.

Release: Any intentional or unintentional entry of any hazardous substance into the environment, including, but not limited to, the abandonment or disposal of containers of hazardous substances.

Remedial Action: Any action to identify, eliminate, or minimize any threat posed by hazardous substances to human health or the environment, including any investigative and monitoring activities of any release or threatened release of a hazardous substance and any health assessments or health effects studies.

Remedial Investigation (RI): A study to define the extent of problems at a site. When combined with a study to evaluate alternative cleanup actions it is referred to as a Remedial Investigation/Feasibility Study (RI/FS). In both cases, a comment period on the draft report is required.

Remedial Investigation/Feasibility Study: Two distinct but related studies. They are usually performed at the same time, and together referred to as the "RI/FS." They are intended to:

-Gather the data necessary to determine the type and extent of contamination;
-Establish criteria for cleaning up the site;
-Identify and screen cleanup alternatives for remedial action; and
-Analyze in detail the technology and costs of the alternatives.

Responsiveness Summary: A summary of oral and/or written public comments received by Ecology during a comment period on key documents, and Ecology's responses to those comments. The Responsiveness Summary is mailed, at a minimum, to those who provided comments and its availability is published in the Site Register.

Site: Any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product

in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.

Site Hazard Assessment (SHA): An assessment to gather information about a site to confirm whether a release has occurred and to enable Ecology to evaluate the relative potential hazard posed by the release. If further action is needed, an RI/FS is undertaken.

Site Register: Publication issued every two weeks of major activities conducted statewide related to the study and cleanup of hazardous waste sites under the Model Toxics Control Act. To receive this publication, please call (360) 407-7200.

Superfund: The federal government's program to clean up the nation's uncontrolled hazardous waste sites.

Surface Water: Lakes, rivers, ponds, streams, inland waters, salt waters, and all other non-underground waters and courses within the state of Washington or under the jurisdiction of the state of Washington.

Total Petroleum Hydrocarbons (TPH): A scientific measure of the sum of all petroleum hydrocarbons in a sample (without distinguishing one hydrocarbon from another). The "petroleum hydrocarbons" include compounds of carbon and hydrogen that are derived from naturally occurring petroleum sources or from manufactured petroleum products (such as refined oil, coal, and asphalt).

Underground Storage Tank (UST): An underground storage tank and connected underground piping as defined in the rules adopted under Chapter 90.76 RCW.

Zinc: Zinc is a metallic chemical element; it has a white color with a bluish tinge. It has a high resistance to atmospheric corrosion. A major use is as a protective coating for iron and steel sheet and wire. Excess zinc in the body interferes with the metabolism of other minerals in the body.

APPENDIX B

STORMWATER POLLUTION PREVENT PLAN AND DISCHARGE MONITORING REPORTS

Storm Water Pollution Prevention Plan (SWPPP)

Samson Tug & Barge Company and Duwamish Marine Center

6361 1st Avenue South, in Seattle, Washington

Submitted to:

Washington State Department of Ecology

February 26, 2009

Prepared By:



GREYLOCK CONSULTING LLC
P.O. Box 23254
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1.0 INTRODUCTION

Federal regulations, administered by the Washington State Department of Ecology (Ecology), require the Samson Tug and Barge Facility at 6361 1st Avenue South, in Seattle, Washington to have a General Industrial Storm Water Permit (hereafter referred to as the "Permit"). The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water. The permit covers the Facility as shown in Figure 1. A copy of the Permit is at the back of this Storm Water Pollution Prevention Plan (SWPPP).

1.1 Purpose of the SWPPP

This SWPPP provides for identification of the potential sources of pollution that could affect the quality of storm water discharged from the facility. It also describes the Best Management Practices (BMPs) used to reduce pollutants in storm water discharges associated with the facility.

2.0 FACILITY ASSESSMENT

The Samson Tug and Barge Facility is approximately 5 acres in size and is located at 6361 1st Avenue South, in Seattle, Washington (Figure 1). The facility is owned by the Gilmur/Hale Family Trust. Operators on the site include Samson Tug and Barge Company and the Duwamish Marine Center.

2.1 General Nature of Facility Activity

The Facility's primary objective is the loading and unloading of cargo containers from seagoing ships. Samson operates on the northern end of the facility and provides bi-weekly barge service to Alaska from Seattle. Various types of cargo are shipped via 20 or 40 ft shipping containers. The primary cargo shipped consists of fish, fish products, construction equipment, and vehicles. The loading equipment (forklifts, cranes, etc.) are maintained on site. Maintenance includes engine maintenance, lubrication, and pressure washing. Samson's busy season is from spring through fall. The yard is often full of cargo during this time.

Duwamish Marine Center operates on the southern portion of the site primarily as a transfer facility for sediments being shipped to Waste Management in Seattle, Washington. Duwamish Marine Center is a certified waste recipient for transfer of dredged sediment. Dredged sediment is placed in lined containers and transferred to trucks at the facility. The trucks then transport the sediment to Waste Management in Seattle, Washington. Duwamish Marine Center's busy season is in winter.

The site is generally level and primarily unpaved. The average elevation of the site is approximately + 18 ft MLLW.

Three buildings are present on the site. Roofing materials for the buildings are as follows:
1) The Duwamish Marine Center has a galvanized metal roof,
2) The Dispatch Office has a composite tile roof, and
3) The Storage Building has a canvas (or fabric) roof.

2.2 Maps of Site

Maps of the site are shown in Figures 1 through 3. Figure 1 shows site features such as buildings, catch basins and storm water drainage structures. Figure 2 shows an outline of the storm water drainage areas for each storm water discharge point, surface water locations, area where storm water discharges to ground, and areas of potential soil erosion. Figure 3 shows locations of industrial activity at the facility and materials exposed to storm water.

2.3 Description of Storm Drainage and Outfalls

Nine catch basins and two outfalls are present on the facility (Fig. 2). Seven catch basins drain the southern 4 acres and discharge to Outfall 1. Two catch basins drain the northern 1 acre and are directed toward Outfall 2, which is locked and sealed. Storm water from the northern drainage area is pumped to the sanitary sewer.

Storm water infiltrates into the ground and flows through catch basins toward the outfalls. According to site personnel, storm water has never been observed going over the top of the bank of the property.

Storm water from the site discharges to the Lower Duwamish Waterway.

2.4 Industrial Activity

Industrial activities at the facility include the following:

- Loading and Unloading of Containerized and Bulk Cargo
- Access Roads for Shipping and Receiving
- Temporary Storage of Raw Materials
- Barge Operations
- Vehicle and equipment maintenance and fueling
- Vehicle wash area

Areas of industrial activities are shown on Figure 3.

2.5 Inventory of Materials

Materials handled or stored at the site that can be exposed to storm water include scrap metal, metal cargo, automobiles, tires, diesel, dredged sediments, steel drums, forklifts, and cranes.

2.6 Potential Pollutants

The locations of various activities that could be sources of pollution are shown on Figure 3 and are described below.

Mobile Vehicle Service Area

With the exception of the cranes located on the dock apron, maintenance of vehicles and equipment occurs in front of the Duwamish Marine Center building. Servicing involves replacement of coolant and lubricants, and fueling. Potential pollutants from this activity include

oil, grease, diesel and antifreeze. Storm water from this area drains to Catch Basin 8 and is pumped to the sanitary sewer.

Vehicle Washing Area
Vehicles are steam cleaned in the area shown on Figure 3. Waste water from steam cleaning is contained and pumped to the sanitary sewer. No wash water is discharged to the Duwamish Waterway. Solids from vehicle washing are contained and appropriately disposed of.

Barge Operations
Large cranes are situated near docks on the northern and southern end of the site to load and unload cargo (Figure 3). Cranes are serviced at the dock side. Maintenance is limited to various lubricants and oils. Leaks could occur from hydraulic hoses. Potential pollutants from this activity include oil and grease. Storm water from this area drains to Outfall 1 which discharges to the Lower Duwamish Waterway.

Container Yard
The container handling equipment (top picks and forklifts) have hydraulic oil lines that can break, spilling oil. Additionally, significant truck traffic is present within the unpaved container yard. Potential pollutants from the container yard include oil, grease, elevated turbidity, and zinc. Storm water from this area drains to Outfall 1 which discharges to the Lower Duwamish Waterway.

Temporary Storage of Materials
Materials such as metal are stored temporarily at locations shown in Figure 3. Potential pollutants from the temporary storage of these materials include oil, grease, lead and zinc. Storm water from this area primarily drains to Outfall 1 which discharges to the Lower Duwamish Waterway.

Access Roads for Shipping and Receiving
Access roads for the facility are shown on Figure 3. Since the site is unpaved, track out of dirt can occur onto public roadways. A potential pollutant from this activity is elevated turbidity in storm water.

Galvanized Metal Roof
The Duwamish Marine Center Building on the northern end of the site has a galvanized metal roof. A potential pollutant coming from this metal roof is zinc. Storm water from this roof discharges to the ground and to catch basins 8 and 9. Storm water from this area is pumped to the sanitary sewer.

Voluntary MTCA Cleanup
The site is currently undergoing a Voluntary Cleanup in accordance with the Model Toxics Control Act (MTCA) due to historic releases of contaminants at the site. The cleanup is currently in the investigative phase. The approximate boundaries of impacted soil are shown on Figure 3. Potential pollutants in near surface soils primarily consist of metals, hydrocarbons, and PCBs. Storm water from this area primarily drains to Outfall 1 which discharges to the

Duwamish Waterway.

3.0 STORM WATER CONTROLS

Storm water will be managed by implementing appropriate Best Management Practices (BMPs) at the facility. This section describes the BMPs that will be used. BMPs were selected from the Storm Water Management Manual for Western Washington using the presumptive method.

3.1 Pollution Prevention Team

A storm water pollution prevention team shall be responsible for developing, implementing, maintaining, and updating this SWPPP. The members of the team will be familiar with all aspects of management and operations of the facility. The members of the team and their primary responsibilities include the following: implementing, maintaining, record keeping, reporting, inspecting, training, and testing. The current team members are listed in Table 1.

TABLE 1.

Storm Water Pollution Prevention Team		
Name	***Title***	***Responsibility***
Wally Stilson	Port Captain for Samson Tug & Barge (Permittee)	Corporate signatory authority; review and implementation of the SWPPP and permit renewal
James D. Gilmur	Property Owner/ Operator of Duwamish Marine Center (Co-Permittee)	Co-signatory authority; review and implementation of the SWPPP.
Fred Thurston	Maintenance Foreman/ SWPPP Coordinator	Onsite coordination of all components of the SWPPP; oversees good housekeeping practices and BMPs. Responsible for monthly site inspections, record-keeping, and reporting.
Site Staff		Implementation of operational source control BMPs (e.g., good housekeeping, fueling procedures, preventive maintenance, etc.), promptly identify conditions not meeting SWPPP, perform SWPPP tasks as directed.
Greylock Consulting LLC	Contracted Environmental Consultant	This designee is responsible for storm water sampling and water quality reporting, as well annual training. Responsible for analysis of monitoring data. Recommends new BMPs, if required.

3.2 Good Housekeeping

Good housekeeping is an ongoing approach to improve and maintain a clean and orderly work environment. BMPs for good housekeeping at this facility will consist of the following:

- Promptly contain and clean up solid and liquid pollutant leaks and spills including oils, and fuels, and dust from operations on any area exposed to storm water.

- Do not hose down pollutants from any area to the ground, storm drain, or receiving water unless necessary for dust control purposes to meet air quality regulations and unless the pollutants are conveyed to a treatment system approved by the local jurisdiction.

- Clean oils, debris, sludge, etc. from all BMP systems regularly, including catch basins, boomed areas, and conveyance systems, to prevent the contamination of storm water.

- Promptly repair or replace all leaking connections, pipes, hoses, valves, etc., which can contaminate storm water.

- Use solid absorbents, e.g., clay and peat absorbents and rags for cleanup of liquid spills/leaks, where practicable.

3.3 Preventive Maintenance

A preventive maintenance program shall be employed at this facility, which includes inspection and maintenance of storm water management devices and drainage systems, and routine inspections of industrial facility operations including vehicle maintenance. Equipment such as containers (drums), and outside piping, pumps, and process equipment shall be checked regularly for signs of deterioration.

Catch basins on the site shall be inspected quarterly for build up of sediments. Catch basins shall be cleaned out when accumulated material comes within 18 inches of the bottom of the lowest pipe exiting the catch basin. Sediments in the catch basins shall be properly removed and disposed of by a contractor licensed to perform such work. Records of catch basin inspections and cleanout will be maintained with compliance records.

3.4 Spill Prevention, Reporting, and Emergency Cleanup

The facility maintains a spill plan which is provided in Attachment A. Employees of the facility shall be made aware of response procedures, including material handling and storage requirements. Spill kits and cleanup equipment shall be stored in locations close to areas of potential spills.

3.5 Training

Onsite training of key personnel responsible for compliance with the SWPPP shall be provided annually. All operators on the site shall be familiarized with the major elements of the plan. Training shall include identifying pollutant sources, understanding pollutant control measures, spill prevention and response, good housekeeping, and environmentally acceptable material handling/management practices. The training will focus on how employees make a difference in complying with the SWPPP and preventing contamination of storm water. Temporary workers and others at the site will be given appropriate training information at the conclusion of site safety meetings or on an as-needed basis.

3.6 Illicit Discharge Detection and Elimination

Illicit discharges are any discharges that are not composed entirely of stormwater with limited exceptions (e.g., fire fighting) listed in the Permit. Illicit discharges are prohibited at the Facility. A dry season inspection will be performed to determine if illicit discharges are occurring. Any discharges identified during the inspection, or at any other time, will be eliminated as soon as practicable.

3.7 Maintenance and Repair of Vehicles and Equipment

Leaks and spills of fluids that occur during the repair of vehicles and equipment shall use good housekeeping and cover and containment BMPs. Employees shall:

- Inspect for leaks all incoming vehicles and equipment stored temporarily outside.
- Use drip pans or containers under parts or vehicles that drip or are likely to drip liquids, such as during dismantling of liquid containing parts or removal or transfer of liquids.
- Retain and maintain an appropriate oil spill cleanup kit on-site for rapid cleanup of material spills.
- Remove batteries and liquids from vehicles and equipment in designated areas designed to prevent storm water contamination. Store cracked batteries in a covered non-leaking secondary containment system.
- Empty oil and fuel filters before disposal. Provide for proper disposal of waste oil and fuel.

Samson employees currently keep maintenance records and check lists for vehicles and equipment. A copy of the current check list is provided in Attachment B.

3.8 Mobile Fueling

The following BMPs will be implemented for mobile fueling on the site.

- Ensure that all mobile fueling operations are approved by the local fire department and comply with local and Washington State fire codes.
- Ensure the presence and the constant observation/monitoring of the driver/operator at the fuel transfer location at all times during fuel transfer and ensure that the following procedures are implemented at the fuel transfer locations:
    - Locating the point of fueling at least 25 feet from the nearest storm drain or inside an impervious containment with a volumetric holding capacity equal to or greater than 110 percent of the fueling tank volume, or covering the storm drain to ensure no inflow of spilled or leaked fuel. Storm drains that convey the inflow to a spill

control separator approved by the local jurisdiction and the fire department need not be covered. Potential spill/leak conveyance surfaces must be impervious and in good repair.

- Placement of a drip pan, or an absorbent pad under each fueling location prior to and during all dispensing operations. The pan (must be liquid tight) and the absorbent pad must have a capacity of 5 gallons. Spills retained in the drip pan or the pad need not be reported.

- The handling and operation of fuel transfer hoses and nozzle, drip pan(s), and absorbent pads as needed to prevent spills/leaks of fuel from reaching the ground, storm drains, and receiving waters.

- Not extending the fueling hoses across a traffic lane without fluorescent traffic cones, or equivalent devices, conspicuously placed so that all traffic is blocked from crossing the fuel hose.

- Removing the fill nozzle and cessation of filling when the automatic shut-off valve engages. Do not allow automatic shutoff fueling nozzles to be locked in the open position.

- Not "topping off" the fuel receiving equipment.

- Provide the driver/operator of the fueling vehicle with adequate flashlights or other mobile lighting to view fill openings with poor accessibility. Consult with local fire department for additional lighting requirements.

3.9 Erosion and Sediment Control

Erosion and sediment control BMPs are needed at this site to minimize track out of dirt onto public roadways. The following BMPs will be implemented at this site during operating hours.

Grated Exits

Grates will be installed in areas where trucks exit the site to help minimize track out of dirt onto public roadways. Truckers will be instructed to drive over the grates prior to exiting the facility, so that excess dirt can be contained on the facility. Grates will be inspected at least twice/year and will be cleaned out on an as needed basis.

Vacuum Sweeper

During times of significant trucking activity, it's possible that track out of dirt may still occur even with grated exits. If this occurs, a vacuum sweeper will be employed on an as needed basis to minimize dirt track out onto the road ways.

Catch Basin Inlet Protection

Where catch basins are located outside of vehicle traffic or storage areas, inlet protections (such as silt fence, hay bales, or wattles) will be installed to reduce the volume of sediment entering the conveyance system.

4.0 MONITORING

In accordance with the permit, storm water monitoring and sampling shall be performed quarterly at location OUT1 (Figure 2). The Facility has two outfalls, but Outfall 2 is normally locked with no discharge. Outfall 1 was selected for monitoring as it receives runoff from the majority of industrial activities occurring on site, and is the only regular surface water discharge. The quarters are defined as:

First Quarter: January, February, March
Second Quarter: April, May, June
Third Quarter: July, August, September
Fourth Quarter: October, November, December

Storm water quality conditions at the site will be monitored by a contracted consultant or qualified technician. Storm water will be collected in general accordance with Ecology's Guidance Document, "How to Do Storm Water Sampling. A Guide for Industrial Facilities." (December 2002). Samples will be tested for pH, Turbidity, Oil and Grease, and, Zinc in accordance with the methods identified in Table 2. Visual observations of sheen, odor, discoloration, turbidity, and odor will be noted on field forms.

Samples will be taken to Friedman Bruya Laboratory in Seattle, Washington.

TABLE 2.

Storm Water Sampling Parameters				
Parameter	**Units**	**Analytical Method**	**Benchmark Value**	**Minimum Sampling**
Turbidity	NTU	Meter	25 NTU	Quarterly
pH	Standard Units	meter/litmus paper	6.5 - 8.5 pH	Quarterly
Total Zinc	ug/L	EPA 200.7	117 ug/L	Quarterly
Petroleum-Oil and Grease	Mg/L	EPA 1664 or 1664A	15 mg/L	Quarterly

For each measurement or sample taken, the following information shall be recorded: (1) the date, exact place, method, and time of sampling or measurement; (2) the individual who performed the sampling or measurement; (3) the dates the analyses were performed; (4) the laboratory that performed the analyses; (5) the analytical techniques or methods used; and (6) the results of all analyses. Also, visual observations of the presence of floating materials including oil and grease, visible sheen, discoloration, turbidity, and odor shall be noted on the sampling forms (Attachment C). Sampling and laboratory chain-of-custody forms shall be signed by the individual conducting the sampling. Copies of sampling forms will be retained with SWPPP compliance records.

Analytical and testing results will be compared against benchmark values stated in the permit and identified in Table 2.

At this facility, the sampling point, OUT1, is exposed during mid to low tides, therefore storm water sampling will occur as soon as the tide has dropped low enough to expose the sampling point.

Discharge Monitoring Reports (DMRs) will be submitted quarterly to Ecology. If there is no discharge during the entire quarter, a report will be submitted stating that no discharge occurred. DMRs must be submitted to Ecology within 45 days following the end of the reporting period:

First Quarter	Not later than May 14
Second Quarter	Not later than August 14
Third Quarter	Not later than November 14
Fourth Quarter	Not later than February 14

If a sample is taken but one or more of the criteria listed above are not met, the report will include an explanation identifying what criteria were not met and why.

5.0 ADMINISTRATIVE REQUIREMENTS

This SWPPP shall be retained on-site or within reasonable access of the site and be immediately available, upon request, to Ecology.

5.1 Reporting and Record Keeping

Records of all monitoring information, inspections and visual observations, corrective actions and follow-up activities, and copies of all reports, shall be maintained for a minimum of five (5) years.

Reports that are completed throughout the year will be kept onsite and made available for regulatory inspections. These reports include:

- Catch basin inspection forms (quarterly)
- Catch Basin Cleanout Records
- Preventive Maintenance Forms
- Employee Training (annually)
- Storm Water Sampling Forms (quarterly)
- Discharge Monitoring Reports (quarterly)

5.2 Certification of the SWPPP

The permittee and co-permittee shall ensure implementation of this SWPPP.

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

BY: _____
PERMITTEE

_____
TITLE

_____
DATE

BY: _____
CO-PERMITTEE

_____
TITLE

_____
DATE

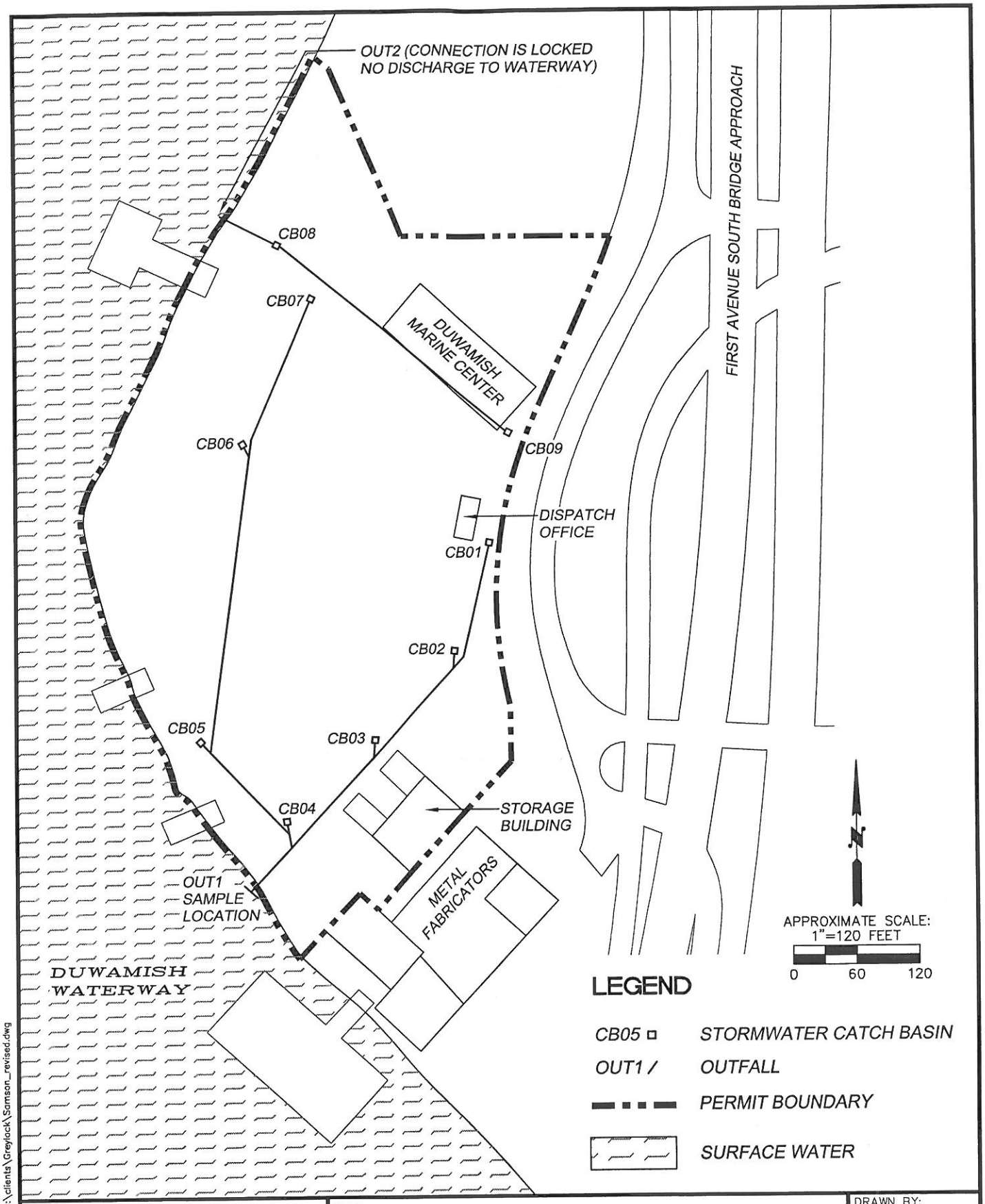
6.0 REFERENCES

Department of Ecology, December 2002. *"How to do Storm Water Sampling. A Guide for Industrial Facilities."*

STORM WATER SAMPLING FIELD LOG

Samson Facility 6361 1st Avenue South, Seattle, WA

Sample Station	Time Rainfall Began	Date	Time	Sampling Method	Name of Sampler	Number of bottles	pH	Turbidity	Visual Observations



P.O. Box 23254
Federal Way, WA 98093
Office: (253) 941-0654
greylockllc@comcast.net

GREYLOCK CONSULTING LLC
Water Resources & Environmental Services

TITLE: FIGURE 1 - SITE PLAN

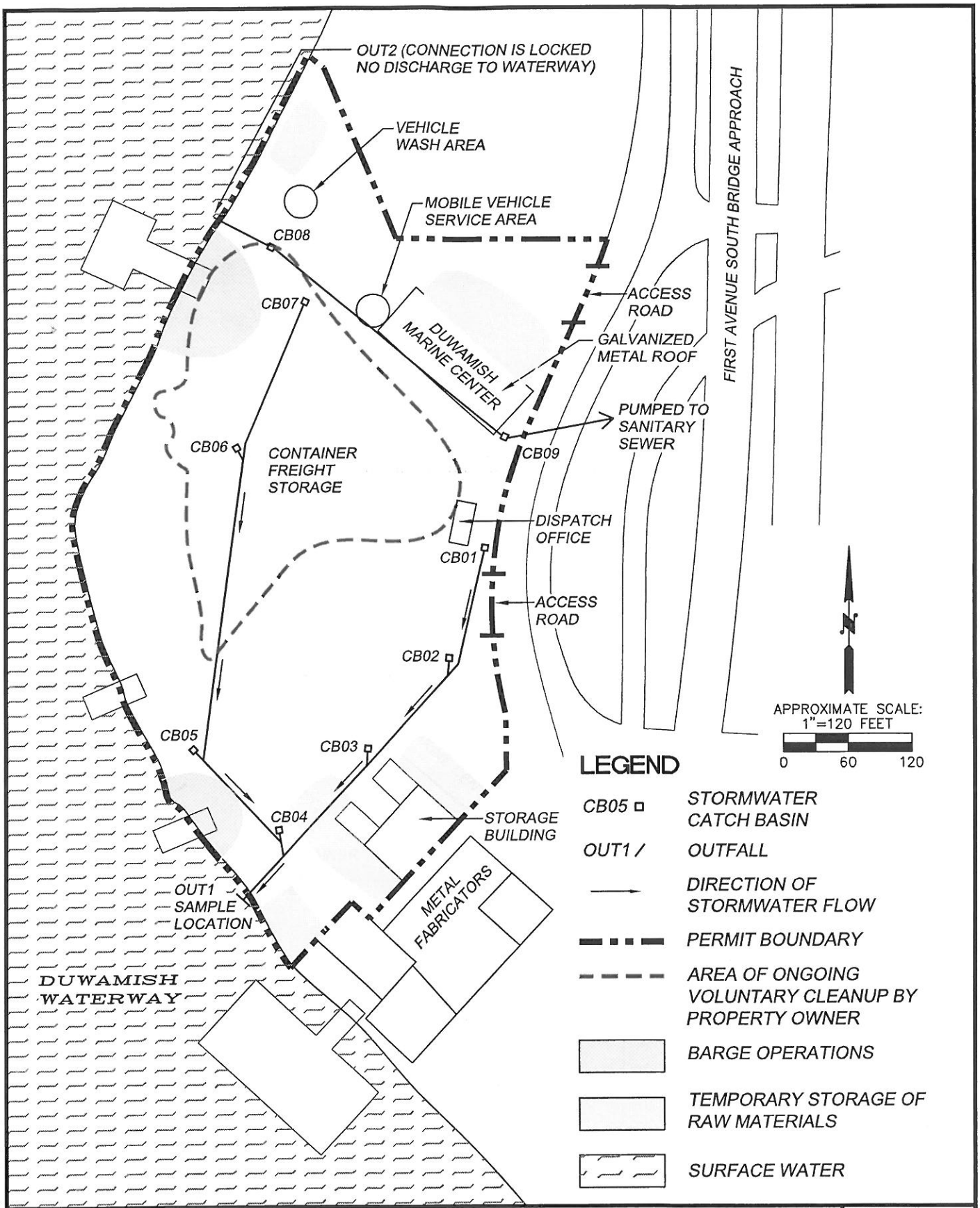
DRAWN BY: CPS

DATE: 02/20/09

SAMPSON TUG AND BARGE FACILITY
6361 1st AVE. S., SEATTLE, WA

SHEET NO: 1

CPS February 20, 2009 - C:\clients\Greylock\Samson_revised.dwg



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greylockllc@comcast.net

GREYLOCK CONSULTING LLC
Water Resources & Environmental Services

TITLE: FIGURE 3 - INDUSTRIAL ACTIVITIES

DRAWN BY: CPS

DATE: 02/20/09

SAMPSON TUG AND BARGE FACILITY
6361 1st AVE. S., SEATTLE, WA

SHEET NO: 3

CPS February 20, 2009 – C:\clients\Greylock\Samson_revised.dwg

*Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures.

Anyone having questions about this plan please contact the terminal manager, tug captain or port captain. We will use this plan as a guideline to protect our employees from the dangers of any chemical product we may use in our operation. This plan should be available for all crews to read and should be available for any inquiries by OSHA.

X. Hazardous Material Spill Notification

An oil or hazardous material spill in a terminal yard or into the water from a terminal or a vessel will be reported as directed in the following instructions:

1. Oil/Haz Spill T/B Annahootz - SOPEP
2. Oil/Haz Spill Deck Cargo Barges - Shipboard Oil Pollution Emergency Plan
3. Oil/Haz Spill Terminals or Unattached Tugs - Take the following action:

A. Action Steps:

- Shut off ignition sources
- Warn people in area
- Contain the spill
- Notify company and agencies
- Stop the product flow
- Use personal protection equipment
- Obtain any assistance needed
- Complete the spill report

B. Notification - notify appropriate personnel and agencies as soon as possible and commence response action.

Sitka office:	Phone 907-747-8559 Fax 907-747-5370
Port Captain Wally Stilson:	907-747-5048 (h) 907-738-3380 (c)
USCG National Response:	1-800-424-8802
Alaska Dept. Of Environmental Conservation:	1-800-478-9300
Washington Dept. Emergency Services:	1-800-258-5990
Washington Maritime:	206-448-7557; Channel 20 VHF Radio
USCG MSO Seattle:	206-217-6232
USCG MSO Juneau:	907-463-2450
USCG MSO Anchorage:	907-271-6700
USCG MSO Valdez:	907-835-4793
USCG MSO Kodiak:	907-487-5750

ADEC Juneau:	907-465-5340
Anchorage:	907-349-7755
Kodiak:	907-486-6760 Fax 907-486-6749

C. Record and provide the information from the Time Line Sheet to the Port Captain when making notification. Continue to use the Time Line Sheet throughout the incident. This will become part of the official record of a spill.

D. Post Spill Action - Provide written report to Port Captain on incident including copy of Time Line Sheet, response taken, amount of oil recovered, amount of time and equipment expended. Include copies of state or federal documents.

Samson Tug and Barge
Hazardous Material Spill Incident
Time Line Sheet

Date and Time of Incident: _____ Position/Location: _____

Tug/Barge/Facility Involved: _____ Injuries or Deaths: _____

Product Spilled: _____ Estimated Quantity Spilled: _____

Notification Made - U.S. Coast Guard (name and time): _____

ADEC or Washington: (name and time): _____

Weather on scene: _____ Weather forecast: _____

Response taken: _____ Assistance requested: _____

Communications: _____ Cause (company use): _____

Additional Info: _____

Date/Time	Information/Data

Additional Comments:

Signature: _____

LIFT TRUCK OPERATOR'S DAILY/WEEKLY INSPECTION REPORT
INTERNAL COMBUSTION LIFT TRUCKS

OPERATOR'S NAME _____ HOUR METER READING (START OF WEEK) _____

UNIT NO. _____ MODEL _____ SERIAL NUMBER _____

SHIFT 1___ 2___ 3___ SPECIAL ATTACHMENTS _____

IMPORTANT!

This check must be made by the truck operator daily at the start of the shift.

Daily Inspection Check List for Week Beginning _____, 19___	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	
	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.	OK	Needs Attn.
1. **Engine Oil**— Check level. (When oil must be added, show number of quarts in "needs attn." column.)														
2. **Fuel System**— Check for leaks. (Report any leaks immediately.)														
3. **Radiator**— Check coolant level. (Caution.)														
4. **Tires**— Check for foreign particles, gouges and cuts; check pneumatic tire pressure.														
5. **Mast, Carriage, Fork or Attachment**— Check for loose or missing bolts and damage; check chain; check adjustment and operation.														
6. **Oil and Water**— Check for leaks.														
7. **Truck Damage**— Explain in remarks section.														
8. **Operator's Compartment**— Inspect for cleanliness.														
9. **Engine Oil Gauge**— Check pressure. (Report any abnormal pressure reading.)														
10. **Fuel**— Check level.														
11. **Ammeter**— Check charging rate (Report unusual readings.)														
12. **Safety Equipment (Rotating lights, back-up alarms, etc.)**— Check operation.														
13. **Steering**— Check operation.														
14. **Brakes**— Check brake pedal travel and parking brake adjustment.														
15. **Truck Operation**— Report any unusual operation or noises.														

REMARKS: _____

_____

_____ _____

(Operators' Signature) (Date)

WEEKLY CHECK

	OK	Needs Attn.		OK	Needs Attn.
1. Clean Air Cleaner*			5. Oil Lines for Leaks		
2. Hydraulic Oil Level			6. Battery Compartment and Electrolyte Level		
3. Oil Clutch Level			7. Power Steering Oil Level		
4. Transmission Oil Level			8. Lift Chain Adjustment		

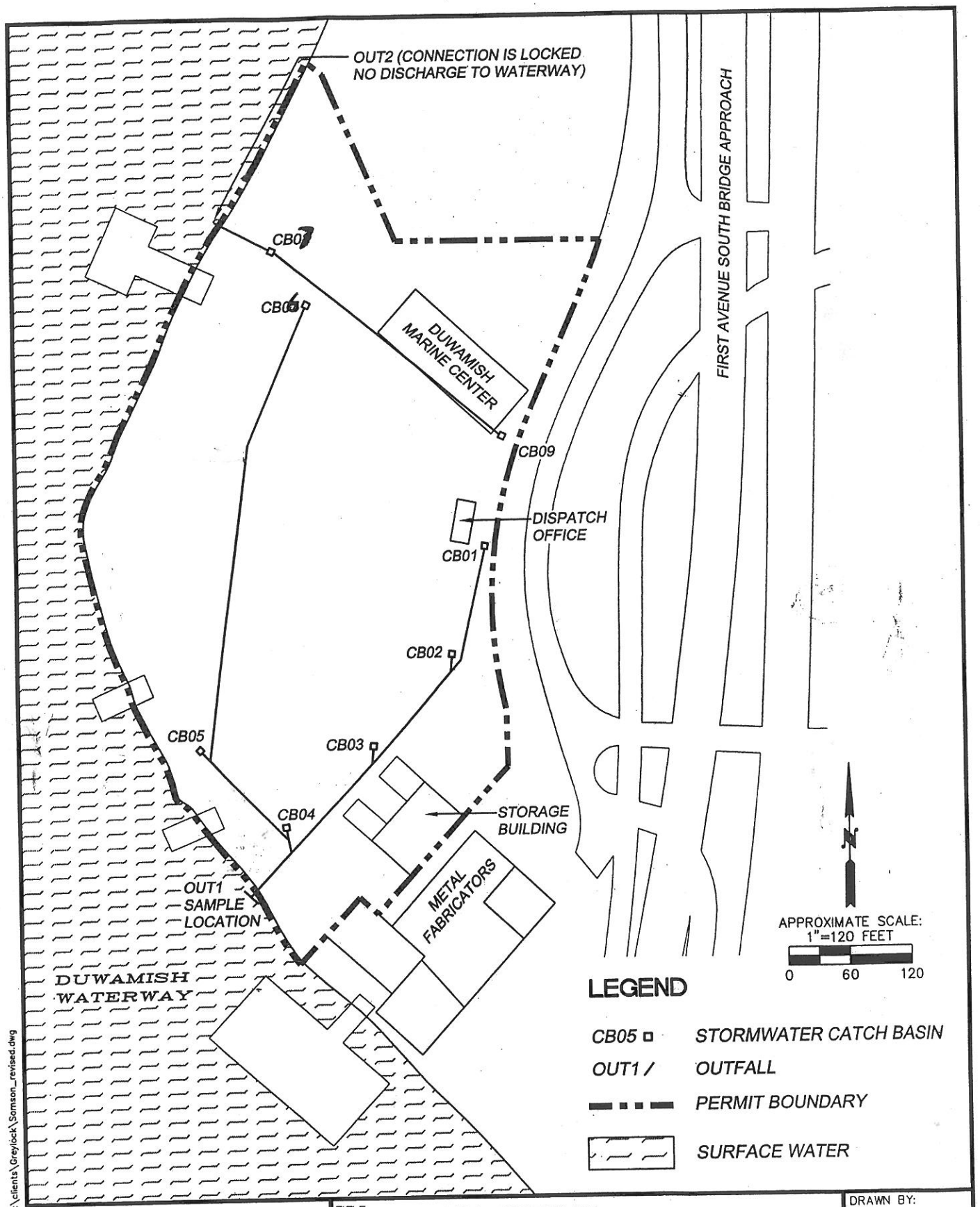
*Where operating conditions require in accordance with agreement.

REMARKS: _____

_____

_____

(Operator's Signature) (Date)



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greylockllc@comcast.net

GREYLOCK CONSULTING LLC
Water Resources & Environmental Services

TITLE: FIGURE 1 - SITE PLAN

DRAWN BY: CPS

DATE: 02/20/09

SAMPSON TUG AND BARGE FACILITY
6361 1st AVE. S., SEATTLE, WA

SHEET NO: 1

CPS February 20, 2009 – C:\clients\Greylock\Samson_revised.dwg

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2011/ 3rd Jan/Feb/Mar Apr/May/Jun X Jul/Aug/Sep Oct/Nov/Dec

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH,
SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	1312	1312	NTU	Grab	1
pH	Consistent Attainment	6.5	6.5	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	713	713	µg/L	Grab	1
Copper (total)	Consistent Attainment	204	204	µg/L	Grab	1
Oil Sheen	Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: MO DAY 2011 YEAR

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

[redacted]
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Sampling Field Form and Laboratory Results are attached.

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2010 (year) ☐ Jan/Feb/Mar ☐ Apr/May/Jun X Jul/Aug/Sep Oct/Nov/Dec

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH,
SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

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Discharge Point Outfall 001 - Duwamish Waterway

☐ There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	☐ Consistent Attainment	59.8	59.8	NTU	Grab	1
pH	☐ Consistent Attainment	8.0	8.0	Standard Units	Grab	1
Zinc (total)	☐ Consistent Attainment	97.7	97.7	µg/L	Grab	1
Copper (total)	☐ Consistent Attainment	51.3	51.3	µg/L	Grab	1
Oil Sheen	☐ Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 10 (MO) 20 (DAY) 2010 (YEAR)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Sampling Field Form and Laboratory Results are attached.

SAMPLE DOCUMENTATION

Site: Samsea Tut & Barge Complex Sample Location: outfall - 1

Date and time of sample collection: 9-8-10 / 1125

Sample collected by: Mark Willoughby

Sample Collection and Preservation

Sample collected in first 12 hours of storm? ☒ Yes ☐ No

If No, explain why not possible to collect sample in first 12 hours: _____

Method of Sample Collection: ☒ Grab ☐ Time weighted composite ☐ Flow weighted composite

Sample Preservation (check all that apply):

- ☐ Collected in bottles provided by lab with pre-measured preservative
- ☐ Stored in cooler
- ☐ Cooled with gel ice packs
- ☐ Cooled with ice
- ☐ Chain of Custody completed

Sample Observations/Comments

Oil Sheen ☐ Yes ☒ No

pH: 8.0 Method: ☐ Test Strip ☐ Field Probe

Turbidity: Lab Method: _____

Site Observations: No Sheen observed. Water flowing from outfall.

Certification: *I certify that these observations are true, accurate, and complete, to the best of my knowledge.*

Mark Willoughby 9-8-10

Sampler Signature Date

Certification by Company Responsible Official

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: _____

Name: _____ Title: _____

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

September 14, 2010

Suzanne Dudziak, Project Manager
Greylock Consulting, LLC
720 S 33rd St, Suite 210
Federal Way, WA 98003

Dear Ms. Dudziak:

Included are the results from the testing of material submitted on September 8, 2010 from the Samson Tug & Barge, F&BI 009066 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GRL0914R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 8, 2010 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson Tug & Barge, F&BI 009066 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
009066-01	OF-1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/14/10
Date Received: 09/08/10
Project: Samson Tug & Barge, F&BI 009066
Date Analyzed: 09/09/10

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Results Reported as NTU

Sample ID Laboratory ID	Date Sampled	Time Sampled	Turbidity
OF-1 009066-01	09/08/10	11:25	59.8
Method Blank			<0.5

Analysis For Total Metals By EPA Method 200.8

Client ID:	OF-1	Client:	Greylock Consulting, LLC
Date Received:	09/08/10	Project:	Samson Tug & Barge, F&BI 009066
Date Extracted:	09/09/10	Lab ID:	009066-01
Date Analyzed:	09/09/10	Data File:	009066-01.031
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	100	60	125

Analyte:	Concentration ug/L (ppb)
Copper	51.3
Zinc	97.7

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	NA	Project:	Samson Tug & Barge, F&BI 009066
Date Extracted:	09/08/10	Lab ID:	I0-487 mb
Date Analyzed:	09/09/10	Data File:	I0-487 mb.017
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	94	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<1

Date of Report: 09/14/10
Date Received: 09/08/10
Project: Samson Tug & Barge, F&BI 009066

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Laboratory Code: 009052-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Turbidity	NTU	1.0	1.0	0	0-20

Date of Report: 09/14/10
Date Received: 09/08/10
Project: Samson Tug & Barge, F&BI 009066

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 009051-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	ug/L (ppb)	20	131	133 b	149 b	50-144	11 b
Zinc	ug/L (ppb)	50	397	148 b	134 b	46-148	10 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	111	66-134
Zinc	ug/L (ppb)	50	102	57-135

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

Send Report To

Company Greylock Consulting LLC

Address 720 S. 333rd St. Ste 210

City, State, ZIP Federal Way WA 98003

Phone # 253 661 3520 Fax #

SAMPLERS (signature) Mark Willoughby

PROJECT NAME/NO. Samson Tug & Barge Company

PO #

REMARKS

Page # _____ of _____

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Turbidity	Total Metals Zn, Cu					Notes
OF-1		9-8-10	1125	Water	2							✓	✓					

ANALYSES REQUESTED

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Mark Willoughby	Mark Willoughby	Greylock Consulting	9-8-10	1755
Received by: [signature]	Nhan Phan	FEBI	9/8/10	1755
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2010 (year) Jan/Feb/Mar Apr/May/Jun X Jul/Aug/Sep Oct/Nov/Dec

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH,
SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
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Discharge Point Outfall 001 - Duwamish Waterway

☐ There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	☐ Consistent Attainment	59.8	59.8	NTU	Grab	1
pH	☐ Consistent Attainment	8.0	8.0	Standard Units	Grab	1
Zinc (total)	☐ Consistent Attainment	97.7	97.7	µg/L	Grab	1
Copper (total)	☐ Consistent Attainment	51.3	51.3	µg/L	Grab	1
Oil Sheen	☐ Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10.000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 10 (MO) 18 (DAY) 2010 (YEAR)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Sampling Field Form and Laboratory Results are attached.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

September 14, 2010

Suzanne Dudziak, Project Manager
Greylock Consulting, LLC
720 S 33rd St, Suite 210
Federal Way, WA 98003

Dear Ms. Dudziak:

Included are the results from the testing of material submitted on September 8, 2010 from the Samson Tug & Barge, F&BI 009066 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GRL0914R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 8, 2010 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson Tug & Barge, F&BI 009066 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
009066-01	OF-1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/14/10
Date Received: 09/08/10
Project: Samson Tug & Barge, F&BI 009066
Date Analyzed: 09/09/10

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Results Reported as NTU

Sample ID Laboratory ID	Date Sampled	Time Sampled	Turbidity
OF-1 009066-01	09/08/10	11:25	59.8
Method Blank			<0.5

Analysis For Total Metals By EPA Method 200.8

Client ID:	OF-1	Client:	Greylock Consulting, LLC
Date Received:	09/08/10	Project:	Samson Tug & Barge, F&BI 009066
Date Extracted:	09/09/10	Lab ID:	009066-01
Date Analyzed:	09/09/10	Data File:	009066-01.031
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	100	60	125

Analyte:	Concentration ug/L (ppb)
Copper	51.3
Zinc	97.7

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	NA	Project:	Samson Tug & Barge, F&BI 009066
Date Extracted:	09/08/10	Lab ID:	I0-487 mb
Date Analyzed:	09/09/10	Data File:	I0-487 mb.017
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	94	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<1

Date of Report: 09/14/10
Date Received: 09/08/10
Project: Samson Tug & Barge, F&BI 009066

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Laboratory Code: 009052-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Turbidity	NTU	1.0	1.0	0	0-20

Date of Report: 09/14/10
Date Received: 09/08/10
Project: Samson Tug & Barge, F&BI 009066

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 009051-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	ug/L (ppb)	20	131	133 b	149 b	50-144	11 b
Zinc	ug/L (ppb)	50	397	148 b	134 b	46-148	10 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	111	66-134
Zinc	ug/L (ppb)	50	102	57-135

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

Send Report To

Company: Greylock Consulting LLC

Address: 720 S. 333rd St. Ste 210

City, State, ZIP: Federal Way WA 98003

Phone #: 253 661 3520 Fax #:

SAMPLERS *(signature)*: Mark Willoughby

PROJECT NAME/NO.: Samson Tug & Barge Company

PO #:

REMARKS:

Page # _____ of _____

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH _____

Rush charges authorized by: _____

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Turbidity	Total Metals Pb, Cu, Zn				Notes
OF-1		9-8-10	1125	water	2							✓	✓				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Mark Willoughby	Mark Willoughby	Greylock Consulting	9-8-10	1755
Received by:		Nhan Phan	FEBT	9/9/10	1253
Relinquished by:					
Received by:					

SAMPLE DOCUMENTATION

Site: Samsea Fuel & Barge Complex Sample Location: outfall - 1

Date and time of sample collection: 9-8-10 / 1125

Sample collected by: Mark Willoughby

Sample Collection and Preservation

Sample collected in first 12 hours of storm? ☒ Yes ☐ No

If No, explain why not possible to collect sample in first 12 hours: _____

Method of Sample Collection: ☒ Grab ☐ Time weighted composite ☐ Flow weighted composite

Sample Preservation (check all that apply):

- ☐ Collected in bottles provided by lab with pre-measured preservative
- ☐ Stored in cooler
- ☐ Cooled with gel ice packs
- ☐ Cooled with ice
- ☐ Chain of Custody completed

Sample Observations/Comments

Oil Sheen ☐ Yes ☒ No

pH: 8.0 Method: ☐ Test Strip ☐ Field Probe

Turbidity: Lab Method: _____

Site Observations: No Sheen observed water flowing from outfall.

Certification: *I certify that these observations are true, accurate, and complete, to the best of my knowledge.*

Mark Willoughby 9-8-10

Sampler Signature Date

Certification by Company Responsible Official

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: _____

Name: _____ Title: _____

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2010 (year) **X Jan/Feb/Mar** **Apr/May/Jun** **Jul/Aug/Sep** **Oct/Nov/Dec**

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH, SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	>1000	>1000	NTU	Grab	1
pH	Consistent Attainment	8.5	8.5	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	703	703	µg/L	Grab	1
Copper (total)	Consistent Attainment	249	249	µg/L	Grab	1
Oil Sheen	Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 5 (MO) 20 (DAY) 2010 (YEAR)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

These results indicate the need for a Level 3 Response due to turbidity exceedances. Treatment BMPs are being evaluated for turbidity. A Level 3 Response Report will be completed by October 26, 2010.

These results indicate the need for a Level 3 Response due to zinc exceedances. Treatment BMPs are being evaluated for zinc. A Level 3 Response Report will be completed by September 30, 2011.

These results indicate the need for a Level 2 Response due to copper exceedances. Structural Source Control BMPs are being evaluated for these constituents. A Level 2 Response Report will be completed by September 30, 2011.

Sample Documentation

Site: SAMSON TUG & BARGE Sample Location: OUT 1

Date and time of sample collection: 3/12/10 08:30 AM

Sample collected by: ERIC MARHOFER

Sample Collection and Preservation

Sample collected in first 12 hours of storm? ☐ Yes ☒ No

If No, explain why not possible to collect sample in first 12 hours: OUTSIDE NORMAL BUSINESS HOURS, MEASURABLE RAINFALL BEGAN @ 7:00 PM ON 3/11/10 (wunderground.com, GEORGETOWN WEATHER STATION), *

Method of Sample Collection: ☒ Grab Sample ☐ Time-weighted composite ☐ Flow-weighted composite

Sample Preservation (check all that apply):

- ☒ Collected in bottles provided by laboratory with pre-measured preservative
- ☒ Stored in cooler
- ☒ Cooled with gel-ice packs
- ☐ Cooled with ice
- ☒ Chain of Custody completed

* OUTFALL (OUT 1) IS ALSO TIDALLY INFLUENCED, HAD TO WAIT FOR LOW ENOUGH TIDE.

Sample Observations

Oil sheen ☒ Yes ☐ No

pH: 8.5 Method: ☒ pH Test strip ☐ Field probe

Calibration Information (for pH field probe only): NA

Turbidity: >1000 NTU Method: FIELD METER

Certification

I certify that these observations are to my knowledge true, accurate, and complete.

Eric Marhofer 3/12/10

Sampler Signature Date

Certification by Company Responsible Official

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: _____

Name: _____ Title: _____

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

March 23, 2010

Owen Reese, Project Manager
Aspect Consulting
401 2nd Ave S, Suite 201
Seattle, WA 98104

Dear Mr. Reese:

Included are the results from the testing of material submitted on March 12, 2010 from the Samson Tug&Barge/090008, F&BI 003132 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
ASP0323R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 12, 2010 by Friedman & Bruya, Inc. from the Aspect Consulting Samson Tug&Barge/090008, F&BI 003132 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting
003132-01	OUT1-031210

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	OUT1-031210	Client:	Aspect Consulting
Date Received:	03/12/10	Project:	Samson Tug&Barge/090008
Date Extracted:	03/12/10	Lab ID:	003132-01 x10
Date Analyzed:	03/15/10	Data File:	003132-01 x10.055
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	113	60	125

Analyte:	Concentration ug/L (ppb)
Copper	249
Zinc	703

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting
Date Received:	Not Applicable	Project:	Samson Tug&Barge/090008
Date Extracted:	03/12/10	Lab ID:	I0-123 mb
Date Analyzed:	03/15/10	Data File:	I0-123 mb.008
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	99	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<1

Date of Report: 03/23/10
Date Received: 03/12/10
Project: Samson Tug&Barge/090008, F&BI 003132

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 003124-20 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Copper	ug/L (ppb)	2.14	2.08	3	0-20
Zinc	ug/L (ppb)	1.64	2.24	31 a	0-20

Laboratory Code: 003124-20 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Copper	ug/L (ppb)	20	2.14	92	50-144
Zinc	ug/L (ppb)	50	1.64	98	46-148

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	96	66-134
Zinc	ug/L (ppb)	50	96	57-135

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

003132

SAMPLE CHAIN OF CUSTODY

ME 03/12/10 AIB

Send Report To: OWEN REESE
Company: ASPECT CONSULTING
Address: 401 SECOND AVE S, STE 201
City, State, ZIP: SEATTLE, WA, 98104
Phone #: 206-838-5844 Fax #:

SAMPLERS (signature):
PROJECT NAME/NO.: SAMSON TUG & BARGE / 090008
PO #: 090008
REMARKS:

Page # 1 of 1

TURNAROUND TIME
☑ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☑ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Zn, Cu (total) EPA 200.8					Notes
OUT 1 - 031210	01	3/12/10	0830	H_2O	1							X					

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Eric Markofer	Aspect	3/12/10	1130
Received by:	Nhan Phan	FeBI	3/12/10	1:15 pm
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

Samples received at 3 °C

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2009 **Jan/Feb/Mar** **Apr/May/Jun** **Jul/Aug/Sep**
X Oct/Nov/Dec
year

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH, SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	--	1427	NTU	Grab	1
pH	Consistent Attainment	--	7.1	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	--	415	µg/L	Grab	1
Copper (total)	Consistent Attainment	--	135	µg/L	Grab	1
Lead (total)	Consistent Attainment	--	110	µg/L	Grab	1
Oil & Grease	Consistent Attainment	--	5.42	mg/L	Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC ⊙ 1001 AND 33 USC ⊙ 1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 12 MO 08 DAY 2009 YEAR

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

These results indicate the need for a Level 3 Response due to turbidity exceedances. Treatment BMPs are being evaluated for turbidity. A Level 3 Response Report will be completed by October 26, 2010.

These results indicate the need for a Level 2 Response due to zinc exceedances. Structural Source Control BMPs are being

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

October 26, 2009

Suzanne Dudziak, Project Manager
Greylock Consulting, LLC
P.O. Box 23254
Federal Way, WA 98003

Dear Ms. Dudziak:

Included are the results from the testing of material submitted on October 19, 2009 from the Samson-Duwamish, F&BI 910175 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
NAA1026R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 19, 2009 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson-Duwamish, F&BI 910175 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
910175-01	OUT1 101609

Sample OUT1 101609 was sent to Aquatic Research for oil and grease analysis. Review of the enclosed report indicates that all quality assurance was acceptable.

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	OUT1 101609	Client:	Greylock Consulting, LLC
Date Received:	10/19/09	Project:	Samson-Duwamish, F&BI 910175
Date Extracted:	10/21/09	Lab ID:	910175-01
Date Analyzed:	10/21/09	Data File:	910175-01.047
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	96	60	125
Holmium	97	60	125

Analyte:	Concentration ug/L (ppb)
Copper	135
Zinc	415
Lead	110

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	Not Applicable	Project:	Samson-Duwamish, F&BI 910175
Date Extracted:	10/21/09	Lab ID:	I9-442 mb redigest
Date Analyzed:	10/21/09	Data File:	I9-442 mb redigest.041
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	93	60	125
Holmium	103	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<5
Lead	<1

Date of Report: 10/26/09
Date Received: 10/19/09
Project: Samson-Duwamish, F&BI 910175

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 910164-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Copper	ug/L (ppb)	26.6	25.0	6	0-20
Zinc	ug/L (ppb)	9.41	7.73	20	0-20
Lead	ug/L (ppb)	<1	<1	nm	0-20

Laboratory Code: 910164-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Copper	ug/L (ppb)	20	26.6	84 b	50-150
Zinc	ug/L (ppb)	50	9.41	83	50-150
Lead	ug/L (ppb)	10	<1	88	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	97	70-130
Zinc	ug/L (ppb)	50	94	70-130
Lead	ug/L (ppb)	10	96	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**FBI005-22**	**PAGE 1**	
REPORT DATE:	**10/23/09**		
DATE SAMPLED:	**10/16/09**	**DATE RECEIVED:**	**10/20/09**

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 910175

CASE NARRATIVE

One water sample was received by the laboratory in good condition. Analysis was performed according to the chain of custody received with the sample. No difficulties were encountered in the preparation or analysis of this sample. Sample data follows while QA/QC data is contained on the following page.

SAMPLE DATA

SAMPLE ID	FOG (mg/l)
OUT1 101609	5.42

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**FBI005-22**	**PAGE 2**	
REPORT DATE:	**10/23/09**		
DATE SAMPLED:	**10/16/09**	**DATE RECEIVED:**	**10/20/09**

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 910175

QA/QC DATA

QC PARAMETER	FOG (mg/l)
METHOD	EPA 1664
DATE ANALYZED	10/23/09
DETECTION LIMIT	2.00
DUPLICATE	
SAMPLE ID	
ORIGINAL	
DUPLICATE	
RPD	NA
SPIKE SAMPLE	
SAMPLE ID	
ORIGINAL	
SPIKED SAMPLE	
SPIKE ADDED	
% RECOVERY	NA
QC CHECK	
FOUND	7.20
TRUE	8.06
% RECOVERY	89.33%
BLANK	<2.00

RPD = RELATIVE PERCENT DIFFERENCE.
NA = NOT APPLICABLE OR NOT AVAILABLE.
NC = NOT CALCULABLE DUE TO ONE OR MORE VALUES BEING BELOW THE DETECTION LIMIT.
OR = RECOVERY NOT CALCULABLE DUE TO SPIKE SAMPLE OUT OF RANGE OR SPIKE TO LOW RELATIVE TOO SAMPLE CONCENTRATION.

SUBMITTED BY:

Steven Lazoff
Laboratory Director

910175

SAMPLE CHAIN OF CUSTODY

ME 10/19/09

AIG

Page # _____ of _____

Send Report To

Company Greylock Consulting

Address PO Box 23254

City, State, ZIP Federal Way WA

Phone # 253 266 2838 Fax #

SAMPLERS (signature)

PROJECT NAME/NO. Samson - Duwamish

PO #

REMARKS Copper detection level < 3 ppb

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Oil & Grease	Zinc (total)	Copper (total)	Lead			Notes
OUT2 101609	01 A-B	10/16/09	1132	Water	2							X	X	X	✓			✓ per SD 10/19/09 MK
																		Samples received at 9 °C

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Suzanne Dudziak	Greylock	10/19/09	1205
Received by:	E. Sandquist	F&B	10/19/09	1205
Relinquished by:				
Received by:		Samples received at ___ °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2009 Jan/Feb/Mar Apr/May/Jun X Jul/Aug/Sep Oct/Nov/Dec
year

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH,
SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

X There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	--	--	NTU	Grab	0
pH	Consistent Attainment	--	--	Standard Units	Grab	0
Zinc (total)	Consistent Attainment	--	--	µg/L	Grab	0
Oil & Grease	Consistent Attainment Consistent Attainment	--	--	mg/L	Grab	0

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC ⊙ 1001 AND 33 USC ⊙ 1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

/SAMSON TUG AND BARGE

Kirk Miles Terminal Foreman
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: MO 10 DAY 01 YEAR 2009

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-767-7820
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

There was no qualifying storm event during work hours this quarter.

CATCH BASIN MEASUREMENT FIELD LOG

Samson Facility 6361 1st Avenue South, Seattle, WA

	CB 01	CB 02	CB 03	CB 04	CB 05	CB 06	CB O7
DATE/	7-7-09	"	"	"	"	"	"
TIME	9:00 AM	9:25 AM	9:45 AM	10:10 AM	10:30 AM	10:45 AM.	11:00 AM
SEDIMENT THICKNESS	3"	1"	½"	8"	5"	4"	7"
MEASURED FROM	ALL Sediment was measured from Concrete Bottom of Catch Basin To Flow line.						
OBSERVATIONS							

DATE OF LAST CATCH BASIN CLEANOUT: 4-13-09 invoice # 02908

IS SEDIMENT IN ANY CB > 18 INCHES THICK? NO

IF YES, SCHEDULE CLEANOUT

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2009 (year) ☐ Jan/Feb/Mar X Apr/May/Jun ☐ Jul/Aug/Sep ☐ Oct/Nov/Dec

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH,
SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

☐ There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	☐ Consistent Attainment	--	>3,000	NTU	Grab	1
pH	☐ Consistent Attainment	--	7.3	Standard Units	Grab	1
Zinc (total)	☐ Consistent Attainment	--	1730	µg/L	Grab	1
Oil & Grease	☐ Consistent Attainment Consistent Attainment	--	27.3	mg/L	Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

Kirk Miles /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 6 (MO) 25 (DAY) 2009 (YEAR)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-767-7820
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Analytical results were received on May 18, 2009 that indicated the need for a Level 1 response for oil and grease, and a Level 2 response for turbidity and zinc.

A Site inspection was conducted on May 28, 2009. The Level 1 response for oil and grease is attached. A Level 2 response for turbidity and zinc is in progress. A Level 2 Response Report will be submitted by November 18, 2009.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

May 18, 2009

Suzanne Dudziak, Project Manager
Greylock Consulting, LLC
P.O. Box 23254
Federal Way, WA 98003

Dear Ms. Dudziak:

Included are the results from the testing of material submitted on May 6, 2009 from the Samson, F&BI 905046 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
NAA0518R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 6, 2009 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson, F&BI 905046 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
905046-01	OUT-01

The sample was sent to Aquatic Research for oil and grease analysis. Review of the enclosed report indicates that all quality assurance was acceptable.

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	OUT-01	Client:	Greylock Consulting, LLC
Date Received:	05/06/09	Project:	Samson, F&BI 905046
Date Extracted:	05/07/09	Lab ID:	905046-01 x10
Date Analyzed:	05/07/09	Data File:	905046-01 x10.025
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	102	60	125

Analyte:	Concentration ug/L (ppb)
Zinc	1,730

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	Not Applicable	Project:	Samson, F&BI 905046
Date Extracted:	05/07/09	Lab ID:	I9-184 mb
Date Analyzed:	05/07/09	Data File:	I9-184 mb.014
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	97	60	125

Analyte:	Concentration ug/L (ppb)
Zinc	<1

Date of Report: 05/18/09
Date Received: 05/06/09
Project: Samson, F&BI 905046

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 905025-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Zinc	ug/L (ppb)	360	367	2	0-20

Laboratory Code: 905025-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Zinc	ug/L (ppb)	50	360	123 b	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Zinc	ug/L (ppb)	50	92	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**FBI004-34**	**PAGE 1**	
REPORT DATE:	**05/14/09**		
DATE SAMPLED:	**05/06/09**	**DATE RECEIVED:**	05/06/09

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 905046

CASE NARRATIVE

One water sample was received by the laboratory in good condition. Analysis was performed according to the chain of custody received with the sample. No difficulties were encountered in the preparation or analysis of this sample. Sample data follows while QA/QC data is contained on the following page.

SAMPLE DATA

SAMPLE ID	FOG (mg/l)
OUT-1	27.3

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**FBI004-34**	**PAGE 2**	
REPORT DATE:	**05/14/09**		
DATE SAMPLED:	**05/06/09**	**DATE RECEIVED:**	05/06/09

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 905046

QA/QC DATA

QC PARAMETER	FOG (mg/l)
METHOD	EPA 1664
DATE ANALYZED	05/14/09
DETECTION LIMIT	2.00
DUPLICATE	
SAMPLE ID	
ORIGINAL	
DUPLICATE	
RPD	NA
SPIKE SAMPLE	
SAMPLE ID	
ORIGINAL	
SPIKED SAMPLE	
SPIKE ADDED	
% RECOVERY	NA
QC CHECK	
FOUND	7.70
TRUE	8.00
% RECOVERY	96.25%
BLANK	<2.00

RPD = RELATIVE PERCENT DIFFERENCE.
NA = NOT APPLICABLE OR NOT AVAILABLE.
NC = NOT CALCULABLE DUE TO ONE OR MORE VALUES BEING BELOW THE DETECTION LIMIT.
OR = RECOVERY NOT CALCULABLE DUE TO SPIKE SAMPLE OUT OF RANGE OR SPIKE TO LOW RELATIVE TOO SAMPLE CONCENTRATION.

SUBMITTED BY:

Steven Lazoff
Laboratory Director

905046

SAMPLE CHAIN OF CUSTODY

ME 05/06/09

AIG

Page # 1 of 1

Send Report To: Suzanne Dudzek
Company: Greylock
Address: PO Box 23254
City; State, ZIP: Federal Way WA 98093
Phone # 253 266 2838 Fax #:

SAMPLERS (signature): S Dudzek
PROJECT NAME/NO.: Samson
PO #:
REMARKS:

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Total Zinc	Oil/Grease					Notes
OUT-01	01 AB	5-6-09	953	Water	2							X	X					
																		Samples received at 12 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: S Dudzek	Suzanne Dudzek	Greylock	5/6/09	1030
Received by: Mai Phan	Khan Phan	FEBI	5/6/09	10:30
Relinquished by:				
Received by:				

Storm Water Permit SO3-011484A
Level 1 Response - Q2 - 2009

Level One Response
Each time after December 31, 2004 quarterly sampling results are above a benchmark value or outside the benchmark range for pH, the permittee shall take the following actions:

Actions:
The permittee shall:
1) Conduct an inspection of their facility as promptly as possible, but no later than two weeks after receipt of sampling results.
2) The inspection shall:

- evaluate possible sources of the benchmark parameter in the storm water discharge,
- identify source /operational control methods by which the permittee can further reduce storm water contamination,
- evaluate whether any improvements or changes to the storm water pollution prevention plan are warranted to control the benchmark parameter,

3) Summarize the results, including remedial actions taken, if any, and place them in the SWPPP,
4) Evaluate the need for a level two or three response as outlined below, and
5) Include a brief summary of inspection results and remedial actions with the quarterly discharge monitoring report for the quarter for which sample results were above benchmark values.

Summary of Actions Taken:

On May 18, 2009 laboratory results were received from the 2009 Q2 storm water sampling event. Results indicated that a Level 1 inspection was required due to exceedances of the Oil and Grease benchmark. Turbidity and zinc also exceeded benchmarks. This is the second exceedance of turbidity and zinc, therefore a Level 2 Response is being prepared to address these issues.

1)Inspection:
On May 28th, Suzanne Dudziak of Greylock Consulting LLC (Greylock) inspected the Facility.

2) Findings of Inspection:

A) Possible Sources of Oil and Grease include the following:

- Spills from maintenance activities
- Leaks from hydraulic hoses
- Leaks from container handling equipment
- Spills from truck traffic in the container yard

No obvious spills were observed during the site inspection on May 28, 2009.

B) Possible source /operational control methods by which the permittee can further reduce storm water contamination.

The site inspection noted that a few catch basins did not have hay bales installed. It was recommended that hay bales be installed at all catch basins that are outside of the flow of traffic, and that regular sediment removal be implemented when significant sediment has built up on the outside of the hay bales.

C) Evaluate whether any improvements or changes to the storm water pollution prevention plan are warranted to control the benchmark parameter.

Significant sediment builds up on the outside of hay bales installed around catch basins. There should be a plan to regularly remove this sediment so that it does not break through and enter the catch basins.

3) Actions Taken:
Additional hay bales were secured for the site and installed around catch basins. Samson is in the process of retrofitting catch basin inserts that will be installed in select catch basins to minimize turbidity, zinc, and oil and grease.

4) Evaluate the Need for a Level 2 or 3 Response:
A Level 2 Response is recommended due to exceedances of turbidity and zinc. A Level 2 Response is in progress.

425-649-7000

WATER Quality
3190 160th AVE SE
Bellevue, WA
98008

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2009 X Jan/Feb/Mar Apr/May/Jun Jul/Aug/Sep Oct/Nov/Dec
year

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH, SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	--	175	NTU	Grab	1
pH	Consistent Attainment	--	6.09	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	--	240	µg/L	Grab	1
Oil & Grease	Consistent Attainment Consistent Attainment	--	3.79	mg/L	Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC ⊙ 1001 AND 33 USC ⊙ 1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

Kirk Miles /SAMSON TUG AND BARGE — MAY 08 2009

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED) — DATE: MO DAY YEAR

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT — 206-767-7820 TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Analytical results were received on April 8, 2009 that indicated the need for a Level 1 inspection.

In response to the analytical results, all catch basins and lines were cleaned out on April 13, 2009.

A Level 1 inspection was conducted on April 16, 2009. Results of the inspection are attached.

Storm Water Permit SO3-011484A
Level 1 Response - Q1 - 2009

Level One Response
Each time after December 31, 2004 quarterly sampling results are above a benchmark value or outside the benchmark range for pH, the permittee shall take the following actions:

Actions:
The permittee shall:
1) Conduct an inspection of their facility as promptly as possible, but no later than two weeks after receipt of sampling results.
2) The inspection shall:

1 evaluate possible sources of the benchmark parameter in the storm water discharge,

2 identify source /operational control methods by which the permittee can further reduce storm water contamination,

3 evaluate whether any improvements or changes to the storm water pollution prevention plan are warranted to control the benchmark parameter,

3) Summarize the results, including remedial actions taken, if any, and place them in the SWPPP,
4) Evaluate the need for a level two or three response as outlined below, and
5) Include a brief summary of inspection results and remedial actions with the quarterly discharge monitoring report for the quarter for which sample results were above benchmark values.

Summary of Actions Taken:

1) On April 8, 2009 laboratory results were received from the 2009 Q1 storm water sampling event. Results indicated that a Level 1 inspection was required.
2) It was recommended that all catch basins and lines be cleaned out as soon as possible. This was accomplished on April 13, 2009.
3) On April 16, 2009, Suzanne Dudziak of Greylock Consulting LLC (Greylock) inspected the Facility.

2) Findings of Inspection:

a) Possible Sources of Turbidity:
Site is not paved. Significant truck traffic flows through the site. Significant dirt is likely entering catch basins in the yard.
b) Possible Sources of Zinc:
Galvanized zinc roofing on office building, and zinc from tire particles off of trucks.
c) Possible Sources of low pH:
No evidence of low pH sources were observed on the Site during the inspection.

Informed the permittee and owner on April 9th that it would be beneficial to completely clean out
catch basins and lines as soon as possible.

SWPPP currently states that catch basins and lines will be cleaned out on a regular basis,

therefore, at this time we don't recommend changes to the SWPPP.

3) Actions Taken:
Catch basins and lines across the facility were cleaned out on April 13, 2009.

4) Evaluate the Need for a Level 2 or 3 Response:
Since this was the very first monitoring event, we don't recommend a Level 2 or 3 response at this time. BMPs were just initiated when the Q1 sample was collected. It would be beneficial to see if continual implementation of BMPs will have a positive impact on the future samples.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

April 8, 2009

Owen Reese, Project Manager
Aspect Consulting
401 2nd Ave S, Suite 201
Seattle, WA 98104

Dear Mr. Reese:

Included are the results from the testing of material submitted on March 30, 2009 from the 090008, F&BI 903280 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
ASP0408R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 30, 2009 by Friedman & Bruya, Inc. from the Aspect Consulting 090008, F&BI 903280 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting
903280-01	OUT1-032809

Sample OUT1-032809 was sent to Aquatic Research for oil and grease analysis. Review of the enclosed report indicates that all quality assurance was acceptable.

All quality control requirements were acceptable.

Date of Report: 04/08/09
Date Received: 03/30/09
Project: 090008, F&BI 903280
Date Analyzed: 03/30/09

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Results Reported as NTU

Sample ID Laboratory ID	Date Sampled	Time Sampled	Turbidity
OUT1-032809 903280-01	03/28/09	1245	175
Method Blank			<0.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	OUT1-032809	Client:	Aspect Consulting
Date Received:	03/30/09	Project:	090008, F&BI 903280
Date Extracted:	03/31/09	Lab ID:	903280-01
Date Analyzed:	04/01/09	Data File:	903280-01.042
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	119	60	125

Analyte:	Concentration ug/L (ppb)
Zinc	240

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Aspect Consulting
Date Received:	NA	Project:	090008, F&BI 903280
Date Extracted:	03/31/09	Lab ID:	I9-136 mb
Date Analyzed:	04/01/09	Data File:	I9-136 mb.024
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	103	60	125

Analyte:	Concentration ug/L (ppb)
Zinc	<1

Date of Report: 04/08/09
Date Received: 03/30/09
Project: 090008, F&BI 903280

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Laboratory Code: 903280-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Turbidity	NTU	175	181	3	0-20

Date of Report: 04/08/09
Date Received: 03/30/09
Project: 090008, F&BI 903280

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 903234-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Zinc	ug/L (ppb)	3.92	1.68	80 a	0-20

Laboratory Code: 903234-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Zinc	ug/L (ppb)	50	3.92	92	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Zinc	ug/L (ppb)	50	99	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES
3927 AURORA AVENUE NORTH, SEATTLE, WA 98103
PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	FBI004-11	PAGE 1	
REPORT DATE:	04/06/09		
DATE SAMPLED:	03/28/09	DATE RECEIVED:	04/01/09

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 903280

CASE NARRATIVE

One water sample was received by the laboratory in good condition. Analysis was performed according to the chain of custody received with the sample. No difficulties were encountered in the preparation or analysis of this sample. Sample data follows while QA/QC data is contained on the following page.

SAMPLE DATA

SAMPLE ID	FOG (mg/l)
OUT1-032809	3.79

AQUATIC RESEARCH INCORPORATED

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FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 903280

QA/QC DATA

QC PARAMETER	FOG (mg/l)
METHOD	EPA 1664
DATE ANALYZED	04/06/09
DETECTION LIMIT	2.00
DUPLICATE	
SAMPLE ID	
ORIGINAL	
DUPLICATE	
RPD	NA
SPIKE SAMPLE	
SAMPLE ID	
ORIGINAL	
SPIKED SAMPLE	
SPIKE ADDED	
% RECOVERY	NA
QC CHECK	
FOUND	8.10
TRUE	8.00
% RECOVERY	101.25%
BLANK	<2.00

RPD = RELATIVE PERCENT DIFFERENCE.
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NC = NOT CALCULABLE DUE TO ONE OR MORE VALUES BEING BELOW THE DETECTION LIMIT.
OR = RECOVERY NOT CALCULABLE DUE TO SPIKE SAMPLE OUT OF RANGE OR SPIKE TO LOW RELATIVE TOO SAMPLE CONCENTRATION.

SUBMITTED BY:

Steven Lazoff
Laboratory Director

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
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We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

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Michael Erdahl
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Enclosures
ASP0408R.DOC

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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 04/08/09
Date Received: 03/30/09
Project: 090008, F&BI 903280
Date Analyzed: 03/30/09

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TURBIDITY USING METHOD SM2130B

Results Reported as NTU

Sample ID Laboratory ID	Date Sampled	Time Sampled	Turbidity
OUT1-032809 903280-01	03/28/09	1245	175
Method Blank			<0.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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Units:	ug/L (ppb)	Operator:	hr

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	119	60	125

Analyte:	Concentration ug/L (ppb)
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3927 AURORA AVENUE NORTH, SEATTLE, WA 98103
PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**FBI004-11**	**PAGE 1**	
REPORT DATE:	**04/06/09**		
DATE SAMPLED:	**03/28/09**	**DATE RECEIVED:**	04/01/09

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 903280

CASE NARRATIVE

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SAMPLE DATA

SAMPLE ID	FOG (mg/l)
OUT1-032809	3.79

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES
3927 AURORA AVENUE NORTH, SEATTLE, WA 98103
PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**FBI004-11**	**PAGE 2**	
REPORT DATE:	**04/06/09**		
DATE SAMPLED:	**03/28/09**	**DATE RECEIVED:**	**04/01/09**

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 903280

QA/QC DATA

QC PARAMETER	FOG (mg/l)
METHOD	EPA 1664
DATE ANALYZED	04/06/09
DETECTION LIMIT	2.00
DUPLICATE	
SAMPLE ID	
ORIGINAL	
DUPLICATE	
RPD	NA
SPIKE SAMPLE	
SAMPLE ID	
ORIGINAL	
SPIKED SAMPLE	
SPIKE ADDED	
% RECOVERY	NA
QC CHECK	
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OR = RECOVERY NOT CALCULABLE DUE TO SPIKE SAMPLE OUT OF RANGE OR SPIKE TO LOW RELATIVE TOO SAMPLE CONCENTRATION.

SUBMITTED BY:

Steven Lazoff
Laboratory Director

903280

SAMPLE CHAIN OF CUSTODY

ME 03/30/09 AI4

Page # 1 of 1

Send Report To Owen Reese

Company Aspect Consulting

Address 401 2nd Ave S, Ste 201

City, State, ZIP Seattle, WA 98104

Phone # ~~206-778-7022~~ 206-~~888~~-5844 Fax #

SAMPLERS (signature) [signature]

PROJECT NAME/NO. 090008

PO #

REMARKS

TURNAROUND TIME
- ☑ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☑ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	0.1 Grease	Zinc	Turbidity			Notes
OUT1_032809	01 A-C	3/28/09	1245	H_2O	3							X	X	X			pH = 6.09

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	[signature]	Owen Reese	Aspect Consulting	3/30/09	07:25
Received by:	[signature]	Nhan Phan	FeBI	3/30/09	15:00
Relinquished by:					
Received by:					

FORMS\COC\COC.DOC

Samples received at 4 °C

STORM WATER SAMPLING FIELD LOG

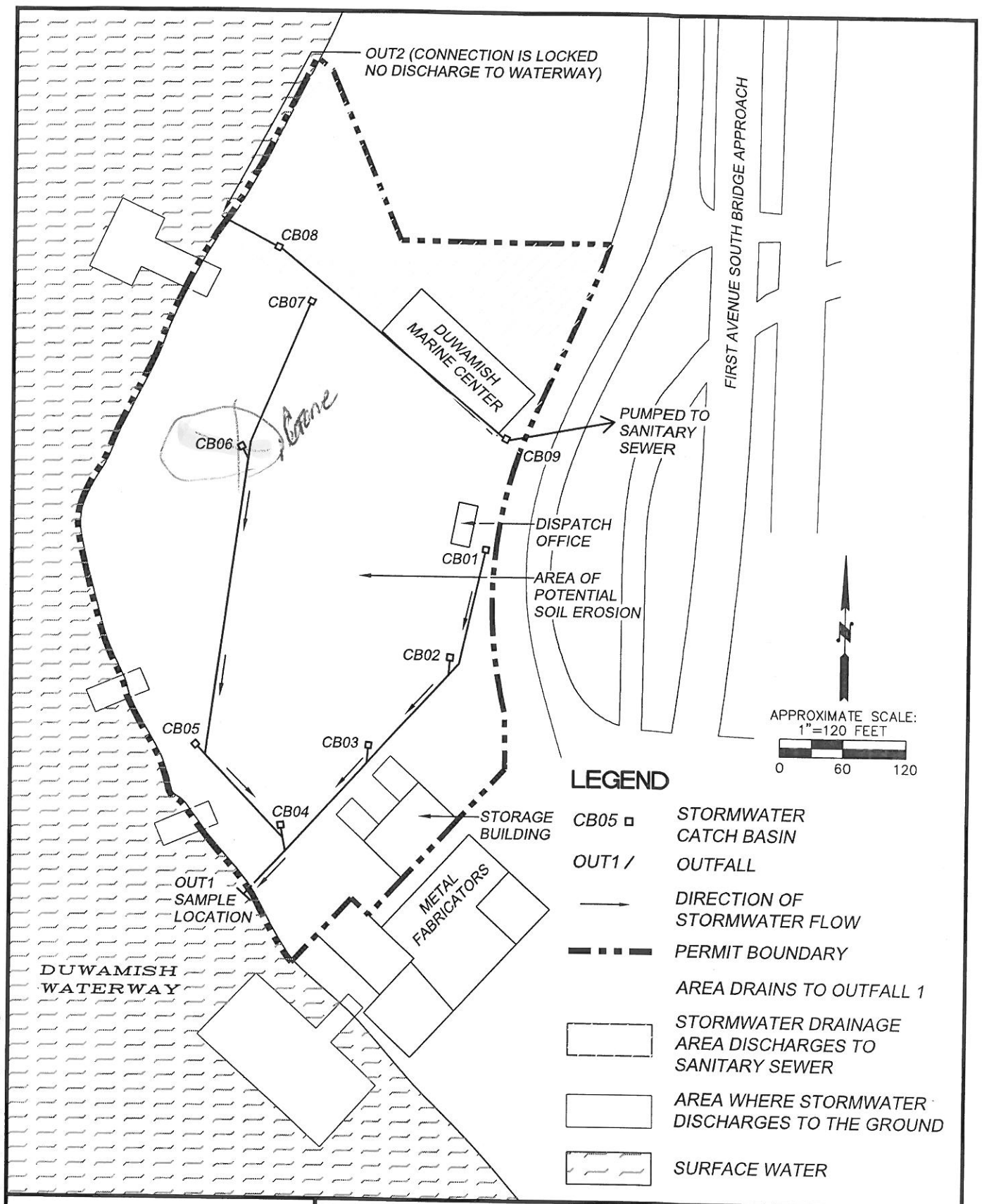
Samson Facility 6361 1st Avenue South, Seattle, WA

Sample Station	Time Rainfall Began	Date	Time	Sampling Method	Name of Sampler	Number of bottles	pH	Turbidity	Visual Observations
OUT 1	~7:00 am	3/28/09	1246 pm	GRAB	ESM	3	6.09	[illegible]	Water appears turbid, took photos. Light Rain, 48°F

STORM WATER SAMPLING FIELD LOG

Samson Facility 6361 1st Avenue South, Seattle, WA

Sample Station	Time Rainfall Began	Date	Time	Sampling Method	Name of Sampler	Number of bottles	pH	Turbidity	Visual Observations
OUT-01	~8:00 AM	5/6/09	9:53	Grab	SD	3	7.3	>3000 NTU	Water is muddy & brown 51°F Light Rain



P.O. Box 23254
Federal Way, WA 98093
Office: (253) 941-0654
greylockllc@comcast.net

GREYLOCK CONSULTING LLC
Water Resources & Environmental Services

TITLE: FIGURE 2 - STORM WATER DRAINAGE

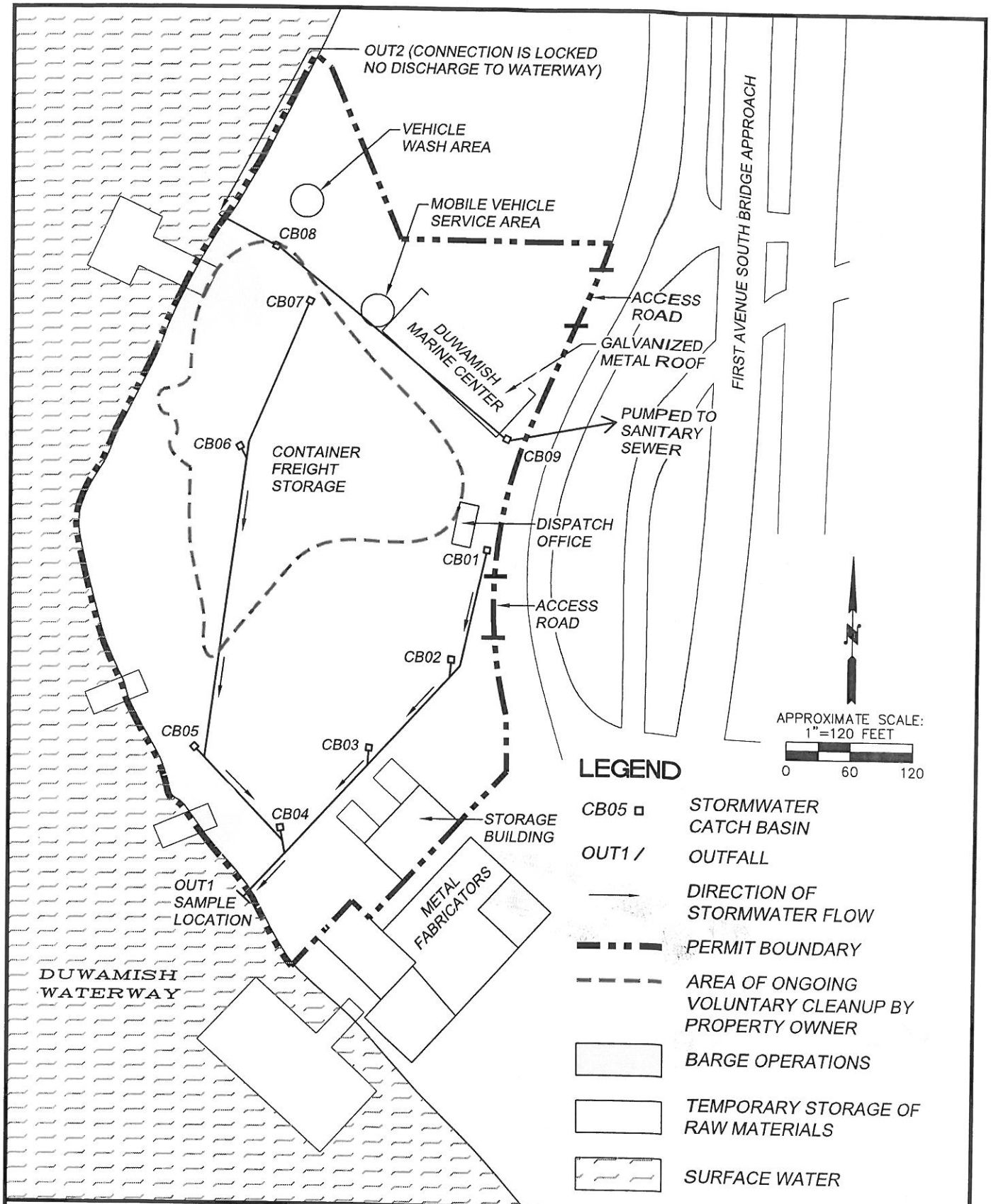
DRAWN BY: CPS

DATE: 02/20/09

SAMPSON TUG AND BARGE FACILITY
6361 1st AVE. S., SEATTLE, WA

SHEET NO: 2

CPS February 20, 2009 – C:\clients\Greylock\Samson_revised.dwg



CPS February 20, 2009 – C:\clients\Greylock\Samson_revised.dwg

P.O. Box 23254
Federal Way, WA 98093
Office: (253) 941-0654
greylockllc@comcast.net

GREYLOCK CONSULTING LLC
Water Resources & Environmental Services

TITLE: FIGURE 3 - INDUSTRIAL ACTIVITIES

DRAWN BY: CPS

DATE: 02/20/09

SAMPSON TUG AND BARGE FACILITY
6361 1st AVE. S., SEATTLE, WA

SHEET NO: 3

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2011/ 1st **Jan/Feb/Mar** Apr/May/Jun Jul/Aug/Sep Oct/Nov/Dec

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH, SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	923.4	923.4	NTU	Grab	1
pH	Consistent Attainment	8.0	8.0	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	362	362	µg/L	Grab	1
Copper (total)	Consistent Attainment	122	122	µg/L	Grab	1
Oil Sheen	Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 4 (MO) 20 (DAY) 2011 (YEAR)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Sampling Field Form and Laboratory Results are attached.

SAMPLE DOCUMENTATION

Site: Samson 1st AVE Sample Location: OF1 (outfall)

Date and time of sample collection: 7-14-11 / 1510

Sample collected by: Mark Willoughby

Sample Collection and Preservation

Sample collected in first 12 hours of storm? ☒ Yes ☐ No

If No, explain why not possible to collect sample in first 12 hours: _____

Method of Sample Collection: ☒ Grab ☐ Time weighted composite ☐ Flow weighted composite

Sample Preservation (check all that apply):

- ☒ Collected in bottles provided by lab with pre-measured preservative
- ☐ Stored in cooler
- ☐ Cooled with gel ice packs
- ☒ Cooled with ice
- ☒ Chain of Custody completed

Sample Observations/Comments

Oil Sheen ☐ Yes ☒ No

pH: 8.0 Method: ☒ Test Strip ☐ Field Probe

Turbidity: 923.4 NTU Method: YSI 6820 V2 Probe

Site Observations: Heavy rainfall occuring. Site muddy with areas of Standing water. Storm water muddy with silt.

Certification: *I certify that these observations are true, accurate, and complete, to the best of my knowledge.*

Mark Willoughby 7-14-11

Sampler Signature Date

Certification by Company Responsible Official

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: _____

Name: _____ Title: _____

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

February 16, 2011

Suzanne Dudziak, Project Manager
Greylock Consulting, LLC
720 S 333rd St, Suite 210
Federal Way, WA 98003

Dear Ms. Dudziak:

Included are the results from the testing of material submitted on February 15, 2011 from the Samson Tug & Barge, F&BI 102152 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GRL0216R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 15, 2011 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson Tug & Barge project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
102152-01	OF-1

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 200.8

Client ID:	OF-1	Client:	Greylock Consulting, LLC
Date Received:	02/15/11	Project:	Samson Tug & Barge, F&BI 102152
Date Extracted:	02/15/11	Lab ID:	102152-01
Date Analyzed:	02/15/11	Data File:	102152-01.048
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	111	60	125

Analyte:	Concentration ug/L (ppb)
Copper	122
Zinc	362

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	Not Applicable	Project:	Samson Tug & Barge, F&BI 102152
Date Extracted:	02/15/11	Lab ID:	I1-100 mb
Date Analyzed:	02/15/11	Data File:	I1-100 mb.046
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	100	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<1

Date of Report: 02/16/11
Date Received: 02/15/11
Project: Samson Tug & Barge, F&BI 102152

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 102152-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	ug/L (ppb)	20	122	69 b	91 b	50-144	27 b
Zinc	ug/L (ppb)	50	362	64 b	67 b	46-148	5 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	103	66-134
Zinc	ug/L (ppb)	50	101	57-135

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

10215 2

SAMPLE CHAIN OF CUSTODY

ME 02/15/11

AI3

Page # 1 of 1

Send Report To

Company Greylock Consulting

Address 720 S 333 st Ste. 21

City, State, ZIP Federal WAY WA 98003

Phone # 253 661 3520 Fax #

SAMPLERS *(signature)* Mark Willoughby

PROJECT NAME/NO. Samson TUG & Barge

PO #

REMARKS

TURNAROUND TIME
- ☒ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Copper, ZINC						Notes
OF-1	01	2-14-11	1510	water Grab	1							✓						
SW-2	02	"	1535	"	1							✓						

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Mark Willoughby	Mark Willoughby	Greylock Consulting	2-15-11	0754
Received by: Nhan Phan	Nhan Phan	FeBI	2/15/11	0754
Relinquished by:				
Received by:		Samples received at 3		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

Letter of Transmittal

Greylock Consulting LLC • 720 S. 333rd St, Ste 210 • Federal Way, WA 98003

Date: May 27, 2011

To: Mr. Kirk Miles
Samson Tug and Barge Company
6361 1st Avenue South
Seattle, WA 98108

From: Suzanne Dudziak
Greylock Consulting LLC

Enclosed are copies of the DMRs for the 1st Avenue and Detroit sites. Also enclosed is a form to update sample points at the Detroit site. Please sign and mail to Ecology by August 15, 2011

Please send us a copy of the signature pages. Thank you.

DEPARTMENT OF ECOLOGY
State of Washington

Updating Discharge/Sample Point(s) Associated with the Industrial Stormwater General Permit Form

Permit No. WAR-011800

Use this form to add or remove, or change discharge and/or sample points at your facility, attach extra sheets of paper if necessary. Contact your permit administrator with any questions.

I. Discharge/Sample Point Info

Discharge Point(s) Latitude and Longitude:

- For the Discharge Identifier, list the name, number, or letter used on the map to identify the point(s) of discharge. The identifier can only be a maximum of three characters long and must be unique for each discharge point.
- In the Description column, provide a brief description of the discharge point (e.g., Catch Basin #1).
- Provide latitude and longitude expressed in decimal degrees. Please use topographic maps and GPS settings that use the 1983 North American Datum (NAD 83). For assistance with latitude/longitude, use either of the following websites: http://www.getlatlon.com/, http://itouchmap.com/latlong.html.
- Indicate which discharge points are stormwater sample points, by checking the "SP" (sample point) box.
- If you are changing a discharge/sample point to a new location, you need to remove the old point in one row of the table (indicate "R"), and add the new point to another row on the table (Indicate "N").

Discharge Identifier			Latitude Decimal Degrees	Longitude Decimal Degrees	Description	SP	Removed, New, or Current point? (R / N / C)
S	W	1	47 32'7.63 °N	122 20'14.25 °W		☒	C
S	W	2	47 32'8.87 °N	122 20'14.24 °W		☒	N
			Decimal Degrees °N	Decimal Degrees °W		☐	
			Decimal Degrees °N	Decimal Degrees °W		☐	
			Decimal Degrees °N	Decimal Degrees °W		☐	
			Decimal Degrees °N	Decimal Degrees °W		☐	

II. Receiving Water Info

Update Location Where Stormwater Enters Receiving Water:

- To add or change the location where stormwater discharged from your facility enters a surface water body, please complete the table below.
- Provide latitude and longitude expressed in degrees (°), minutes ('), and seconds ("). Please use topographic maps and GPS settings that use the 1983 North American Datum (NAD 83).

Receiving Water Body	Latitude Decimal Degrees	Longitude Decimal Degrees	Removed, New, or Current? (R / N / C)
	Decimal Degrees °N	Decimal Degrees °W	
	Decimal Degrees °N	Decimal Degrees °W	
	Decimal Degrees °N	Decimal Degrees °W	

III. Certification by Permittee

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Kirk Miles Printed Name	Samson Tug and Barge Company Company	Date 6-15-11
Signature*		

Ecology is an equal opportunity agency.

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2011/ 2ND **Jan/Feb/Mar** X **Apr/May/Jun** **Jul/Aug/Sep** **Oct/Nov/Dec**

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH, SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	763.4	763.4	NTU	Grab	1
pH	Consistent Attainment	7.5	7.5	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	676	676	µg/L	Grab	1
Copper (total)	Consistent Attainment	180	180	µg/L	Grab	1
Oil Sheen	Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: 6 (MO) 15 (DAY) 2011 (YEAR)

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Sampling Field Form and Laboratory Results are attached.

SAMPLE DOCUMENTATION

Site: Samson 1st AVE Sample Location: OF-1

Date and time of sample collection: 1025 4-25-11

Sample collected by: Mark Willoughby

Sample Collection and Preservation

Sample collected in first 12 hours of storm? ☒ Yes ☐ No

If No, explain why not possible to collect sample in first 12 hours: _____

Method of Sample Collection: ☒ Grab ☐ Time weighted composite ☐ Flow weighted composite

Sample Preservation (check all that apply):

- ☒ Collected in bottles provided by lab with pre-measured preservative
- ☒ Stored in cooler
- ☐ Cooled with gel ice packs
- ☒ Cooled with ice
- ☒ Chain of Custody completed

Sample Observations/Comments

Oil Sheen ☐ Yes ☒ No

pH: 7.5 Method: ☒ Test Strip ☐ Field Probe

Turbidity: 763.4 Method: YSI 6620 V2 Probe

Site Observations: Storm water muddy with silt. Heavy rainfall occurring at the time sample was taken.

Certification: *I certify that these observations are true, accurate, and complete, to the best of my knowledge.*

Mark Willoughby 4-25-11

Sampler Signature Date

Certification by Company Responsible Official

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: 6-15-11

Name: Kirk Miles Title: Term. Foreman

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on April 25, 2011 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson & Tug 1st Ave, F&BI 104304 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
104304-01	OF-1

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 200.8

Client ID:	OF-1	Client:	Greylock Consulting, LLC
Date Received:	04/25/11	Project:	Samson & Tug 1st Ave, F&BI 104304
Date Extracted:	04/26/11	Lab ID:	104304-01
Date Analyzed:	04/26/11	Data File:	104304-01.030
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	122	60	125

Analyte:	Concentration ug/L (ppb)
Copper	180
Zinc	676

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	Not Applicable	Project:	Samson & Tug 1st Ave, F&BI 104304
Date Extracted:	04/26/11	Lab ID:	I1-290 mb
Date Analyzed:	04/26/11	Data File:	I1-290 mb.016
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	95	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<1

Date of Report: 04/28/11
Date Received: 04/25/11
Project: Samson & Tug 1st Ave, F&BI 104304

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 104313-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	ug/L (ppb)	20	4.98	103	98	50-144	5
Zinc	ug/L (ppb)	50	1,760	176 b	11 b	46-148	176 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	103	66-134
Zinc	ug/L (ppb)	50	109	57-135

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

104304

SAMPLE CHAIN OF CUSTODY

ME 04/25/11

AI2

Send Report To Suzanne Dudziak

Company Greylock Consulting

Address 710 33rd St. Ste. 210

City, State, ZIP Federal WA 98005

Phone # 253-661-3520 Fax #

SAMPLERS (signature) Mark Willoughby

PROJECT NAME/NO. Samson & TUB 1st Ave

PO#

REMARKS

TURNAROUND TIME
- ☑ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	copper, zinc						Notes
OF-1	01	4-25-11	1025	Water	1							✓						

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Mark Willoughby	Mark Willoughby	Greylock	4-25-11	
Received by:	Nhan Phan	FeBI	4/25/11	1145
Relinquished by:				
Received by:		Samples received at 5 °C		

Letter of Transmittal

Greylock Consulting LLC • 720 S. 333rd St, Ste 210 • Federal Way, WA 98003

Date: January 21, 2011

To: Mr. Kirk Miles
Samson Tug and Barge Company
6361 1st Avenue South
Seattle, WA 98108

From: Suzanne Dudziak
Greylock Consulting LLC

Enclosed are copies of the DMRs for the 1st Avenue and Detroit sites. Please sign and mail to Ecology by February 14, 2011

SO3-011484A
INDUSTRIAL STORMWATER GENERAL PERMIT
DISCHARGE MONITORING REPORT

MONITORING PERIOD for (year/quarter): 2010 (year) **Jan/Feb/Mar** **Apr/May/Jun** **Jul/Aug/Sep** **X Oct/Nov/Dec**

Facility/Site Information

SAMSON TUG AND BARGE COMPANY, INC.
Location: 6361 1ST AVENUE SOUTH, SEATTLE
County: KING
Primary SIC Code: 4491

Mailing Information

SAMSON TUG AND BARGE COMPANY, INC.
6361 1ST AVENUE SOUTH,
SEATTLE, WA 98108

You must send a Discharge Monitoring Report (DMR) to Ecology **every quarter**. If there was **no discharge** *or* you have **suspended sampling** because of consistent attainment of benchmark values, mark the appropriate boxes and send the DMR to Ecology. Please read the instructions before completing the DMR.

Discharge Point Outfall 001 - Duwamish Waterway

There was no qualifying storm event this quarter so no values are entered below (see explanation)

Quarterly Monitoring		AVERAGE	MAXIMUM	UNITS	Sample Type	Events Sampled
Turbidity	Consistent Attainment	>2000	>2000	NTU	Grab	1
pH	Consistent Attainment	8.0	8.0	Standard Units	Grab	1
Zinc (total)	Consistent Attainment	4330	4330	µg/L	Grab	1
Copper (total)	Consistent Attainment	1640	1640	µg/L	Grab	1
Oil Sheen	Consistent Attainment	YES/NO			Grab	1

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION; I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC/1001 AND 33 USC/1319. *(PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO $10,000.00 AND OR MAXIMUM IMPRISONMENT OF BETWEEN SIX MONTHS AND FIVE YEARS.)*

KIRK MILES /SAMSON TUG AND BARGE
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER (TYPED OR PRINTED)

DATE: MO DAY 2011 YEAR

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

206-910-3243
TELEPHONE NUMBER

COMMENTS/EXPLANATIONS

Sampling Field Form and Laboratory Results are attached.

SAMPLE DOCUMENTATION

Site: Samson 1st Ave Sample Location: OUT-1 1st Ave Site

Date and time of sample collection: 12-27-10 1506

Sample collected by: Suzanne Dudzinski

Sample Collection and Preservation

Sample collected in first 12 hours of storm? ☒ Yes ☐ No

If No, explain why not possible to collect sample in first 12 hours: _____

Method of Sample Collection: ☒ Grab ☐ Time weighted composite ☐ Flow weighted composite

Sample Preservation (check all that apply):

- ☒ Collected in bottles provided by lab with pre-measured preservative
- ☒ Stored in cooler
- ☒ Cooled with gel ice packs
- ☐ Cooled with ice
- ☒ Chain of Custody completed

Sample Observations/Comments

Oil Sheen ☐ Yes ☒ No

pH: 8.0 Method: ☒ Test Strip ☐ Field Probe

Turbidity: >2000 NTU Method: YSI 6280 Probe

Site Observations: Moderate Rain, Stormwater appears turbid/muddy Sample has a lot of silt in it

Certification: *I certify that these observations are true, accurate, and complete, to the best of my knowledge.*

Suzanne Dudzinski 12-27-10

Sampler Signature Date

Certification by Company Responsible Official

"I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: _____

Name: _____ Title: _____

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 28, 2010 by Friedman & Bruya, Inc. from the Greylock Consulting, LLC Samson - 1st Ave, F&BI 012305 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Greylock Consulting, LLC
012305-01	OUT-1

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 200.8

Client ID:	OUT-1	Client:	Greylock Consulting, LLC
Date Received:	12/28/10	Project:	Samson - 1st Ave, F&BI 012305
Date Extracted:	01/04/11	Lab ID:	012305-01 x10
Date Analyzed:	01/04/11	Data File:	012305-01 x10.026
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	110	60	125

Analyte:	Concentration ug/L (ppb)
Copper	1,640
Zinc	4,330

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Greylock Consulting, LLC
Date Received:	Not Applicable	Project:	Samson - 1st Ave, F&BI 012305
Date Extracted:	01/04/11	Lab ID:	I1-03 mb
Date Analyzed:	01/04/11	Data File:	I1-03 mb.016
Matrix:	Water	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125

Analyte:	Concentration ug/L (ppb)
Copper	<1
Zinc	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/05/11
Date Received: 12/28/10
Project: Samson - 1st Ave, F&BI 012305

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 012322-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Copper	ug/L (ppb)	20	8.50	93 b	96 b	50-144	3 b
Zinc	ug/L (ppb)	50	25.7	96 b	97 b	46-148	1 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Copper	ug/L (ppb)	20	111	66-134
Zinc	ug/L (ppb)	50	105	57-135

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

012305

SAMPLE CHAIN OF CUSTODY

ME 12/28/10

AIZ

Send Report To

Company Greylock Consulting

Address 720 S 333rd St Ste 210

City, State, ZIP Federal Way WA 98003

Phone # 2536615578 Fax #

SAMPLERS (signature) Suzanne Dufresne

PROJECT NAME/NO. Samson - 1st Ave

PO #

REMARKS

Page # 1 of 1

TURNAROUND TIME
- [x] Standard (2 Weeks)
- [ ] RUSH

Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Cu, Zn						Notes
OUT - 1	01	12-27-10	1506	W	1							X						

Samples received at 6 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Suzanne Dufresne	Suzanne Dufresne	Greylock	12/28/10	950
Received by:	Kurt Johnson	F&B	12/28/10	950
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

APPENDIX C
BORING LOGS

The Riley Group, Inc.

Geotechnical Engineering • Environmental • Wetland Services

PRELIMINARY PHASE II SUBSURFACE INVESTIGATION

DUWAMISH MARINE CENTER PROPERTY
6365 FIRST AVENUE SOUTH
SEATTLE, WASHINGTON 98108

September 13, 2000

PREPARED BY:

The Riley Group, Inc.
10728 Lake City Way NE
Seattle, WA 98125

PREPARED FOR:

Mr. Jim Gilmur
% Duwamish Marine Center
16 South Michigan Street
Seattle, Washington 98108

RECEIVED
OCT 05 2000
DEPT. OF ECOLOGY

Riley Project No. 2000-122

Test Pit TP-1

Logged by D. Holmes on July 17, 2000

Excavated using a Case 580 rubber-tired backhoe operated by Mr. Joe Koivu of Duwamish Marine Center.

Depth (feet)	Sample ID/ Interval	Moisture Content (%)	PID (ppm)	USCS	Soil Description
				F (GP)	Sparse grass over brownish gray sandy gravel FILL to 4 inches.
1				F (SP)	Gravelly sand FILL to 1.0 feet, grayish brown, fine grained, pebble to cobble gravel, abundant debris including concrete, brick, wood, damp.
2	1.5'	11	8.0	F (GP)	**TP-1-1.5' (9:10)** Sandy gravel FILL to 2.3 feet, brownish gray, sand medium-grained, pebble to cobble gravel including basalt fragments, damp.
3	2.5'	15	0.0	F (SP)	**TP-1-2.5' (9:20)** Sand FILL to 3.2 feet with sparse gravel and wire debris, very dark gray, medium-grained, odor of decay, faint odor of hydrocarbons, damp (possible disturbed native soil).
4				F (SM)	Silty sand FILL with very sparse debris (brick fragments) to at least 5 feet, dark gray, medium- to fine-grained, damp (possible slightly disturbed native soil).
5	4.5'		5.0		**TP-1-4.5' (9:30)**
6					

Total depth of excavation: 5.0 feet. Unit breaks are based upon visual observations of soil color, texture, and amount of debris present.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	Log of Test Pit TP-1	Figure A-1
Logged by: D. Holmes	Date Logged: 7/17/2000	
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

Test Pit TP-2

Logged by D. Holmes on July 17, 2000

Excavated using a Case 580 rubber-tired backhoe operated by Mr. Joe Koivu of Duwamish Marine Center.

Depth (feet)	Sample ID/ Interval	Moisture Content (%)	PID (ppm)	USCS	Soil Description
1				F (GP)	Sandy gravel/gravelly sand FILL to 1 foot, light brownish gray, medium grained, pebble gravel, minor metal debris, dry.
2	2'		0.0	F (SP)	Sand FILL to 3.25 feet, brown, medium- to fine-grained, minor pebble gravel, minor debris including cardboard, concrete fragments, brick fragments, damp. **TP-2-2' (10:00)**
3					
4	3.5'	12	2.1	F (GP)	**TP-2-3.5' (10:05)** Sandy Gravel FILL to 4.2 feet, dark gray, cobble gravel, sand medium-grained, very dark gray, abundant debris including concrete, pipe fragments, wood, glass, brick, wire, etc., some dense silty lenses, damp.
5	4.5'	18	4.1	F (SP)	**TP-2-4.5' (10:10)** Sand FILL to 5.0 feet, grayish brown, medium-grained, minor debris as above, damp.
6	5.5'	22	4.0	F (SP)	Sand FILL to at least 7.0 feet, very dark gray, medium-grained, slightly moist (possible native soil). **TP-2-5.5' (10:15)**
7					

Total depth of excavation: 7.0 feet. Unit breaks are based upon visual observations of soil color, texture and amount of debris present.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	*Log of Test Pit TP-2*	*Figure A-2*
Logged by: D. Holmes	*Date Logged: 7/17/2000*	
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

Test Pit TP-3

Logged by D. Holmes on July 17, 2000

Excavated using a Case 580 rubber-tired backhoe operated by Mr. Joe Koivu of Duwamish Marine Center.

Depth (feet)	Sample ID/ Interval	Moisture Content (%)	PID (ppm)	USCS	Soil Description
1				F (GP)	Sandy gravel FILL to 1 foot, light brown, medium grained, pebble gravel, minor metal debris, dry.
2				F (GP)	Sandy gravel FILL to at least 6.5 feet bgs, very dark gray, medium-grained, pebble gravel, decreasing gravel to 2.5 feet bgs, slightly moist, increasing moisture with depth to moist at 6.5 feet.
3					
4				F (SP)	
5					
6	5.5'	15	6.3		**TP-3-5.5' (10:15)** Sand FILL as above, debris includes rubber, cans, metal cuttings, wood, concrete fragments. @ 6.5' - encountered large concrete clast and backfilled excavation.
7					

Total depth of excavation: 6.5 feet. Unit breaks are based upon visual observations of soil color, texture and amount of debris present.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	*Log of Test Pit TP-3*	*Figure A-3*
Logged by: D. Holmes	*Date Logged: 7/17/2000*	
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

Test Pit TP-4

Logged by D. Holmes on July 17, 2000

Excavated using a Case 580 rubber-tired backhoe operated by Mr. Joe Koivu of Duwamish Marine Center.

Depth (feet)	Sample ID/ Interval	Moisture Content (%)	PID (ppm)	USCS	Soil Description
1				F (GP)	Sandy gravel FILL to 1 foot, light brown, medium grained, pebble gravel, minor metal debris, dry.
2	2'	19	27.0	F (SP)	Silty sand with gravel FILL to at least 3.5 feet bgs, black, medium-grained, very dark gray, medium-grained, pebble gravel, slightly moist, increasing moisture with depth. **TP-4-2' (11:30)** Black silty sand FILL as above, abundant metal cuttings/debris.
3					@ 3.5' - encountered large concrete clast or a concrete slab and backfilled excavation.
4					
5					
6					
7					

Total depth of excavation: 3.5 feet. Unit breaks are based upon visual observations of soil color, texture and amount of debris present.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	Log of Test Pit TP-4	Figure A-4
Logged by: D. Holmes	Date Logged: 7/17/2000	
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

Boring B-1

Logged by D. Holmes on August 3, 2000
Driller: R & R Drilling

Drilled using Mobile B-61, 4.5" ID HSA with 140 lb. hammer.

Depth (feet)	Sample ID/ Interval	(N) Blows/ft	Moisture Content (%)/ Water Table	PID (ppm)	USCS	Soil Description
						Dust over brownish gray sandy gravel gravel (FILL), gravel pea to pebble sized, sand medium-grained, dry.
	1	50/4"		na		1 - No recovery, probable sandy gravel fill, very dense. (8:35)
5	2	77/10"		0.3	F (GP)	2 - Sandy gravel FILL, gray, gravel pea-sized to pebble, sand fine-grained, dry, very dense. (8:45)
	3	28		0.3		3 - Sandy pebble gravel FILL, dark gray, sand fine- to medium grained, minor silt and clay, sheet metal noted in sample, damp, medium dense. (9:00)
10	4	17	▼	0.0		4 - Clayey sandy pebble gravel FILL, dark grayish brown, sand medium- to fine-grained, wet, medium dense. (9:10)
	5	68/10"		na	F (SM)	5 - Silty sand/sandy silt FILL, very dark gray, sand fine-grained, pebble in sample shoe, very little recovery, wet, very dense. (9:15)
	6	50/4"		12.6	F (GP)	@ 14' - refusal (drilling through wire rope). 6 - Sandy pea gravel FILL, black, abundant wood and wire rope fragments, sand medium- to coarse-grained, sheen present, pizza-like odor noted, very dense. (9:30)
15						
20						

Boring terminated at 14.3 feet. Groundwater encountered at 10.5 feet bgs. A groundwater sample was not retreivable. Groundwater exhibited a very faint sheen. Boring located 8 feet east of the south edge of the north dock.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	Log of Boring B-1	Figure A-5
Logged by: D. Holmes		Date Logged: 8/3/2000
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

Boring B-2

Logged by D. Holmes on August 3, 2000.
Driller: R & R Drilling

Drilled using Mobile B-61, 4.5" ID HSA with 140 lb. hammer.

Depth (feet)	Sample ID/ Interval	(N) Blows/ft	Moisture Content (%)/ Water Table	PID (ppm)	USCS	Soil Description
						Tan-colored sandy pebble gravel FILL, sand fine- to medium-grained, machine shop-type metal cuttings present in drill cuttings at a depth of 8 inches. Extremely hard drilling to 3.0 feet.
	1	36	7.0	132	F (GP & SP)	1 - Gravelly sand FILL with wood fragments and metal cuttings, black, sand medium-grained, pebble gravel, dense, damp. (10:40)
5						@ 6' - very hard drilling with abundant metal cuttings in drill cuttings.
	2	26		53.2		2 - Upper 6": Wood and rubber tire fragments in a sand matrix (FILL). Lower 12": SAND, very dark gray to black, medium-fine-grained, damp, medium dense. (10:50)
10			▼		SP	
	3	12		1.5	ML	3 - SILT with very fine-grained sand, brownish gray, moderate to high plasticity, very moist, stiff. (10:55)
15						
	4	35		0.0	SP	4 - SAND, very dark gray to black, medium- to medium-coarse-grained, 1.5-inch thick silt bed and 1.5" peat bed present in center of sample (both light brown), wet, dense. (11:05)
20						

Boring terminated at 19.0 feet. Groundwater encountered at 10.8 feet bgs. Groundwater sample B-2-W obtained at 11:15. Boring located 84 feet south of the adjacent Burgess Enterprises building.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	*Log of Boring B-2*	*Figure A-6*
Logged by: D. Holmes	*Date Logged: 8/3/2000*	
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

Boring B-3

Logged by D. Holmes on August 3, 2000
Driller: R & R Drilling

Drilled using Mobile B-61, 4.5" ID HSA with 140 lb. hammer.

Depth (feet)	Sample ID/ Interval	(N) Blows/ft	Moisture Content (%)/ Water Table	PID (ppm)	USCS	Soil Description
						Brush and 5/8" crushed rock over gray sandy pebble gravel fill, sand medium grained, very hard drilling to 7.0'.
	1	50/5"		na		1 - No recovery, probable sandy gravel fill, very dense. (12:35)
5						@ 5' to 5.5' - white rock fragments (quartzite) in cuttings along with T-shirt and rag fragments. Very difficult drilling.
						@ 7' - cuttings become fine-grained sand.
	2	11		0.0		2 - Gravelly sand with silt (FILL), grayish brown, medium- to fine-grained, pebble gravel, glass fragments present, damp, medium dense. (13:05)
10			▼		F (GP & SP)	@ 10' - encountered black sand fill with pizza-like odor.
	3	30		0.0		3 - Gravel with silt and sand (FILL), black, sand medium- to coarse-grained, pebble gravel, glass fragments present, faint pizza-like odor noted, wet, medium dense. (13:15)
15						
	4	30		0.0		4 - Silty sand (FILL), black, medium to fine-grained, minor pebble gravel present, "greasy" appearance, glass and wood fragments present, pizza-like odor noted, wet, medium dense. (13:20)
20						
						@ 21' - cuttings become silty sand, probable fill/native soil interface.
	5	23		0.0	SP	5 - SAND, black, medium- to coarse grained, slight "greasy" appearance, wet, very faint pizza-like odor noted, wet, medium dense. (13:35)

Boring terminated at 24.0 feet. Groundwater encountered at 12.0 feet bgs. Groundwater sample B-3-W obtained at 13:45. Noticeable sheen on groundwater. Boring located 180 feet west-northwest of boring B-2 and 100 feet south-southwest of boring B-1.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	*Log of Boring B-3*	*Figure A-7*
Logged by: D. Holmes		*Date Logged: 8/3/2000*

Site Address: 6365 First Avenue South, Seattle, Washington 98108

Boring B-4

Logged by D. Holmes on August 3, 2000
Driller: R & R Drilling

Drilled using Mobile B-61, 4.5" ID HSA with 140 lb. hammer.

Depth (feet)	Sample ID/ Interval	(N) Blows/ft	Moisture Content (%)/ Water Table	PID (ppm)	USCS	Soil Description
						Dust over brownish gray sandy gravel gravel (FILL), gravel pea to pebble sized, sand medium-grained, dry.
	1	50/6"		na	F	1 - No recovery, sample was one large fragment of basalt (FILL), very dense. (14:35)
5						
	2	34	▼	na		2 - No recovery, sample was large basalt fragment with approximately 1-ounce of brown, medium-grained sand (FILL), dense. (14:45)
10	3	8		0.0	OL	3 - Organic silty CLAY, brown, moderately plastic, damp, medium soft, damp. (15:15)
						@ 12' - cuttings are medium-grained black sand to 14.5 feet.
					SP	
15	4	9		0.0	OH	4 - As sample 3 above, highly plastic, wood fibers present, wet, stiff. (15:20)
20						

Boring terminated at 16.5 feet. Groundwater encountered at 9.25 feet bgs. Groundwater was not sampled. Boring located 68 feet northeast of the south edge of the middle dock.

The Riley Group, Inc.
10728 LAKE CITY WAY NE
SEATTLE, WASHINGTON 98125

Duwamish Marine Center Property

Riley Project # 2000-122	Log of Boring B-4	Figure A-8
Logged by: D. Holmes		Date Logged: 8/3/2000
Site Address: 6365 First Avenue South, Seattle, Washington 98108		

FARALLON CONSULTING
Quality Service for Environmental Solutions

320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

T: 425 . 427.0061
F: 425 . 427.0067

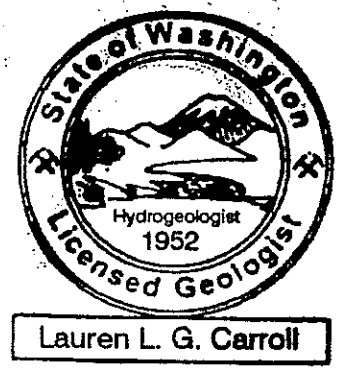
SITE CLOSURE REPORT

GILMUR/HALE FAMILY TRUST SITE
6365 FIRST AVENUE SOUTH
SEATTLE, WASHINGTON

Submitted by:
Farallon Consulting, L.L.C.
320 3rd Avenue NE, Suite 200
Issaquah, Washington 98027

Farallon PN: 781-001

For:
Mr. Jim Gilmur
16 South Michigan Street
Seattle, Washington 98108



September 25, 2002

Prepared by:

Lauren Carroll
Senior Hydrogeologist

Reviewed by:

Peter Jewett
Principal

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-1

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1030
Date/Time Completed : 3-13-02/1050
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD - : 7.5'
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION	Water Level
0		1035	70	B1-0-3	Y	0	GM		Gravelly SILT with sand, medium brown-gray, slightly moist, plastic debris (Fill)	
							SW		SAND, poorly sorted medium sand, gray (Fill)	
5		1040	10	B1-3-6		0			Woody debis, some plastic, creosote-like odor (Fill)	
							SM		SILT/SAND with debris, blackish-brown (Fill)	
			75			0	SW		SAND with silt, very fine, wet, gray, no odor (Fill)	▼
10										
15										

ABBREVIATIONS

LOG OF BORING B-1
(Page 1 of 1)

08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-1.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-2

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3-13-02/1000	Sampler Type	: 1.5" splitspoon
Date/Time Completed	: 3-13-02/1025	Depth Of Water ATD	: 7.0'-7.5'
Drilling Company	: Cascade Drilling	Total Depth	: 12'
Drilling Forman	: Casey Goble		
Drilling Method	: Geoprobe with autohammer		

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							GM		Silty sandy GRAVEL, fine sand, dark brown, gray, light brown in color (Fill)
		1005	80	B2-0-3	Y	0	SW		SAND, fine, orangish brown to dark brown, moist (Fill)
							SM		Silty SAND, gray, trace gravel (angular), moist (Fill)
							SM		Sand and silt, gray, moist (Fill)
		1010	60	B2-3-6		0			Whitish, solid substance (fractured).
5									Wood and glass debris, black, with sandy SILT, minor
							GM		Sandy, silty GRAVEL (fractured), fine to coarse, fine sand, sub-round to angular (Fill)
		1015	50	B2-6-9		0			Glass and plastic debris, wet (Fill)
10									Wet, more glass and plastic observed, minimal recovery, no sand (Fill)
			25			0			
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-2

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issoquah, WA 98027

LOG OF BORING B-3

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/0900
Date/Time Completed : 3-13-02/0920
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : ~7.5'
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SW		SAND, wet
							GW		GRAVEL, gray, slightly moist, angular and fractured (Fill)
		0905	100	B3-0-3	Y	2.0	SW		Silty, gravelly SAND, fine, fine to coarse gravel, dark brown to black, moist, metal and glass debris (Fill)
									Brick and metal debris (Fill)
5		0910	100	B3-3-6		0			SAND, dark brown to black, moist, fine to medium grained, well-graded (Fill)
		0915	90	B3-6-9		0	SW		
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-3

(Page 1 of 1)

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320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-4

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/0930
Date/Time Completed : 3-13-02/0950
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : ~8.0'
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION	Depth in Feet	Water Level
0							GM		Sandy GRAVEL with silt, fine to coarse gravel, fine sand, light to dark brown, moist, subround to fractured angular (Fill)	0	
		0940	100	B4-0-3	Y	5.0	SM		Silty SAND, dark brown to black, moist, light petroleum-like odor (Fill)		
							SP		SAND, fine to medium, well sorted, black-gray, very moist, no odor (Fill)		
5		0945	100	B4-3-6		0	SW		SAND with a trace amount of coarse rounded gravel (Fill)	5	
							SW		SAND, blackish gray (Fill)		
		0950	90	B4-6-9		0	SW		Silty SAND, dark brown (sharp contact) (Fill)		
							SW		SAND, fine to medium, well sorted, black-gray, very moist, no odor, visible contact (Fill)		▼
							SW		SILT with trace organics, wet, gray, no odor, (Fill)		
10										10	
15										15	
20										20	

ABBREVIATIONS

LOG OF BORING B-4

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-5

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1100
Date/Time Completed : 3-13-02/1130
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 8.5'
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Recovery	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SW		SAND, medium brown (Fill)
			80			0	SM		Silty SAND with gravel, debris (plastic, rubber, metal, glass), brown to black, medium grained, well sorted, moist (Fill)
							Fill		Plastic, rubble, glass, and wood debris.
5		1110	60	B5-3-4	Y	150	SM		Silty SAND, fine to medium grained, black, with plastic and wood debris (Fill)
		1120	25	B5-6-9	Y	0	SM		Silty SAND, fine to medium grained, well graded, moist, with glass, wood, and plastic debris (Fill)
									No recovery from the bottom
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-5

(Page 1 of 1)

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-6

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/0815
Date/Time Completed : 3-13-02/0850
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 7'-7.5'
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		0835	75	B6-0-3	Y	0	GM		Silty, Sandy GRAVEL, fine to coarse gravel, fine to coarse sand, subrounded to angular fractured, medium to dark brown, moist, no odor (Fill)
							SP		SAND, fine to medium grained well sorted, silt lens one inch thick at about two feet, brown to black, very moist, no odor (Fill)
5		0840	80	B6-3-4		0	SP		SAND, fine to medium, well sorted, very moist, brown, with glass shards (Fill)
		0845	80	B6-6-9		0			Black, no odor (Fill)
							ML		SILT, gray, wet (Fill)
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-6

(Page 1 of 1)

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-7

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1135
Date/Time Completed : 3-13-02/1200
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : ~10'
Total Depth : 11'(refusal)

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		1140	100	B7-2-4	Y	0	GM		Sandy GRAVEL with silt, fine to coarse grained, subround to subangular, light brown to light gray, slightly moist (Fill)
							SW		SAND, black , sharp contact with color change, debris with metal shavings (Fill)
5			100			0	ML		SILT, gray, stiff, slightly moist (Fill)
							FILL		Plastic, metal and woody debris.
							SP		SAND, fine to medium, well sorted, black, moist (Fill)
		1150	100	B6-6-7.5	Y	0			
							ML		Gravelly SAND, fine to medium well sorted black with woody debris and possibly some concrete (Fill)
10			50				SP		SAND, black wet, with no odor (Fill) Refusal at 11' bgs.
15									
20									

Depth in Feet	Water Level
0	
5	
10	▼
15	
20	

ABBREVIATIONS

LOG OF BORING B-7

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08-14-2002 W:\Projects\781001 Duwamish Marinet\Drawings_Plots\b-7.bor

FARALLON CONSULTING
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Issaquah, WA 98027

LOG OF BORING B-8

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1300
Date/Time Completed : 3-13-02/1325
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : NA
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION	Depth in Feet	Water Level
0		1300	60	B8-2-3	Y	0	GW		Sandy GRAVEL, fine to coarse grained sand, subround to angular, medium brown to blue gray in color, wet (Fill)	0	
							SM		Sandy SILT/silty SAND, moist, dark brown in color, gray SILT at bottom two inches (Fill)		
							ML		SILT, gray, moist (Fill)		
							SW		SAND, coarse gravelly, light tan (Fill)		
5			20			0	Fill		Woody plywood debris	5	
							GW		Sandy GRAVEL, fine to coarse grained wet (possibly from puddle at ground surface) (Fill)		
		1315		B8-7.5-9		0	Fill		Woody debris		
							SP		SAND, fine to medium, well sorted, brown to black, moist (Fill)		
10										10	
15										15	
20										20	

ABBREVIATIONS

LOG OF BORING B-8

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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-8.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-9

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3-13-02/1340	Sampler Type	: 1.5" splitspoon
Date/Time Completed	: 3-13-02/1350	Depth Of Water ATD	: NA
Drilling Company	: Cascade Drilling	Total Depth	: 5'(refusal)
Drilling Forman	: Casey Goble		
Drilling Method	: Geoprobe with autohammer		

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SW		Gravelly SAND, brown, fine to medium grained (Fill)
							GM		GRAVEL with silt and sand, fine to coarse grained, moist (Fill)
			100	B9-1.5-2	Y	0	SP		SAND, fine to medium grained, well sorted, light brown to black, moist (Fill)
							SM		SILT, interbedded with fine to medium grained, well sorted, dark brown to black, moist (Fill)
				B9-3-4.5		0			
							ML		SILT with gravel and wood debris.
5									
10									
15									
20									

Depth in Feet | Water Level

ABBREVIATIONS

LOG OF BORING B-9

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-10

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1430
Date/Time Completed : 3-13-02/1450
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 8'
Total Depth : 9'

Depth in Feet	Sample Interval	Time	% Recovery	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							GW		Sandy GRAVEL, fine to course grained, light brown to blue gray to tan in color, subangular (Fill)
		1440	90	B10-1-3	Y	0	SP		SAND, fine to medium grained, well sorted, medium brown in color, moist (Fill)
5			40				SM		Silty SAND with minor amount of brick debris. Only 6" recovered (Fill)
			60				SP		SAND, fine to medium grained, well sorted, medium brown, wet below 7.5' (Fill)
10									
15									
20									

Depth in Feet | Water Level

ABBREVIATIONS

LOG OF BORING B-10
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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-10.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-11

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3-14-02/1000	Sampler Type	: 1.5" splitspoon
Date/Time Completed	: 3-14-02/1025	Depth Of Water ATD	: 7.5'
Drilling Company	: Cascade Drilling	Total Depth	: 9'
Drilling Forman	: Casey Goble		
Drilling Method	: Geoprobe with autohammer		

Depth in Feet	Sample Interval	Time	% Recovery	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		1005	100	B11-0-3	Y	0	SP		SAND, medium to coarse grained, well sorted, medium brown, moist (Fill)
		1010	100	B11-3-6		0	SM		Gravelly Silty SAND with plastic, rubber, and glass debris (Fill)
5		1015	75			0	SP		SAND, fine to medium grained, well sorted, color grades from medium gray to dark gray, grades from moist to wet (Fill)
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-11

(Page 1 of 1)

08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-11.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-12

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-14-02/1040
Date/Time Completed : 3-14-02/1100
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 6.0'
Total Depth : 9.0'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		1045	60	B12-0-1	Y	0	SP		SAND, medium to course grained, well sorted, light tan, moist (Fill)
		1046	60	B12-1-3		0	SM		Silty, Gravelly SAND, fine gravel, fine to coarse grained sand, blue-gray (Fill)
5		1050	50	B12-3-6		0	SP		SAND, medium to fine grained, well sorted, blue-gray
		1055	75	B12-6-9		0	SP		SAND, fine to medium grained well sorted, dark gray, grades from very moist to wet
							ML		SILT, stiff, gray, wet.
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level: ▼ at 5

ABBREVIATIONS

LOG OF BORING B-12

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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-12.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-13

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1515
Date/Time Completed : 3-13-02/1535
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 7.0'
Total Depth : 9.0'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		1520	75	B13-0-3	Y	0	GM		Silty GRAVEL with sand, fine to coarse grained gravel, fine to coarse grained sand, brown, moist, minor amount of metal shard debris (Fill)
							GW		Sandy GRAVEL, fine to coarse grained, gray, moist (Fill)
5		1525	40	B13-3-6		0	SM		Silty SAND with gravel, gray, slightly moist (Fill)
		1530	5				SM		Silty SAND with gravel, black, wet
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-13

(Page 1 of 1)

08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-13.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-15

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-14-02/0940
Date/Time Completed : 3-14-02/1000
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 7.5'
Total Depth : 9.0'

Depth in Feet	Sample Interval	Time	% Recovery	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							GM		Sandy GRAVEL with silt, medium brown in color, moist (Fill)
		0945	90	B15-0-3	Y	0	SM		Silty, gravelly SAND, fine to coarse grained, gray, moist (Fill)
		0950	80	B15-3-6		0	ML		Sandy SILT with gravel, dark brown in color, moist (Fill)
5							SP		SAND medium to fine grained, well sorted, moist to wet (Fill)
			60						
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-15

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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-15.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-14

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1455
Date/Time Completed : 3-13-02/1510
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 4.0'
Total Depth : 4.5'(refusal)

Depth in Feet	Sample Interval	Time	% Recovery	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							GW		Sandy GRAVEL
							SP		SAND, medium to fine grained, well sorted, medium brown, grades from moist to very moist (Fill)
		1500	90	B14-2-3	Y	0			
		1505	25				SW		SAND with gravel, medium to fine grained, well sorted, medium brown, wet (Fill)
5									Refusal at 4.5'
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level: ▼ at ~4.0'

ABBREVIATIONS

LOG OF BORING B-14

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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-14.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-16

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3-14-02/0905	Sampler Type	: 1.5" splitspoon
Date/Time Completed	: 3-14-02/0935	Depth Of Water ATD	: 6.0'-6.5'
Drilling Company	: Cascade Drilling	Total Depth	: 9.0'
Drilling Forman	: Casey Goble		
Drilling Method	: Geoprobe with autohammer		

Depth in Feet	Sample Interval	Time	% Recovery	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		0915	80	B16-0-1.5	Y	0	SM		Silty SAND with gravel, gray in color, moist (Fill)
		0916	80	B16-1.5-3			SP		SAND, medium to fine grained, well sorted, dark gray to black, grades from moist to wet (Fill)
5		0930		B16-3-6		0			
							ML		Sandy SILT, medium gray, wet (Fill)
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level: ▼ at 5

ABBREVIATIONS

LOG OF BORING B-16

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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-16.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-17

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3-14-02/0815	Sampler Type	: 1.5" splitspoon
Date/Time Completed	: 3-14-02/0840	Depth Of Water ATD	: 6.0'
Drilling Company	: Cascade Drilling	Total Depth	: 7.5'
Drilling Forman	: Casey Goble		
Drilling Method	: Geoprobe with autohammer		

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION	Depth in Feet	Water Level
0										0	
		0820	100	B17-0-3	Y	0	SM		Silty SAND with gravel, light brown to gray, fine to coarse grained, fine to course grained subrounded to angular gravel (Fill)		
		0825	70	B17-4-5		0	SM		SILT/silty SAND/sandy, fine to medium grained sand, black, wet (Fill)		
5		0830	100	B17-6-7.5			Fill		Debris mixed with silty, sandy gravel (Fill)	5	▼
10										10	
15										15	
20										20	

ABBREVIATIONS

LOG OF BORING B-17

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08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-17.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-18

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-14-02/0845
Date/Time Completed : 3-14-02/0905
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 7.0'
Total Depth : 9.0'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SP		SAND, fine to medium grained, well sorted
		0850	60	B18-0-3	Y	0	SW		Gravelly SAND with silt, fine to coarse grained sand and gravel, dark brown, moist, angular to subrounded gravel (Fill)
5		0855	70	B18-4-6		0	SP		SAND, fine to medium grained, well sorted, medium brown-gray to grayish black, grades from moist to wet (Fill)
			60						
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level: ▼ at approximately 5 feet

ABBREVIATIONS

LOG OF BORING B-18
(Page 1 of 1)

08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-18.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF BORING B-19

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started : 3-13-02/1400
Date/Time Completed : 3-13-02/1420
Drilling Company : Cascade Drilling
Drilling Forman : Casey Goble
Drilling Method : Geoprobe with autohammer

Sampler Type : 1.5" splitspoon
Depth Of Water ATD : 8.5"
Total Depth : 9.0'

Depth in Feet	Sample Interval	Time	% Rec-overy	Sample ID	Sample Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SW		SAND with gravel (Fill)
							GM		Sandy, silty GRAVEL, fine to course grained, rounded to angular, light brown, fine grained sand, moist (Fill)
		1405	100	B19-1.5-3	Y	0	SM		Silty SAND, fine to medium grained, dark brown in color, some wood debris with black coating, light petroleum odor, moist (Fill)
5		1410	90	B19-3-6		0	SP		SAND fine to medium grained, well sorted, minor amounts of interbedded SILT/silty SAND. Moderately stiff silt, moist, no odor (Fill)
							GM		Silty, Sandy GRAVEL, fine grained, gray, grades from moist to wet, some woody debris (Fill)
10									
15									
20									

Depth in Feet: 0, 5, 10, 15, 20

Water Level

ABBREVIATIONS

LOG OF BORING B-19

(Page 1 of 1)

08-14-2002 W:\Projects\781001 Duwamish Marine\Drawings_Plots\b-19.bor

FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF WELL MW-1

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

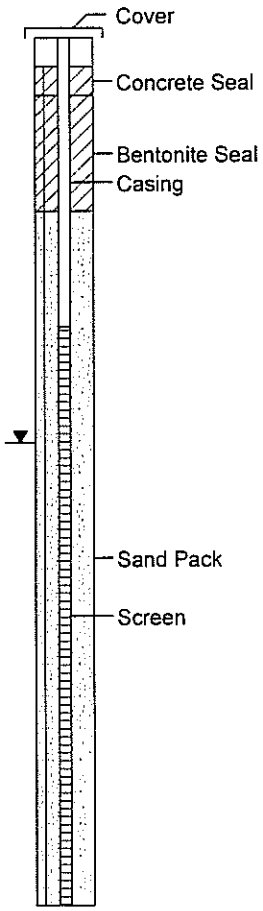
Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3/18/02; 0815	Drilling Method	: Hollow Stem Auger
Date/Time Completed	: 3/18/02; 0910	Sampler Type	: D&M with 140 lb. hammer
Equipment	: CME 175	Depth Of Water ATD	: 7-7.5 feet bgs
Drilling Company	: Cascade Drilling	Total Depth	: 15 feet bgs
Drilling Forman	: James Goble		

Depth in Feet	Sample Interval	Blow Counts 6/6/6	% Recovery	Sample ID	Samples Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SM		Silty SAND, fine, with fine to coarse gravel, dark brown, dense, moist, contains some organic material (Fill)
	X	15/16/27	100	MW1-3-4.5		0	SM		Silty SAND, fine, with fine to coarse gravel, dark brown to light grey, dense, contains debris - plastic, rubber (Fill)
5	X	16/20/20	100	MW1-5-6.5		0	SP		SAND, brown, dense, very moist, no odor (Fill)
	X	4/3/3	100	MW1-7.5-9		0	SP		Sandy SILT, fine sand, loose, grey, wet (Fill)
10	X	3/3/3	0	No Sample		-	SM		SILT, with fine sand, brown to dark grey, loose, contains organic material (Fill)
	X	3/5/5	0	No Sample		-	SP		SAND (Fill)
15									
20									

Well: MW-1
Elev.: Unknown



WELL INFORMATION

Cover: 8" steel
Casing: 2" PVC
Screen: 2", 0.010-slot
Grout: Bentonite Chips
Seal: Concrete
Sand Pack: 2/12

LOG OF WELL MW-1

(Page 1 of 1)

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF WELL MW-2

(Page 1 of 1)

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

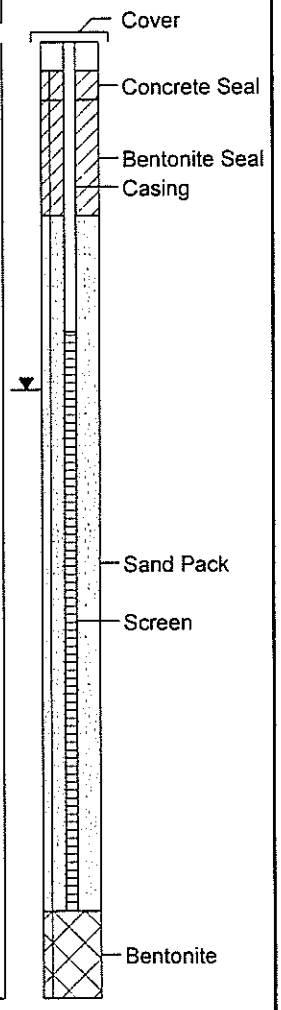
Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3/18/02; 0920	Drilling Method	: Hollow Stem Auger
Date/Time Completed	: 3/18/02; 1000	Sampler Type	: D&M, 140 lb. hammer
Equipment	: CME 175	Depth Of Water ATD	: 6 feet bgs
Drilling Company	: Cascade Drilling	Total Depth	: 16.5 feet bgs
Drilling Forman	: James Goble		

Depth in Feet	Sample Interval	Blow Counts 6/6/6	% Recovery	Sample ID	Samples Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0		Hand	dug	MW2-2-4			SM		Sandy SILT, fine to coarse sand, with fine to coarse gravel, some cobbles, grey, very moist (Fill)
5		50 for 6"	0	No Sample			SP		Rock in sampler, no recovery, wet (Fill)
10		14/11/10	5	No Sample			SM		Sandy GRAVEL, fine, with silt, fine to coarse sand, medium grey, medium dense, wet (Fill)
15		6/7/9		No Sample					
20									

Well: MW-2
Elev.: Unknown



WELL INFORMATION

Cover: 8" steel
Casing: 2" PVC
Screen: 2", 0.010-slot
Grout: Bentonite Chips
Seal: Concrete
Sand Pack: 2/12

LOG OF WELL MW-2

(Page 1 of 1)

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF WELL MW-3

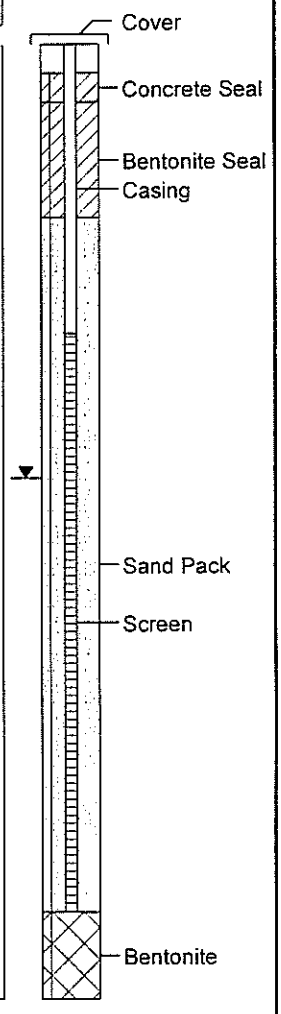
Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3/18/02; 1015	Drilling Method	: Hollow Stem Auger
Date/Time Completed	: 3/18/02; 1130	Sampler Type	: D&M, 140 lb. hammer
Equipment	: CME 175	Depth Of Water ATD	: 7.5 feet bgs
Drilling Company	: Cascade Drilling	Total Depth	: 16.5 feet bgs
Drilling Forman	: James Goble		

Depth in Feet	Sample Interval	Blow Counts 6/6/6	% Recovery	Sample ID	Samples Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0									
		50 for 6"	100	MW3-2.5-4			GM		Silty, sandy GRAVEL, fine to coarse, subrounded to angular, fine to coarse sand, light brown to dark brown, very dense, moist (Fill)
5									
10		3/3/6					SM		Sandy SILT, fine sand, grey, medium stiff, wet, contains some organic material as woody debris (Fill)
15		5/11/22					SW		SAND, fine, well-graded
20									



WELL INFORMATION

Cover: 8" steel
Casing: 2" PVC
Screen: 2", 0.010-slot

Grout: Bentonite Chips
Seal: Concrete
Sand Pack: 2/12

LOG OF WELL MW-3

(Page 1 of 1)

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FARALLON CONSULTING
320 3rd Ave. NE, Suite 200
Issaquah, WA 98027

LOG OF WELL MW-4

Gilmur/Hale Family Trust
6365 1st Avenue South
Seattle, Washington

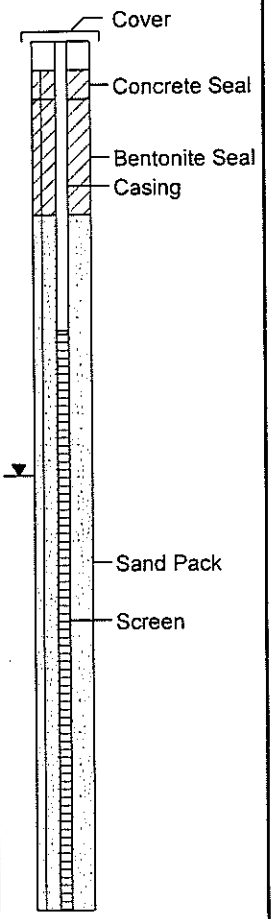
Farallon PN: 781-001

Logged By: Jim Pender

Date/Time Started	: 3/18/02; 1240	Drilling Method	: Hollow Stem Auger
Date/Time Completed	: 3/18/02; 1315	Sampler Type	: D&M, 140 lb. hammer
Equipment	: CME 175	Depth Of Water ATD	: 7.5 feet bgs
Drilling Company	: Cascade Drilling	Total Depth	: 15 feet bgs
Drilling Forman	: James Goble		

Depth in Feet	Sample Interval	Blow Counts 6/6/6	% Recovery	Sample ID	Samples Analyzed	PID (units)	USCS	GRAPHIC	DESCRIPTION
0							SM		Silty SAND, fine to coarse, with gravel, light brown to grey, subrounded to angular (Fill)
				From B-17 (0-7.5 feet)			SM		Sandy SILT, fine to medium sand, black, wet (Fill)
5									Fill, debris mixed with silty, sandy gravel
10		7/7/10	100	No Sample			SP		GRAVEL, SILT and SAND interbeds, fine sand, trace organics, grey to black, medium dense, wet (Fill)
			100	No Sample			SP		SAND, fine, minor silt, grey to black
15									
20									

Well: MW-4
Elev.: Unknown



WELL INFORMATION

Cover: 8" steel	Grout: Bentonite Chips
Casing: 2" PVC	Seal: Concrete
Screen: 2", 0.010-slot	Sand Pack: 2/12

LOG OF WELL MW-4

(Page 1 of 1)

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PACIFIC CREST ENVIRONMENTAL
1531 BENDIGO BOULEVARD NORTH PO BOX 952 NORTH BEND, WA 98045
T 425.888.4990 F 425.888.4994

REMEDIAL INVESTIGATION REPORT

GILMUR/HALE FAMILY TRUST
6365 FIRST AVENUE SOUTH
SEATTLE, WASHINGTON

Submitted by:

Pacific Crest Environmental, LLC

1531 Bendigo Boulevard North
North Bend, Washington 98045

Pacific Crest PN: 107-001

For:
Mr. Jim Gilmur
16 South Michigan Street
Seattle, Washington 98108

May 11, 2009

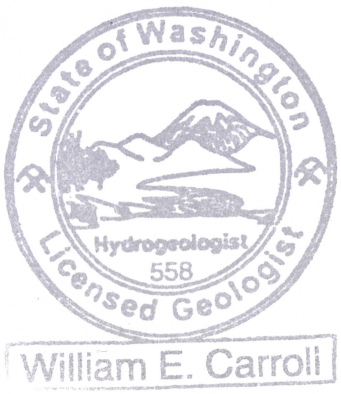
Prepared by:

Annica Nord
Staff Geologist

William Carroll, L.H.G.
Principal Geologist

Reviewed by:

Lauren G. Carroll, L.H.G.
Principal Hydrogeologist



LOG OF WELL MW-1d

(Page 1 of 2)

Date/Time Started	: 6-02-2008 / 1100
Date/Time Completed	: 6-02-2008 / 1310
Total Boring Depth	: 31.5ft
Total Well Depth	: 30.0 ft
DTW ATD	: 6 ft
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

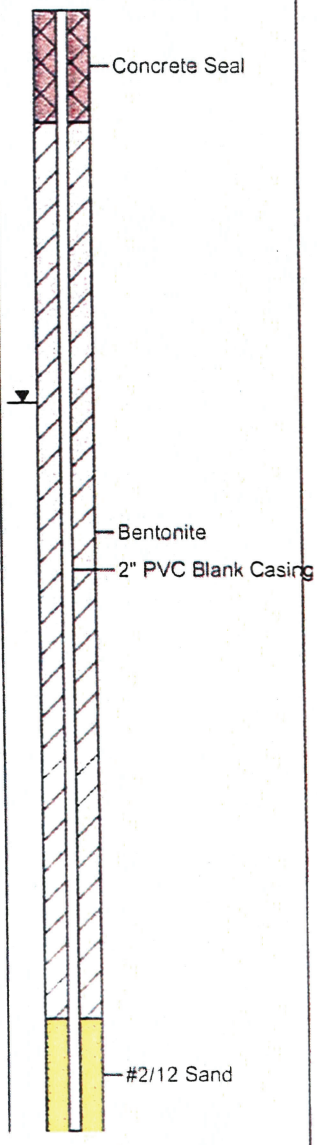
Site Name: Gilmur/Hale Property

Client: Mr. Jim Gilmur

Project #: 107-001

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
0		2.5 - 4.0 Sandy SILT minor gravel (55% silt, 35% fine sand, 10% fine gravel), black, dry, (fill).	ML		60	11-15/6"	35.0	-
5		5.0 - 6.0 SAND, minor gravel, trace silt (80% fine to medium sand, 15% fine gravel, 5% silt), black, dry, (fill).	SP		90	12/15/18	4.2	MW1d-5.0-6.5
		6.0 - 6.5 SAND (100% fine to medium sand), black, dry, (fill).	SP					
		7.5 - 8.5 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet, (fill).	SP		100	2/2/2	0.6	-
		8.5 - 9.0 SILT with sand (80% silt, 20% fine to medium sand), black, wet, (fill).	ML					
10		10.0 - 10.5 SILT, trace sand (95% silt, 5% fine to medium sand), medium-dark brown, wet, (fill)	ML		100	2/2/2	0.9	-
		10.5 - 11.5 SILT (100% silt), medium-dark brown, wet, wood fragments, (fill).	ML					
		12.5 - 13.5 Sandy SILT (60% silt, 40% fine-medium sand), black, wet, (fill).	ML		100	4/4/4	0.4	-
		13.5 - 14.0 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet.	SP					
15		15.0 - 16.5 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet.	SP		95	4/10/12	0.4	-
		17.5 - 19.0 SAND (100% medium to coarse sand), black, wet.	SP		100	4/4/4	0.4	-
20								

Well: MW-1d



Drilling Company	: Cascade Drilling Inc.
Drilling Foreman	: Scott
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-1d

(Page 1 of 2)

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LOG OF WELL MW-2d

(Page 1 of 2)

Site Name: Gilmur/Hale Property

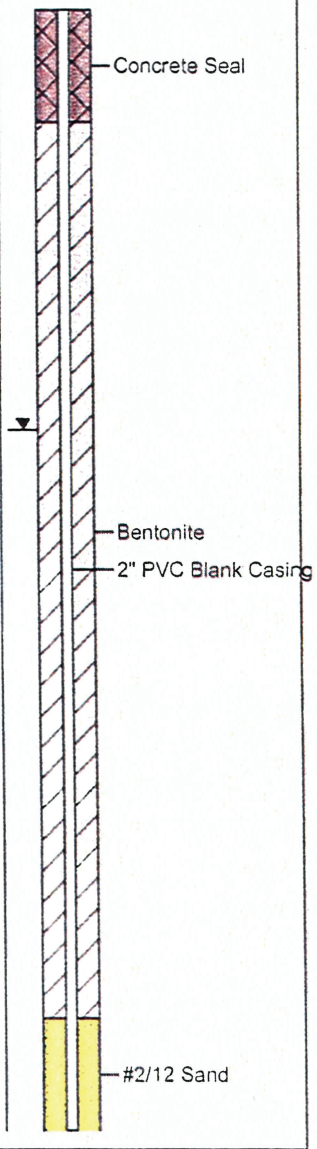
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 06-02-2008/0751
Date/Time Completed	: 06-02-2008/0930
Total Boring Depth	: 31.5'
Total Well Depth	: 30'
DTW ATD	: 7.5
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
0								
		2.5 - 3.5 Sandy SILT minor gravel (50% silt, 35% fine to medium sand, 15% gravel), dark gray, moist, wood fragments, (fill).	ML		70	7/6/4	8.5	-
		3.5 - 4.0 SAND, trace silt (95% fine to medium sand, 5% silt), med brown, moist, (fill).	SP					
5		5.0 - 6.5 Silty SAND, trace gravel (60% fine to medium sand, 35% silt, 5% gravel), medium to dark brown, moist, wood fragments, (fill).	SP-SM		70	3/4/5	7.2	MW2d-6-6.5
		7.5 - 9.0 Gravelly SAND with silt (50% fine to medium sand, 30% gravel, 20% silt), medium to dark brown, wet, wood fragments, (fill).	SP-SM		35	2/4/10	68.0	-
10		10.0 - 11.5 Gravelly SAND with silt (50% fine to medium sand, 30% gravel, 20% silt), black, wet, sheen, (fill).	SP-SM		60	8/12/20	6.5	-
		12.5 - 13.5 SAND with silt, minor gravel (70% fine to medium sand, 20% silt, 10% fine gravel), black, wet, (fill).	SP-SM		100	5/8/10	10.5	-
		13.5 - 14.0 SILT, trace sand (98% silt, 5% fine sand), black, wet, (fill).	ML					
15		15.0 - 16.5 Gravelly SAND, trace silt (65% fine to medium sand, 30% fine gravel, 5% silt), black, wet, (fill).	SP		90	8/10/10	6.1	-
		17.5 - 19.0 Silty SAND, trace gravel (60% fine to med sand, 35% silt, 5% fine gravel), black, wet.	SP-SM		75	8/10/10	11.8	-
20								

Well: MW-2d



Drilling Company	: Cascade Drilling, Inc.
Drilling Foreman	: Scott
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-2d

(Page 1 of 2)

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LOG OF WELL MW-1d

(Page 2 of 2)

Site Name: Gilmur/Hale Property

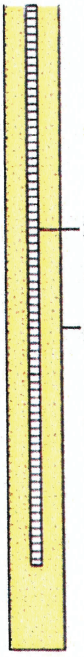
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 6-02-2008 / 1100
Date/Time Completed	: 6-02-2008 / 1310
Total Boring Depth	: 31.5ft
Total Well Depth	: 30.0 ft
DTW ATD	: 6 ft
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
20	X	20.0 - 21.5 SAND (100% medium to coarse sand), black, wet.	SP		85	10/12/12	1.1	-
	X	22.5 - 24.0 SAND (100% medium to coarse sand), black, wet.	SP		80	10/12/15	1.5	-
25	X	25.0 - 26.5 SAND (100% medium to coarse sand), black, wet.	SP		100	10/10/16	1.7	-
	X	27.5 - 29.0 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet.	SP		70	10/15/16	1.7	-
30	X	30.0 - 31.0 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet.	SP		80	10/15/16	1.2	-
		31.0 - 31.5 SAND, minor silt (90% fine to medium sand, 10% silt), black, wet.	SP					
35								
40								

Well: MW-1d



Drilling Company	: Cascade Drilling Inc.
Drilling Foreman	: Scott
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-1d

(Page 2 of 2)

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LOG OF WELL MW-2d

(Page 2 of 2)

Site Name: Gilmur/Hale Property

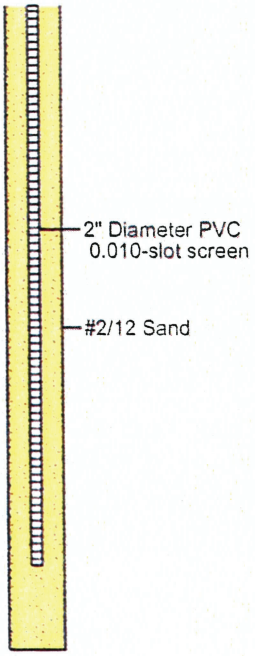
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 06-02-2008/0751
Date/Time Completed	: 06-02-2008/0930
Total Boring Depth	: 31.5'
Total Well Depth	: 30'
DTW ATD	: 7.5
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
20		20.0 - 20.5 SAND, minor silt (90% fine to medium sand, 10% silt), black, wet.	SP					
		20.5 - 21.5 SAND (100% fine to medium sand), black, wet.	SP		100	10/10/10	4.6	-
		22.5 -24.0 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet.	SP		100	8/10/12	5.5	-
25		25.0 -26.5 SAND, trace silt (95% fine sand, 5% silt), black, wet.	SW		75	10/10/10	3.4	-
		27.5 - 29.0 SAND, trace silt (95% fine sand, 5% silt), black, wet.	SW		30	10/12/12	2.0	-
30		30.0 - 31.5 SAND, trace silt (95% fine sand, 5% silt), black, wet.	SW		85	9/12/15	5.7	-
35								
40								

Well: MW-2d



Drilling Company	: Cascade Drilling, Inc.
Drilling Foreman	: Scott
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-2d

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LOG OF WELL MW-3d

(Page 1 of 2)

Site Name: Gilmur/Hale Property

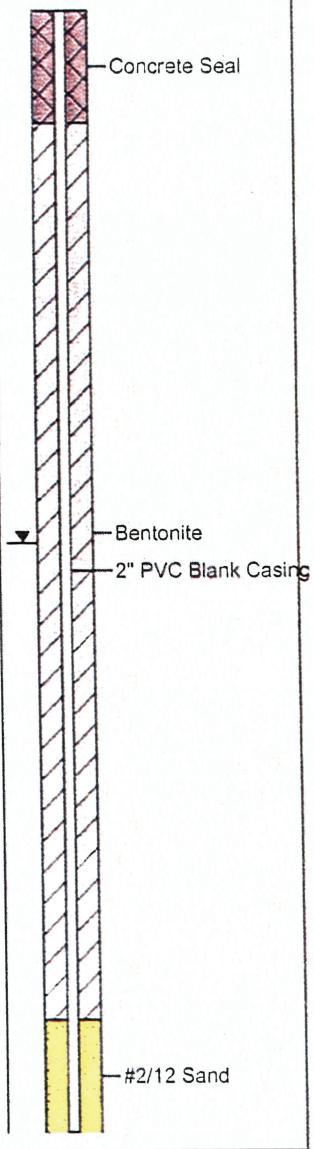
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 05-30-2008/0855
Date/Time Completed	: 05-30-2008/1110
Total Boring Depth	: 31.5'
Total Well Depth	: 30'
DTW ATD	: 9'
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
0								
		2.5 - 4.0 SAND, minor gravel, trace silt (85% fine to medium sand, 10% gravel, 5% silt), dark brown, moist, (fill).	SP		75	15/16/14	12.3	-
5		5.0 - 6.5 SAND, minor gravel, trace silt (85% fine to medium sand, 10% gravel, 5% silt), dark brown, moist, wood fragments, (fill).	SP		75	12/12/14	7.7	-
		7.5 - 9.0 SILT, trace sand (95% silt, 5% medium sand), olive mottled with gray, moist, .(fill)	ML		95	4/4/8	7.1	MW3d-8
10		10.0 - 10.75 SILT, trace sand (95% silt, 5% medium sand) medium to dark brown, wet, (fill).	ML					
		10.75 - 11.5 SAND, minor gravel (90% fine to medium sand, 10% fine to coarse gravel), gray, wet, sheen on outside of sampler, (fill).	SP		55	4/5/6	12.7	-
		12.5 - 13.25 SAND, trace silt, trace gravel (90% fine to coarse sand, 5% silt, 5% fine gravel), dark gray to black, wet, sheen, (fill).	SP		80	4/9/18	67.2	-
		13.25 - 14.0 Silty SAND with gravel (50% fine to medium sand, 30% silt, 20% fine to coarse gravel), black, wet, sheen, wood fragments and organic material, (fill).	SP-SM					
15		15.0 - 16.5 SILT with sand (75% silt, 25% very fine sand), black ,wet, (fill).	ML		100	4/8/10	869	-
		17.5 - 18.0 Silty SAND (60% fine sand, 40% silt), black, wet, (fill).	SW-SM					
		18.0 - 19.0 SAND (100% fine sand), black, wet, (fill).	SW		85	9/12/15	20 8	-
20								

Well: MW-3d



Drilling Company	: Cascade Drilling, Inc.
Drilling Foreman	: Dave
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-3d

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LOG OF WELL MW-3d

(Page 2 of 2)

Site Name: Gilmur/Hale Property

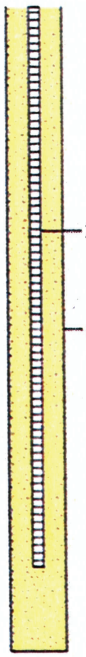
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 05-30-2008/0855
Date/Time Completed	: 05-30-2008/1110
Total Boring Depth	: 31.5'
Total Well Depth	: 30'
DTW ATD	: 9'
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
20		20.0 - 21.5 SAND, minor silt (90% fine sand, 10% silt nodules) black, wet.	SW		100	7/11/13	56.4	-
		22.5 -24.0 SAND (100% fine to medium sand), black, wet.	SP		90	16/20/23	39.4	-
25		25.0 -26.5 SAND (100% fine to medium sand), black, wet.	SP		100	12-50/6"	15.4	-
		27.5 - 29.0 SAND (100% fine to medium sand), black, wet, sheen.	SP		100	18-50/6"	51.5	-
30		30.0 - 31.0 SAND (100% fine to medium sand), black, wet, sheen.	SP					
		31.0 - 31.5 SAND, minor silt (90% fine to medium sand, 10% silt), black, wet.	SP		85	17/18/15	58.1	-
35								
40								

Well: MW-3d



Drilling Company	: Cascade Drilling. Inc.
Drilling Foreman	: Dave
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-3d

(Page 2 of 2)

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LOG OF WELL MW-4d

(Page 1 of 2)

Site Name: Gilmur/Hale Property

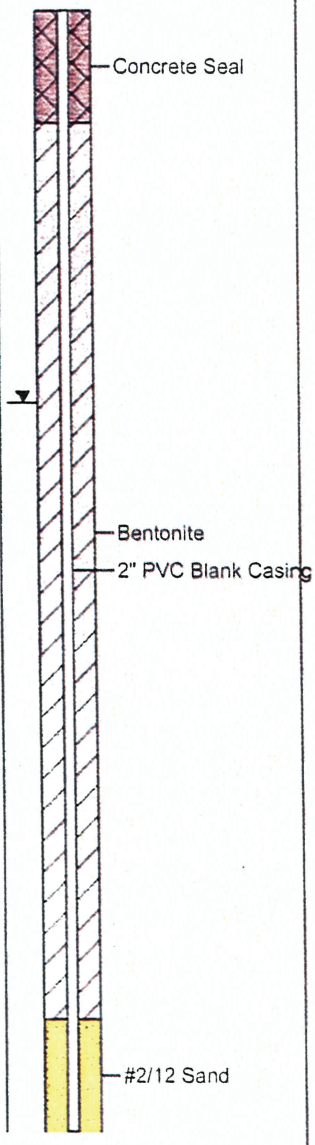
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 05-30-2008/1209
Date/Time Completed	: 05-30-2008/1400
Total Boring Depth	: 31.5'
Total Well Depth	: 30'
DTW ATD	: 7'
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
0								
		2.5 - 4.0 SAND, with gravel, minor silt (65% fine to medium sand, 20% gravel, 15% silt), dark brown to black, moist, (fill).	SP		20	16-50/6"	300	-
5		5.0 - 5.5 SAND, with gravel, minor silt (65% fine to medium sand, 20% gravel, 15% silt), dark brown to black, moist, (fill).	SP					
		5.5 - 6.5 SAND (100% fine to medium sand), black, moist, (fill).	SP		90	16/18/20	256	MW4d-6.5
		7.5 - 9.0 SAND (100% fine to medium sand), black, wet, (fill).	SP		70	6/7/10	129	-
10		10.0 - 11.0 SILT (100% silt), black, wet, (fill).	ML		100	4/5/6	55.5	-
		11.0 - 11.5 SAND, trace silt (95% fine to medium sand, 5% silt), gray, wet, (fill).	SP					
		12.5 - 14.0 Sandy SILT (70% silt, 30% fine to medium sand) black, wet, wood fragments, (fill).	ML		90	4/4/4	30.3	-
15		15.0 - 16.5 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet, silt nodules.	SP		90	1/4/7	39.2	-
		17.5 - 19.0 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet, very thin silt lenses.	SP		90	7/8/8	31.1	-
20								

Well: MW-4d



Drilling Company	: Cascade Drilling, Inc.
Drilling Foreman	: Dave
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-4d

(Page 1 of 2)

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LOG OF WELL MW-4d

(Page 2 of 2)

Site Name: Gilmur/Hale Property

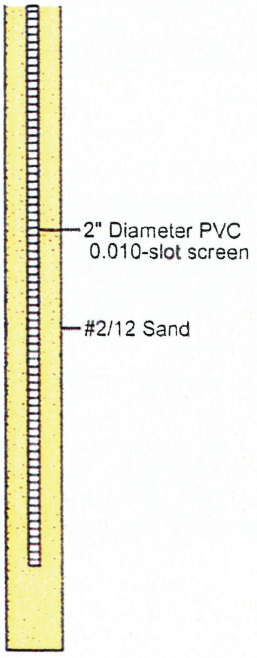
Client: Mr. Jim Gilmur

Project #: 107-001

Date/Time Started	: 05-30-2008/1209
Date/Time Completed	: 05-30-2008/1400
Total Boring Depth	: 31.5'
Total Well Depth	: 30'
DTW ATD	: 7'
Elevation (ft)	: NA
Drilling Method	: Hollow Stem Auger
Sampler Type	: D+M 18" split spoon
Drive Hammer (lbs)	: 140

Depth In Feet	Samples	Description	USCS	Graphic	% Recovery	Blow Count	PID (ppm)	Sample ID
20		20.0 - 21.5 SAND, minor silt (85% fine to medium sand, 15% silt), black, wet.	SP		90	7/8/10	174.1	-
		22.5 -24.0 SAND (100% fine to medium sand), black, wet.	SP		90	10/12/14	380.5	-
25		25.0 -26.0 SAND trace silt (95% fine to medium sand, 5% silt), black, wet.	SP		100	5/7/8	212.3	-
		26.0 - 26.5 SAND (100% fine to medium sand), black, wet.	SP					
		27.5 - 28.5 SAND, trace silt (95% fine to medium sand, 5% silt), black, wet.	SP		90	5/8/11	98.4	-
		28.5 - 29.0 SILT, trace sand (95% silt, 5% fine to medium sand), black , wet.	ML					
30		30.0 - 31.5 Silty SAND (65% fine to medium sand, 35% silt), black, wet.	SP-SM		100	4/7/8	87.7	-
35								
40								

Well: MW-4d



Drilling Company	: Cascade Drilling, Inc.
Drilling Foreman	: Dave
Equipment	: CME 75 HSA
Pacific Crest Rep.	: Monty Busbee

LOG OF WELL MW-4d

(Page 2 of 2)

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LIMITED PHASE II SUBSURFACE INVESTIGATION REPORT

GILMUR SOUTH PARCEL
16 SOUTH MICHIGAN STREET
SEATTLE, WASHINGTON

Submitted by:
Farallon Consulting, L.L.C.
320 3rd Avenue NE
Issaquah, Washington 98027

Farallon PN: 781-003

For:
Mr. Jim Gilmur
16 South Michigan Street
Seattle, Washington 98108

April 5, 2004

Prepared by:

DRAFT

Deborah Gardner, L.H.G.
Associate Geologist

Reviewed by:

DRAFT

Lauren Carroll, L.H.G.
Senior Hydrogeologist

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-1

Client: Mr. Jim Gilmur
Project: Gilmur South Property
Location: Seattle, Washington
Farallon PN: 781-003
Logged By: John Schmitt

Date/Time Started: 01/09/04 1610
Date/Time Completed: 01/09/04 1700
Equipment: Geoprobe
Drilling Company: Cascade
Drilling Foreman: Kasey Gobel
Drilling Method: Direct Push

Sampler Type: 2 inch by 4 foot
Disposable sleeves: Yes
Depth of Water ATD : 4.5 feet bgs
Total Boring Depth: 12 feet bgs.

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0			0-2' CONCRETE.								0
5	GP		2-6' Sandy GRAVEL, brown, moist, no odor. Sample includes whitish sandy substance similar to concrete washout.		10	SB1-2-6	5.6		▼		5
10	ML		6-10' SILT?, wet. Sample not observed. Soil type based on driller's description of sample residue.		0						10
	ML		10-12' SILT?, wet. Sample not observed. Soil type based on Soil type based on driller's description of sample residue.		0						
15											15
20											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: 4 **to:** 7 **ft.** **Screen Slot Size (inches):** 0.010
Purging method: Peristaltic **Sampling method:** Peristaltic
Time begin purging: 1625 **Time sample collection complete:** 1640
Groundwater Sample Identification: SB1-GW

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-2

Client: Mr. Jim Gilmur
Project: Gilmur South Property
Location: Seattle, Washington

Farallon PN: 781-003

Logged By: John Schmitt

Date/Time Started: 01/09/04 1415
Date/Time Completed: 01/09/04 1535
Equipment: Geoprobe
Drilling Company: Cascade
Drilling Foreman: Kasey Gobel
Drilling Method: Direct Push

Sampler Type: 2 inch by 4 foot
Disposable sleeves: Y
Depth of Water ATD : N/A feet bgs
Total Boring Depth: 2.5 feet bgs.

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0			0-2' CONCRETE.								0
			2-2.5' Pieces of cement and asphalt (6"). Refusal at 2.5' due to large concrete pieces obstructing sample tube under concrete slab.								
5											5
10											10
15											15
20											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: N/A **to:** **ft.** **Screen Slot Size (inches):**
Purging method: N/A **Sampling method:** N/A
Time begin purging: **Time sample collection complete:**
Groundwater Sample Identification:

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-3

Client: Mr. Jim Gilmur
Project: Gilmur South Property
Location: Seattle, Washington
Farallon PN: 781-003
Logged By: John Schmitt

Date/Time Started: 01/09/04 0850
Date/Time Completed: 01/09/04 1200
Equipment: Geoprobe
Drilling Company: Cascade
Drilling Foreman: Kasey Gobel
Drilling Method: Direct Push

Sampler Type: 2 inch by 4 foot
Disposable sleeves: Y
Depth of Water ATD : 6 feet bgs
Total Boring Depth: 10 feet bgs.

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0			0-2' CONCRETE, consecutive slabs of 4", 8" and 8"								0
	SP		2-8' SAND, fine to medium, trace rounded gravel, trace silt, moist, no odor, no sheen. 2-2.5' Very light brown coloration. 2.5' Becomes brown coloration.		50	SB3-2-6	6.6				
5			6' Becomes wet, dark greyish brown coloration, no odor, no sheen.			SB3-6-8	6.8	Y			5
	ML		8-10' SILT, trace fine sand, organic present (highly decayed wood), olive grey, soft, wet, organic odor, no sheen. 8.5' Becomes brown with light orange mottling.		100	SB3-8-10	7.4				
10											10
15											15
20											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: 7 **to:** 10ft. **Screen Slot Size (inches):** 0.010
Purging method: Peristaltic **Sampling method:** Peristaltic
Time begin purging: 1130 **Time sample collection complete:** 1147
Groundwater Sample Identification: SB3-GW

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-4

Client: Mr. Jim Gilmur
Project: Gilmur South Property
Location: Seattle, Washington
Farallon PN: 781-003
Logged By: John Schmitt

Date/Time Started: 01/09/04 1200
Date/Time Completed: 01/09/04 1410
Equipment: Geoprobe
Drilling Company: Cascade
Drilling Foreman: Kasey Gobel
Drilling Method: Direct Push

Sampler Type: 2 inch by 4 foot
Disposable sleeves: Yes
Depth of Water ATD : 6.5 feet bgs
Total Boring Depth: 8 feet bgs.

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0			0-10" CONCRETE.								0
	SP		10"-6' SAND, trace silt, fine to medium, brown, moist, loose, no odor, no sheen.		70	SB4-1-4	5.2				
5					60	SB4-4-6	5.6				5
	SP-SM		6-7' Silty SAND, fine, brown, wet, no odor, no sheen.								
	ML		7-8' SILT, trace fine to medium sand, greyish brown, wet, soft, no odor, no sheen.		60	SB4-6-8	6.1	Y			
10											10
15											15
20											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: 5 **to:** 8 **ft.** **Screen Slot Size (inches):** 0.010
Purging method: Peristaltic **Sampling method:** Peristaltic
Time begin purging: 1340 **Time sample collection complete:** 1400
Groundwater Sample Identification: SB4-GW

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-5

Client: Mr. Jim Gilmur
Project: Gilmur South Property
Location: Seattle, Washington

Farallon PN: 781-003

Logged By: John Schmitt

Date/Time Started: 01/09/04
Date/Time Completed: 01/09/04
Equipment: Geoprobe
Drilling Company: Cascade
Drilling Foreman: Kasey Gobel
Drilling Method: Direct Push

Sampler Type: 2 inch by 4 foot
Disposable sleeves: Y
Depth of Water ATD : 5 feet bgs
Total Boring Depth: 12 feet bgs.

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0	SP-SM		0-3" ASPHALT.								0
			3"-1' SAND with silt and fine gravel, sand fine to medium, dark brown, moist, no odor, no sheen.								
	SP		1-6' SAND, fine to medium, trace fine rounded gravel, trace silt, brown, moist, no odor, no sheen.			SB5-1-4	4.4				
5						SB5-4-6	3.2		▼		5
	ML		5' Becomes wet.								
			6-8' SILT, trace fine sand, organics (highly decayed wood), olive brown, wet, no odor, no sheen.			SB5-6-8	4.4				
			8-12' SILT, trace fine sand, brown, wet, no odor, no sheen.								
10	ML										10
15											15
20											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: 7 **to:** 10ft. **Screen Slot Size (inches):** 0.010
Purging method: Peristaltic **Sampling method:** Peristaltic
Time begin purging: 0800 **Time sample collection complete:** 0820
Groundwater Sample Identification: SB5-GW

LDWSF 12.3.24 v.4
04/06/04
DRAFT – Issued for Client Review

LIMITED PHASE II SUBSURFACE INVESTIGATION REPORT

GILMUR NORTH PARCEL
6357 FIRST AVENUE SOUTH
SEATTLE, WASHINGTON

Submitted by:
Farallon Consulting, L.L.C.
320 3rd Avenue NE
Issaquah, Washington 98027

Farallon PN: 781-002

For:
Mr. Jim Gilmur
16 South Michigan Street
Seattle, Washington 98108

April 6, 2004

Prepared by:
DRAFT
Jeff Keller
Staff Chemist

Reviewed by:
DRAFT
Lauren Carroll, L.H.G.
Senior Hydrogeologist

USEPA SF
1269883

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-1

Client: Mr. Jim Gilmur
Project: Gilmur North Property
Location: Seattle, Washington
Farallon PN: 781-002
Logged By: John Schmitt

Date/Time Started: 01/08/04 1500
Date/Time Completed: 01/08/04 1600
Equipment: Geoprobe
Drilling Company: Cascade
Drilling Foreman: Kasey Gobel
Drilling Method: Direct Push

Sampler Type: 2 inch by 4 foot
Disposable sleeves: Yes
Depth of Water ATD : 7.5 feet bgs
Total Boring Depth: 12 feet bgs.

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0	GP-GM		0-1' Sandy GRAVEL with silt, gravel mostly fine, angular, brown to brownish grey, dense, no odor, no sheen.								0
	GP		1-5' Sandy GRAVEL mostly fine, angular, trace silt, brown to brownish grey, dense, no odor, no sheen. 3.5-5' slight orange/grey mottling.		90	SB1-0-4	5.3				
5	SP		5-9' SAND fine to medium, trace coarse, trace fine gravel, trace silt, greyish brown, moist, no odor. 7.5' Becomes wet.		100	SB1-5-8	5.4	Y	⧗		5
	SM		9-10' Silty SAND, fine to medium, greyish brown, wet.								
10	ML		10-12' SILT, trace fine sand, trace organics, brown, soft, moist to wet, no odor, no sheen.		75	SB1-10-12	5.4				10
15											15
											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: 9 to: 12ft. Screen Slot Size (inches): 0.010
Purging method: Peristaltic Sampling method: Peristaltic
Time begin purging: 1200 Time sample collection complete: 1200
Groundwater Sample Identification: SB1-GW

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-1A

Client: Mr. Jim Gilmur
Project: Gilmur North Property
Location: Seattle, Washington

Farallon PN: 781-002

Logged By: John Schmitt

Date/Time Started:	01/08/04 1425	**Sampler Type:**	2 inch by 4 foot
Date/Time Completed:	01/08/04 1445	**Disposable sleeves:**	Y
Equipment:	Geoprobe	**Depth of Water ATD :**	N/A feet bgs
Drilling Company:	Cascade	**Total Boring Depth:**	2 feet bgs.
Drilling Foreman:	Kasey Gobel		
Drilling Method:	Direct Push		

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0	GP		0-2' Sandy GRAVEL, brown, moist, very dense. 2' Refusal due to very dense gravel.		20	SB1A-0-2	-				0
5											5
10											10
15											15
											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: to: ft. **Screen Slot Size (inches):**
Purging method: **Sampling method:**
Time begin purging: **Time sample collection complete:**
Groundwater Sample Identification:

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-1B

Client:	Mr. Jim Gilmur
Project:	Gilmur North Property
Location:	Seattle, Washington
Farallon PN:	781-002
Logged By:	John Schmitt

Date/Time Started:	01/08/04 1425	Sampler Type:	2 inch by 4 foot
Date/Time Completed:	01/08/04 1500	Disposable sleeves:	Y
Equipment:	Geoprobe	Depth of Water ATD :	N/A feet bgs
Drilling Company:	Cascade	Total Boring Depth:	5 feet bgs.
Drilling Foreman:	Kasey Gobel		
Drilling Method:	Direct Push		

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0	GP		0-3' Sandy GRAVEL, brown, moist, dense.		20	SB1B-0-4	5.3				0
	SP		3-5' SAND, fine to medium, with gravel, dark brown, moist, dense, organic odor, no sheen.								
5			4-5' sample not retained. 5' Refusal.		20	SB1B-4-5	-				5
10											10
15											15
											20

Boring Details

Boring Abandonment: Bentonite backfill.

Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: to: ft. Screen Slot Size (inches):

Purging method: Sampling method:

Time begin purging: Time sample collection complete:

Groundwater Sample Identification:

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-2

Client: Mr. Jim Gilmur
Project: Gilmur North Property
Location: Seattle, Washington
Farallon PN: 781-002
Logged By: John Schmitt

Date/Time Started:	01/08/04 1310	**Sampler Type:**	2 inch by 4 foot		
Date/Time Completed:	01/08/04 1425	**Disposable sleeves:**	Y		
Equipment:	Geoprobe	**Depth of Water ATD :**	8	feet bgs	
Drilling Company:	Cascade	**Total Boring Depth:**	12	feet bgs.	
Drilling Foreman:	Kasey Gobel				
Drilling Method:	Direct Push				

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0	SP		0-8' SAND with gravel, trace silt, sand fine to medium, gravel fine to coarse, subrounded, brown, moist, no odor.		70	SB2-0-4	6.0				0
5			7.5' Becomes very moist		60	SB2-4-8	6.1				5
	SP		8' Refusal due to wood. Move boring 5 feet south and resume sampling at 8 feet. 8-10' Same as above, wet.								
10	ML		10-11' Sandy SILT (organic), sand mostly fine to medium, highly decayed wood present, black, organic odor, no sheen.		75	SB2-8-12	6.4				10
	SM		11-12' Silty SAND, fine, dark grey, wet, no odor.								
15											15
											20

Boring Details

Boring Abandonment: Bentonite backfill.
Notes:

Reconnaissance Groundwater Sample Collection Details

Screen interval from: to: 12ft. **Screen Slot Size (inches):** 0.010
Purging method: Peristaltic **Sampling method:** Peristaltic
Time begin purging: 1200 **Time sample collection complete:** 1200
Groundwater Sample Identification: SB2-GW

FARALLON CONSULTING
320 3rd Avenue NE
Issaquah, WA 98027

Log of Boring: SB-3

Client:	Mr. Jim Gilmur
Project:	Gilmur North Property
Location:	Seattle, Washington
Farallon PN:	781-002
Logged By:	John Schmitt

Date/Time Started:	01/08/04 1050	Sampler Type:	2 inch by 4 foot
Date/Time Completed:	01/08/04 1310	Disposable sleeves:	Yes
Equipment:	Geoprobe	Depth of Water ATD :	8 feet bgs
Drilling Company:	Cascade	Total Boring Depth:	12 feet bgs.
Drilling Foreman:	Kasey Gobel		
Drilling Method:	Direct Push		

Depth (feet bgs.)	USCS	Graphic	Lithologic Description	Sample Interval	% Recovery	Sample ID	PID (ppm)	Sample Analyzed	Water Level	Temporary well	Depth (feet bgs.)
0	SP		0-3" CEMENT 4"-3' Gravelly SAND, fine, angular (fill), trace silt, brown, moist, no odor.		75	SB3-0-3	6.5				0
	ML		3-5' SILT, minor fine sand, trace gravel, grey, moist, slight organic odor								
5	SM		5-5.5' Silty SAND, fine to coarse, degraded asphalt present, moist, no odor.		60	SB3-4-8	6.0				5
	ML		5.5-8' SILT, minor fine sand, trace gravel, grey, moist, no odor.								
			8' Trends to gravelly SILT, wet, grey, no odor.								
10	ML				70	SB3-8-12	6.0	Y			10
15											15
											20

Boring Details

Boring Abandonment: Bentonite backfill.

Notes: Temporary well repeatedly went dry during sampling.

Reconnaissance Groundwater Sample Collection Details

Screen interval from: 9 to: 12ft. Screen Slot Size (inches): 0.010

Purging method: Peristaltic Sampling method: Peristaltic

Time begin purging: 1140 Time sample collection complete: 1310

Groundwater Sample Identification: SB3-GW

APPENDIX D

WASHINGTON STATE DEPARTMENT OF ECOLOGY SPREADSHEETS— MOST STINGENT SCREENING LEVELS

Screening Levels for Sediment
Duamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemical	Most Stringent Screening Levels Based on Dry Weight (mg/kg)	Applicable PQL (mg/kg)	Applicable Method Detection Limit (mg/kg)	Comments
Volatile Organic Compounds/Semi-Volatile Organic Compounds/Polychlorinated biphenyls				
acetone	--	**0.5**	0.067523795	PQL used for SL
acenaphthene	**0.5**[a]	0.0012	0.0104	
acenaphthylene	**0.56**[b]	0.0018	0.0106	
anthracene	**0.96**[b]	0.0018	0.00778	
benzo(g,h,i)perylene	**0.67**[a]	0.003	0.00753	
benzo[a]anthracene	**0.062**[c]	0.0033	0.00582	
benzo[a]pyrene	**0.062**[c]	0.0033	0.00545	
benzo[b]fluoranthene	**0.062**[c]	0.0033	0.00637	
benzo[k]fluoranthene	**0.062**[c]	0.0032	0.00787	
benzoic acid	**0.65**[a]	0.12	0.0861	
benzyl alcohol	**0.057**[a]	0.0043	0.00627	
bis(2-chloroethoxy)methane	--	**0.00818**	0.00818	PQL used for SL
bis(2-ethylhexyl) phthalate	**1.3**[a]	0.3	0.0153	
butyl benzyl phthalate	**0.063**[b]	0.0018	0.00836	
carbon disulfide	--	**5**	--	PQL used for SL
carbazole	--	**0.06**	0.00925	PQL used for SL
chrysene	**0.062**[c]	0.0019	0.00921	
dibenz[a,h]anthracene	**0.062**[c]	0.0027	0.00723	
dibenzofuran	**0.54**[a]	0.0015	0.0103	
di-butyl phthalate	**1.4**[a]	0.03	0.00855	
dimethylphenol, 2,4-	0.029[a]	**0.3**	0.0689	PQL used for SL
dimethyl phthalate	**0.071**[a]	0.0021	0.00987	
fluoranthene	**1.7**[b]	0.0029	0.0103	
fluorene	**0.54**[b]	0.002	0.0102	
hexachlorobenzene	**0.022**[a]	--	0.012	
indeno[1,2,3-cd]pyrene	**0.062**[c]	0.03	0.00776	
isopropyltoluene	--	**0.05**	0.009475844	PQL used for SL
Methyl Ethyl Ketone (2-Butanone)	**1.376**[c]	0.5	0.033104528	
methylnaphthalene, 1-	--	**0.01**	0.000109898	PQL used for SL
methylnaphthalene, 2-	**0.67**[a]	0.002	0.02	
naphthalene	**2.1**[a]	0.0015	0.02	
pcb mixtures	0.0000039[c]	**0.0022**	0.067	PQL used for SL
pcb - Aroclor 1016	--	--	--	
pcb - Aroclor 1221	--	--	--	
pcb - Aroclor 1232	--	--	--	
pcb - Aroclor 1242	--	--	--	
pcb - Aroclor 1248	--	--	--	
pcb - Aroclor 1254	--	--	--	
pcb - Aroclor 1260	--	--	--	
pentachlorophenol	**0.36**[a]	0.3	0.0709	
phenol (total)	**0.42**[a]	0.0022	0.0709	
phenanthrene	**1.5**[a]	0.0017	0.0000942	
pyrene	**2.6**[a]	0.0017	0.000121	
trimethylbenzene, 1,2,4-	--	**0.05**	0.004988	PQL used for SL
trimethylbenzene, 1,3,5-	--	**0.05**	0.005125767	PQL used for SL
m,p-Xylene	--	**0.1**	0.013944073	PQL used for SL
o-Xylene	--	**0.05**	0.00623564	PQL used for SL
xylene (dimethylbenzene)	**0.04**[b]	--	--	

Screening Levels for Sediment
Duamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemical	Most Stringent Screening Levels Based on Dry Weight (mg/kg)	Applicable PQL (mg/kg)	Applicable Method Detection Limit (mg/kg)	Comments
Metals				
Arsenic (total)	**0.39**[c]	0.2	0.0196	
Cadmium	**3.7**[c]	0.2	0.0111	
Chromium, total (or III)	**1.6**[c]	0.5	0.0359	
Chromium VI	--	**5**	2.2	PQL used for SL
Copper	**310**[c]	0.2	0.0206	
Lead	**40**[c]	1.0	0.00632	
Mercury	**0.41**[a]	0.05	0.000328	
Nickel	**140**[b]	1	0.05	
Zinc	**410**[a]	0.6	0.115	
Petroleum Hydrocarbons				
LPAH	**5.2**[a]	0.0022	--	
Diesel	--	--	--	
Heavy Oil	--	--	--	

Notes:

Bold indicates selected screening level. In cases where Friedman & Bruya, Inc., the selected analytical laboratory, could not achieve the screening level concentration, the practical quantitation limit was used as the most stringent cleanup level.

[a]Sediment Management Standards/Sediment Quality Standards, WAC 173-340-760.

[b]Sediment Management Standards, Lowest Apparent Effects Threshold, WAC 173-340-760 (1988).

[c]CERCLA 40 CFR 160, Human Health - Lower Duamish Waterway Beach Play & Clam Fishing.

-- = not available/not applicable
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
CLARC = Cleanup Levels and Risk Calculations
mg/kg = milligrams per kilogram
MTCA = Washington State Model Toxics Control Act
PQL = practical quantitation limit

SoundEarth Strategies

Screening Levels for Groundwater
Duamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemical	Most Stringent Screening Levels (micrograms/liter)	Applicable PQL (micrograms/liter)	Applicable Method Detection Limit (micrograms/liter)	Comments
Volatile Organic Compounds/Semi-Volatile Organic Compounds/Polychlorinated Biphenyls				
acenaphthene	**2.614379085**[a]	0.1	0.00571	
acenaphthylene	**10.78431373**[a]	0.1	0.00424	
acetone	**6,000**[b]	10	2.954	
anthracene	**10.78431373**[a]	0.1	0.00988	
benzene	0.795[c]	**1**	0.252	PQL used for SL
benzo[a]anthracene	0.000112155[d]	**0.01**	0.0101	PQL used for SL
benzo[a]pyrene	6.5888E-06[d]	**0.1**	0.0228	PQL used for SL
benzo[b]fluoranthene	5.26914E-05[d]	**0.01**	0.0137	PQL used for SL
benzo(g,h,i)perylene	0.011584454[a]	**0.1**	0.0262	PQL used for SL
benzo[k]fluoranthene	5.51854E-05[d]	**0.01**	0.0104	PQL used for SL
carbon disulfide	**800**[e]	0.2	--	
carbazole	--	**1**	0.546	PQL used for SL
chloroethane	**21,000**[d]	1	0.186	
chloroform (trichloromethane)	**4.3**[d]	1	0.192	
chrysene	0.001120636[d]	**0.01**	0.008	PQL used for SL
dibenz[a,h]anthracene	2.71511E-05[d]	**0.1**	0.0211	PQL used for SL
dibenzofuran	**1.327433628**[a]	0.1	0.454	
dichloroethane, 1,1-	**1**[f]	0.2	--	
dichloroethene, cis-1,2-	**70**[g]	0.2	--	
ethylbenzene	**700**[h]	1	0.182	
fluoranthene	**2.256699577**[a]	0.1	0.0144	
fluorene	**2.03539823**[a]	0.1	0.00393	
indeno[1,2,3-cd]pyrene	2.27382E-05[d]	**0.1**	0.0141	PQL used for SL
isopropylbenzene	**800**[e]	1	--	
methylnaphthalene, 1-	**1.5**[c]	0.1	0.00499	
methylnaphthalene, 2-	**18.18181818**[a]	0.1	0.00499	
naphthalene	**53.80434783**[a]	0.1	0.00458	
nitrobenzene	**16**[e]	1	--	
pcb mixtures	2.30915E-05[d]	**0.1**	0.0447	PQL used for SL
pcb - Aroclor 1016	0.0000641[d]	**0.1**	0.0447	PQL used for SL
pcb - Aroclor 1221	2.30915E-05[d]	**0.1**	0.0447	PQL used for SL
pcb - Aroclor 1232	--	**0.1**	0.0447	PQL used for SL
pcb - Aroclor 1242	2.30915E-05[d]	**0.1**	0.0255	PQL used for SL
pcb - Aroclor 1248	2.30915E-05[d]	**0.1**	0.0255	PQL used for SL
pcb - Aroclor 1254	5.49145E-06[d]	**0.1**	0.0255	PQL used for SL
pcb - Aroclor 1260	2.30915E-05[d]	**0.1**	0.0255	PQL used for SL
pcb - Aroclor 1262	--	**0.1**	0.0255	PQL used for SL
pcb - Aroclor 1268	--	**0.1**	0.0255	PQL used for SL
pentachlorophenol	**0.219**[c]	0.2	--	
phenanthrene	**4.807692308**[a]	0.1	0.0153	
pyrene	**9.8**[d]	0.1	0.0326	
tetrachloroethylene	**0.020523086**[d]	0.2	0.091	
trimethylbenzene, 1,2,4-	--	**0.2**	--	PQL used for SL
trimethylbenzene, 1,3,5-	**45**[d]	0.5	--	
toluene	**1,000**[h]	0.2	--	
xylene (dimethylbenzene)	**1,000**[h]	2	0.357	

Screening Levels for Groundwater
Duamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemical	Most Stringent Screening Levels (micrograms/liter)	Applicable PQL (micrograms/liter)	Applicable Method Detection Limit (micrograms/liter)	Comments
Metals				
Antimony	**3.865979381**[d]	1	0.0349	
Arsenic (total)	0.05[f]	**0.2**	0.0467	PQL used for SL
Beryllium	**4**[i]	1	0.0609	
Cadmium	**0.21**[d]	0.2	0.0201	
Chromium, total (or III)	**50**[h]	0.5	0.0188	
Copper	**7.3**[d]	0.5	0.0142	
Lead	**2.5**[d]	1	0.0288	
Mercury	0.005161594[a]	**0.1**	0.000144	PQL used for SL
Nickel	**8.2**[d]	1	0.0274	
Selenium	**5**[d]	1	0.0977	
Silver	**1.532250723**[j]	1	0.0625	
Thallium	0.47[d]	**1**	0.0138	PQL used for SL
Zinc	**32.56745762**[a]	1	0.0437	
Petroleum Hydrocarbons				
Gasoline	**1,000**[h]	100	--	
Gasoline (w/benzene)	**800**[h]	100	--	
Diesel	**500**[h]	50	10.5	
Heavy Oil	**500**[h]	100	90	

Notes:

Bold indicates selected screening level. In cases where Friedman & Bruya, Inc., the selected analytical laboratory, could not achieve the screening level concentration, the practical quantitation limit was used as the most stringent cleanup level.

[a]Groundwater to Sediment Protection, Washington State Department of Ecology, Sediment Quality Standards, WAC 173-340-720(1)(c).

[b]Groundwater Method A–Human Health, Potable, ARAR, WAC 173-340-720(3)(b)(ii).

[c]Groundwater, Method B–Human Health, Carcinogen/Potable, WAC 173-340-720(4)(b)(iii)(B), CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[d]U.S. Environmental Protection Agency, Resource Conservation and Recovery Act, Lower Duwamish Waterway/Plant 2 Total Maximum Contaminate Load.

[e]Groundwater, Method B–Human Health, Non-Carcinogen/Potable, WAC 173-340-720(4)(b)(iii)(A), CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[f]Groundwater, State Quality Criteria ARAR, WAC 173-340-720(3)(b)(ii) and WAC 173-200-040(3).

[g]Groundwater ARAR, State Primary Maximum Contaminant Level, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[h]Groundwater, Method A–Human Health, Potable, WAC 173-340-720 (3)(b)(i), Table 720-1, November 2007.

[i]Groundwater, State Board of Health, Maximum Contaminant Levels, WAC 173-340-720(3)(b)(ii)C.

[j]Groundwater to Sediment Protection, Washington State Department of Ecology, Cleanup Screening Levels, WAC 173-340-720(1)(c).

-- = not available/not applicable
ARAR = Applicable or Relevant and Appropriate Requirements
CLARC = Cleanup Levels and Risk Calculations
PQL = practical quantitation limit
SL = screening level
WAC = Washington Administrative Code

Screening Levels for Soil
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemical	Most Stringent Screening Levels (mg/kg)	Applicable PQL (mg/kg)	Applicable Method Detection Limit (mg/kg)	Comments
Volatile Organic Compounds/Semi-Volatile Organic Compounds/Polychlorinated Biphenyls				
acetone	**1.731886**[a]	0.02	0.00203	
acenaphthene	**0.016749455**[b]	0.002	0.000074	
acenaphthylene	**0.069091503**[b]	0.002	0.000115	
anthracene	**0.223091503**[b]	0.002	0.0000577	
benzo(g,h,i)perylene	**0.031003321**[b]	0.002	0.0000615	
benzo[a]anthracene	4.78776E-05[a]	**0.002**	0.000089	PQL used for SL
benzo[a]pyrene	5.18596E-06[a]	**0.002**	0.000233	PQL used for SL
benzo[b]fluoranthene	4.23316E-05[a]	**0.002**	0.000101	PQL used for SL
benzo[k]fluoranthene	4.34357E-05[a]	**0.002**	0.000168	PQL used for SL
bis(2-ethylhexyl) phthalate	0.047081657[b]	**0.3**	0.0153	PQL used for SL
butyl benzyl phthalate	0.003954085[a]	**0.03**	0.00836	PQL used for SL
carbon disulfide	**8.000**[c]	--	--	
carbazole	--	**0.06**	0.00925	PQL used for SL
chrysene	0.000264903[a]	**0.002**	0.0000128	PQL used for SL
dibenz[a,h]anthracene	7.1198E-05[a]	**0.002**	0.0000601	PQL used for SL
dibenzofuran	0.015367257[a]	**0.02**	0.0103	PQL used for SL
di-n-butyl phthalate	**0.081356353**[a]	0.02	0.00855	
fluoranthene	**0.160534086**[a]	0.002	0.000184	
fluorene	**0.023563127**[a]	0.002	0.000136	
indeno[1,2,3-cd]pyrene	6.0854E-05[a]	**0.002**	0.0000802	PQL used for SL
Methyl Ethyl Ketone (2-Butanone)	**1.376**[c]	0.01	0.005	
methylnaphthalene, 1-	**35**[d]	0.01	0.000082	
methylnaphthalene, 2-	**0.043212121**[b]	0.01	0.0000703	
naphthalene	0.00047[e]	**0.002**	0.0000738	PQL used for SL
pcb mixtures	6.66052E-07	**0.1**	--	PQL used for SL
pcb - Aroclor 1016	1.75613E-06[a]	**0.1**	0.0122	PQL used for SL
pcb - Aroclor 1221	2.44557E-07[a]	**0.1**	0.0122	PQL used for SL
pcb - Aroclor 1232	0.00012[e]	**0.1**	0.0122	PQL used for SL
pcb - Aroclor 1242	1.39278E-08[a]	**0.1**	0.0122	PQL used for SL
pcb - Aroclor 1248	1.01785E-06[a]	**0.1**	0.0122	PQL used for SL
pcb - Aroclor 1254	4.16425E-07[a]	**0.1**	0.0122	PQL used for SL
pcb - Aroclor 1260	4.77489E-06[a]	**0.1**	0.00552	PQL used for SL
pcb - Aroclor 1262	--	**0.1**	0.00552	PQL used for SL
pcb - Aroclor 1268	--	**0.1**	0.00552	PQL used for SL
phenanthrene	**0.101378205**[b]	0.02	0.0000942	
pentachlorophenol	0.000803[d]	**0.1**	0.0709	PQL used for SL
pyrene	**0.683027333**[a]	0.002	0.000121	
toluene	**0.554666667**[a]	0.001	0.00054	
Metals				
Antimony	0.17507732[a]	**1**	0.013	PQL used for SL
Arsenic (total)	0.000157807[a]	**0.5**	0.0196	PQL used for SL
Beryllium	**3.161146667**[a]	1	0.0111	
Cadmium	0.0014672[a]	**0.2**	0.0111	PQL used for SL
Chromium, total (or III)	**42**[f]	0.5	0.0359	
Chromium (VI)	0.00083	**0.1**	--	PQL used for SL
Copper	0.053488[g]	**0.2**	0.0206	PQL used for SL
Lead	**5.4001548**[a]	0.5	0.00632	
Mercury	0.000269883[a]	**0.05**	0.000328	PQL used for SL
Nickel	0.326433333[h]	**0.5**	0.05	PQL used for SL
Selenium	0.026433333[a]	**1**	0.0177	PQL used for SL
Silver	0.013156926[a]	**0.5**	0.00904	PQL used for SL
Thallium	0.033504733[a]	**1**	0.00692	PQL used for SL
Zinc	**2.028518377**[a]	1	0.115	

Screening Levels for Soil
Duwamish Marine Center
6365 First Avenue South
Seattle, Washington

Chemical	Most Stringent Screening Levels (mg/kg)	Applicable PQL (mg/kg)	Applicable Method Detection Limit (mg/kg)	Comments
Petroleum Hydrocarbons				
Gasoline	**100**[i]	--	--	
Gasoline (w/benzene)	**30**[i]	--	--	
Diesel	**200**[f]	10	1.28	
Heavy Oil	**2,000**[i]	25	3.19	

Notes:

Bold indicates selected screening level. In cases where Friedman & Bruya, Inc., the selected analytical laboratory, could not achieve the screening level concentration, the practical quantitation limit was used as the most stringent cleanup level.

[a]Screening level obtained from Ecology worksheet titled "Most Stringent Levels W-O PSW," as requested in Comment #2(b) in Ecology letter dated March 6, 2012.

[b]Washington State Department of Ecology, Sediment Quality Standard, Soil to Sediment Protection, WAC 173-340-740(1)(d), Equation 747-1/747-2 Saturated Soil.

[c]Soil, Method B, Human Health, Groundwater Protection, Non-Carcinogenic, WAC 173-340-740(3)(b)(iii)(A), Equation 747-1/747-2 Saturated Soil, CLARC
Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[d]Soil, Method B, Human Health, Groundwater Protection, Carcinogenic, 40-740(3)(b)(iii)(A), Equation 747-1/747-2 Saturated Soil, CLARC
Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[e]CERCLA/U.S. Environmental Protection Agency Regional Screening Level (May 2010), Potable Groundwater Protection, Risk Based, Saturated Soil.

[f]Soil, Method B, Terrestrial, WAC 173-340-740(3)(b)(ii), WAC 173-340-7493, Table 749-3, Soil Biota (Site-Specific Terrestrial Ecological Evaluation).

[g]Soil to Surface Water Protection, Aquatic Life, Marine/Chronic, National Toxics Rule– 40 CFR 131.36, Saturated Soil.

[h]Soil to Surface Water Protection, Aquatic Life, Fresh/Chronic, National Toxics Rule– 40 CFR 131.36, Saturated Soil.

[i]MTCA Cleanup Regulation, Chapter 173-340-900 of WAC, Table 740-1 Method A Soil Cleanup Levels for Unrestricted Land Uses.

-- = not available/not applicable
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
CLARC = Cleanup Levels and Risk Calculations
Ecology=Washington State Department of Ecology
mg/kg = milligrams per kilogram
MTCA = Washington State Model Toxics Control Act
PQL = practical quantitation limit
SL = screening level
WAC = Washington Administrative Code

APPENDIX E
FARALLON INTERIM REMEDIAL ACTION

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Quality Service for Environmental Solutions

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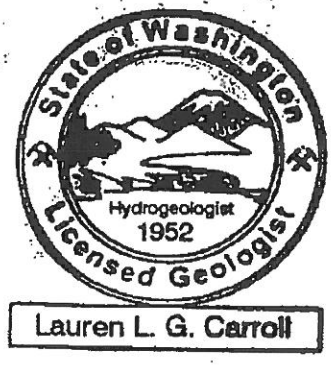
SITE CLOSURE REPORT

GILMUR/HALE FAMILY TRUST SITE
6365 FIRST AVENUE SOUTH
SEATTLE, WASHINGTON

Submitted by:
Farallon Consulting, L.L.C.
320 3rd Avenue NE, Suite 200
Issaquah, Washington 98027

Farallon PN: 781-001

For:
Mr. Jim Gilmur
16 South Michigan Street
Seattle, Washington 98108



September 25, 2002

Prepared by:

Lauren Carroll
Senior Hydrogeologist

Reviewed by:

Peter Jewett
Principal

5.0 INTERIM ACTION

An interim action was conducted at the Site between May 13 and 17, 2002, to excavate and dispose of soil in the vicinity of test pit TP-3(R) that contained leachable lead concentrations above the TCLP dangerous waste criteria of 5 mg/l (Chapter 173-303-090 WAC). The area of TCLP-lead exceedance in the vicinity of test pit TP-3(R) was indicated by the analytical results for sample TP-3(R)-5.5, which was collected by The Riley Group (2000; see Table 2). Test pit TP-3(R) is located on the northwest portion of Lot 16 in Block 34, which is in the general vicinity of the former junk dealer area of the Site, and therefore, the TCLP-lead concentrations detected are suspected to be related to the former activities in these areas (Figure 2).

Prior to conducting the excavation, Farallon estimated that the quantity of soil to be excavated and removed from the Site to remediate the TCLP-lead contamination was less than 50 cubic yards. Therefore, neither a fill and grading permit, or a State Environmental Policy Act (SEPA) checklist were required to be completed prior to conducting the excavation activities.

The excavation was conducted using a trackhoe operated by a Duwamish Marine Center employee under the direction of Farallon. Soil samples were collected at select locations within the excavation using the trackhoe bucket to expose fresh surfaces on the excavation sidewalls and bottom. Farallon personnel collected the confirmation soil samples directly from the trackhoe bucket using a stainless-steel sampling trowel, and transferred the samples directly into laboratory-prepared sample containers. The labeled sample jars were completely filled, sealed with Teflon-lined screw caps, and placed in a field cooler on ice pending delivery to the analytical laboratory. Standard chain-of-custody procedures were followed during the excavation field program. The confirmation soil samples were submitted to OnSite for analysis of TCLP-lead by EPA Method 1311/6010B, and for total lead by EPA Method 6010 B on a 48-hour turnaround time.

A chronological description of the excavation activities conducted in the vicinity of Test Pit TP-3(R) is as follows:

- On May 13, 2002, an area approximately 7 feet wide by 11 feet long by 8.5 feet deep was excavated. Approximately 30 cubic yards of material were loaded directly into a shipping container for temporary storage pending off-site disposal. Confirmation soil samples were collected from each of the excavation sidewalls at depths of between approximately 3 to 4 feet bgs (samples EX1-WSW-4.0, EX1-NSW-4.0, EX1-ESW-4.0, and EX1-SSW-3-4.0), and from the excavation bottom at a depth of approximately 8.5 to 10 feet bgs (sample EX1-8.5-10.0) (see Table 9). A diagram of the excavation, illustrating the approximate sample locations and excavation outline on May 13, 2002, is provided as Figure 11. The analytical results for the confirmation soil samples collected on May 13, 2002, indicate that TCLP-lead concentrations obtained from the east sidewall (sample EX1-ESW-4.0) and bottom (sample EX1-8.5-10.0) contained TCLP-lead concentrations above 5 milligrams per liter (mg/l); therefore, additional excavation was necessary to complete the cleanup at these locations. The analytical results for the remaining confirmation soil samples obtained from the excavation sidewall were below 5 mg/l (see Table 9).

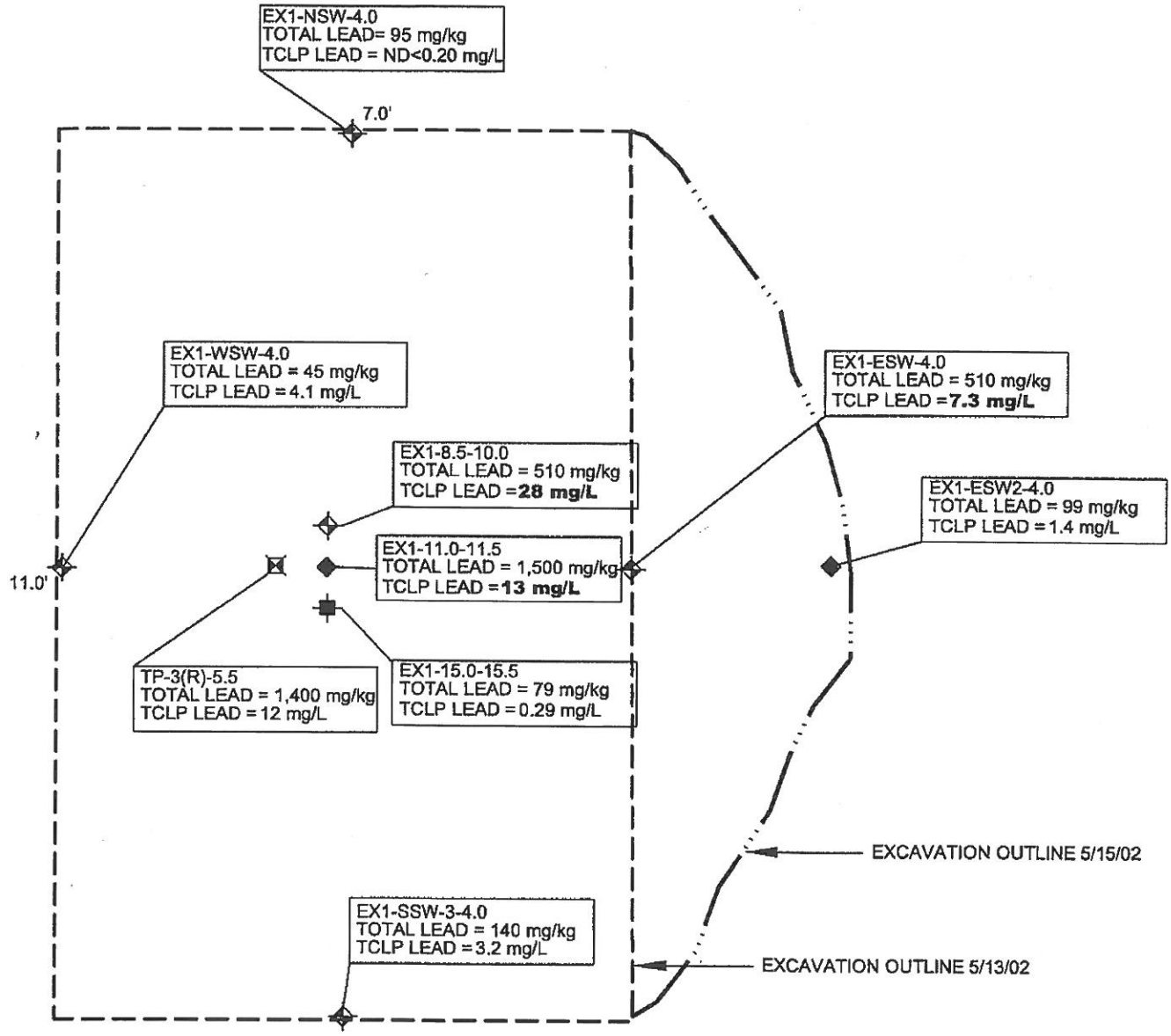
- On May 15, 2002, additional excavation was conducted in the open excavation to extend the excavation bottom by an average of approximately 2 feet, and extend the eastern excavation sidewall by approximately 3 feet. A confirmation soil sample (EX1-ESW2-4.0) was collected from the east sidewall and from the bottom (sample EX1-11.0-11.5) (Figure 11). Approximately 12 cubic yards of excavated material were placed on plastic sheeting and covered at a location adjacent to the shipping container full of the material excavated on May 13, 2002. The analytical results for the confirmation soil samples collected on May 15, 2002, indicate that TCLP-lead concentration in the confirmation soil sample obtained from the excavation bottom (sample EX1-11.0-11.5) was above 5 mg/l; therefore, additional excavation was warranted at the excavation bottom. The analytical result for the confirmation soil sample obtained from the eastern excavation sidewall (EX1-ESW2-4.0) was below 5 mg/l.
- On May 17, 2002, additional excavation was conducted in the open excavation to extend the excavation bottom by an average depth of approximately 2 feet. Large woody debris (timber) was encountered from approximately 13.0 to 15.0 feet bgs. The excavator bucket was used to break through the woody debris to allow collection of a confirmation soil sample from directly below the woody debris (sample EX1-15.0-15.5). Approximately 6 cubic yards of excavated material were temporarily placed on plastic sheeting with the material stockpiled on May 15, 2002, and covered with plastic sheeting. The analytical result for the confirmation soil sample collected from the excavation bottom (sample EX1-15.0-15.5) on May 17, 2002, had a detected TCLP-lead concentration below 5 mg/l. Therefore, no additional excavation was warranted.

A vertical profile of the material encountered in the TP-3(R) excavation is presented as follows:

0-2 feet	Sandy Gravel with minor cobbles, light gray to light brown, with a slight hydrocarbon odor, slightly moist.
2-3.5 feet	Gravelly Sand (fine), dark gray to black with non-continuous debris layer consisting of metal (machine shavings), rubber and wood.
3.5-5 feet	Silt, blue gray, moist
5-6 feet	Solid debris, trash, rubber, plastic, metal, wood pieces (some treated), creosote odor.
6-13 feet	Debris consisting of wood scraps, wood lathe strips, timber, and plastic mixed with gravelly sand, dark gray, hydrocarbon odor. Saturation at approximately 12 feet bgs.
13-15 feet	Debris, woody consisting of large logs.
15-15.5 feet	Sand, fine to medium, gray overlying silt layer.

Three discrete soil samples were collected from the materials excavated and temporarily stockpiled on Site (samples SP-1 through SP-3) were submitted to OnSite for analysis for total lead by EPA Method 6010B. Based on the total lead concentration in sample SP-3, the sample was also analyzed for TCLP-lead by EPA Method 1311/6010B. The TCLP analysis of SP-3 was above 5 mg/l; therefore, all of the material excavated from the TP-3 excavation area was profiled as a hazardous waste. On June 12, 2002, approximately 50 cubic yards of soil from the

excavation were transported off site to Chemical Waste Management of the Northwest in Arlington, Oregon, for stabilization treatment and disposal. The waste profile, soil disposal manifest, and disposal permit are provided as Appendix D.



LEGEND

TP-3(R)-5.5' SAMPLE OBTAINED BY THE RILEY GROUP (7/17/00)

EX-1-8.5'-10' SAMPLE OBTAINED BY FARALLON (5/13/02)

EX1-11.0'-11.5' SAMPLE OBTAINED BY FARALLON (5/13/02)

EX1-15.0'-15.5' SAMPLE OBTAINED BY FARALLON (5/13/02)

NOTE: TCLP LEAD = TOXICITY CHARACTERISTIC LEACHING PROCEDURE LEAD
ND< = NOT DETECTED ABOVE LABORATORY PRACTICAL QUANTITATION LIMIT (PQL)
(mg/L) = MILLIGRAMS PER LITER
(mg/kg) = MILLIGRAMS PER KILOGRAM

BOLD DENOTE CONCENTRATIONS ABOVE TCLP LEAD CLEANUP CRITERIA OF 5.0 mg/L

0 2 4

APPROXIMATE SCALE IN FEET

N

FARALLON CONSULTING
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Issaquah, WA 98027

FIGURE 11

TEST PIT TP-3 AREA SOIL EXCAVATION FOR TCLP LEAD
GILMUR/HALE FAMILY TRUST
6365 FIRST AVE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 781-001

Drawn By: DEW	Checked By: PJ	Date: 7/17/02	Disk Reference: 781-001